SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION

INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION

IBRAHIM AGAMY

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GUTACHTER: 1.PROF. DR. Hartmut Giest (Universität Potsdam)
2. PROF. DR. Thomas Köhler (Technische Universität Dresden)

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Abbreviation

HTML	Hyper Text Markup Language
ICT	Information and Communication Technology
IP	Internet Protocol
IT	Information technology
VET	Vocational Education and Training
WBT	Web Based Training
WBL	Web Based Learning
WWW	World Wide Web
SNS	Social Networking Software
CCS	Classroom community Scale
TLI	Teacher-learner interaction
VET	Vocational Education and Training
IVET	Initial vocational education and training
CVET	Continuing vocational education and training
PBL	Problem-based learning
LLL	Lifelong learning
OER	Open Educational Resources
LMS	Learning Management System
CSCL	Computer supported collaborative learning
LSDA	Learning and Skills Development Agency
CMC	Computer Mediated Communication
CSCW	Computer Supported Cooperative Work
CAL	Computer Assisted Learning
ZPD	Zone of Proximal Development
CBT	Computer Based Training
ODL	Open and Distance Learning
LMS	learning management systems
LLL	Lifelong Learning
CMSS	Computer-Mediated Social Support

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1. Introduction

In the last decades there were some frequented names described our modern society refer to the changes that have been happened through this society, and those most reflected upon 'information' or 'knowledge society', referring to the ways in which new digital media have brought about new shapes for society (Rosvek, 2011, p. 98) by considering media as means of social communication that dependent on cultural context (Giest, 2010, p. 368). Through such changes, deep transformations have occurred in our society. These changes can be characterized by the rapid development of (ICTs) which considered one of the key technological developments of the last three decades. The need to acquire new digital competencies and ICT skills occurs as a natural development of living in a knowledge-based society driven by the wide range of increasingly multiplying ICT tools (Coutinho, 2007, p. 1). In order to utilize these changes in this new society, we should change our vision to conform to the changes which are taking place on a daily basis. The wide use of ICT applications in all fields has significantly affected the field of education (Cort & Volmari, 2004, p. 13). They brought quick and deep changes, which have had a strong influence on teaching and learning situations (Cornu, 2011, p. 11), where information is accessible by modern and digital media devices and tools within these informational and communicational systems. The question that arises herein, is whether the integration of these technologies, e.g. ICTs in educational institutions, can face these requirements of a knowledge society? And can this change the practices, or we should immerse these technologies to create a new learning culture?

Education becomes a part of the process of globalization and the growing economic resource base that is affected by the intercultural diversity in this knowledge society (Aceleau et al., 2010, p. 945). It creates some of the most essential features in any society. This is due in large part to the presence of diverse relations between individuals and society in educational institutions, such that individuals can learn to participate and contribute as a member of society with other human beings; to share, edit, build, modify or otherwise conduct different elements of society. Through these processes they try to counterbalance what they learn in educational settings and others' contributions, in order to be able to coexistent with other individuals (Aceleau et al., 2010, p. 946).

In our modern society, there is a rapid growth in attention to education from the perspective of its roles and functions. Experience has proved that requirements of the future are clearer and achieved more quickly in areas involving highly educated people with a high level of training, assuming that the possibilities for carrying out these requirements are

available and can be achieved faster than in other areas (Aceleau et al., 2010, p. 945). In addition, when new technologies are integrated into schools and other educational institutions, they can provide new and powerful opportunities for evolving and enriching pedagogy (Cornu, 2011, p. 16). Technology in our knowledge society is available and suitable for new forms of learning, but simply bringing a new tool to educational institutions does not automatically change practices; it is the basic principles of good practice in pedagogy that make learning occur (Gutierrez, 2000), thus the greatest importance must be placed on pedagogy. Media pedagogues believe that the process of supporting learners with ICTs and their applications does not guarantee the creation of a new learning culture, but rather as a result of the digital revolution, new learning needs required pedagogical framework using new media as powerful learning tools (Vovides et al., 2007) where most of the e-learning projects in different European countries report that the use of ICT is the main prerequisite of the new learning culture (LLinE XIV, 2009).

With regards to such increasing and continuous development, the educators in knowledge society are challenged with the question of how e-learning can be exploited as an enrichment of learning, to serve future teachers. Due to ICT-based digital media, ICT tools have ample opportunities to support the learning process when they are adopted in contemporary classrooms: "The teacher must play a central and curial management role regarding ICT in schools" (OECD, 2001, p. 74). There are a lot of interventions surround the e-learning concept, largely because: (a) different people have different interpretations of the term e-learning; (b) most educators do not have in mind a clear vision about what kind of support they should provide; and (c) educators do not have consensus over the belief that e-learning and online learning should be engaged in future teachers' education at all (Hrusecky & Kalas, 2011, p. 90; Laurillard et al., 2007). Research in this area must address and essential questions of how ICT can help enriching pedagogy, how it can change pedagogy, and how pedagogy can really use all of the benefits from new technologies (Cornu, 2011, p. 15). Both in face-to-face classroom situations and in online instruction environments, teachers have been seeking ways to implement more effective education for their students.

Schools and other educational institutions have been and still paying attention to the tools or technologies, as if this will alone be sufficient, and therefore the gap between technology and pedagogy has been increased. Schools fit new technologies into their existing systems, supporting their traditional courses with some new technological tools. This is far from renewing and adjusting the courses to serve the new pedagogical issues, such as determining the relationship between the teacher and the learner as information and

communication technologies (ICTs) are more and more integrated into education (Cornu, 2011, p. 15). The application of ICT support learning with great potential; ICT and in particular the tools and features offered by web 2.0 specially networking social software do not automatically lead to a new learning culture (Giest, 2010. P. 372). Therefore, we need a new learning culture and emerging self-directed learning situations in our educational institutions in order to address the rapid change in this society.

The ease with ICT can be accessed has inspired teachers all over the world to utilize them in teaching and learning situations, thereby giving both teachers and learners new roles in our knowledge society. Teachers can build the course environment and prepare the content, resources and learning activities, but the learner may do not like or prefer them, partly because they now have more things to do than in the traditional set-up. This is a major problem in higher education. The expectations of online courses presented by universities to learners have not yielded what they hoped to achieve. Therefore, the emergence of new and innovative methods - of tools supported by a new pedagogic approach – will enable a lot of learning problems to be solved. Schools as well as teachers are challenged with these fundamental developments stemming from the knowledge society, and whatever the schools do or do not do, the new learners or 'digital natives' will bring this new context into their day life activities.

The concepts of teacher acting as a facilitator, controlling pace and providing clear feedback are the core elements of the ten principles of effective web design in education (Janick & Liegle 2001). These components may benefit how to design web-based learning environments to support learning efficiency, increasing the interactivity of learning environments, including: using a variety of presentation styles, providing multiple exercises, hands-on problems, frequent testing, clear navigation, available help screens and consistent layout. The roles of both of teacher and learners are increasingly varied. Computer mediated instructional environments impact teachers' role, and shift it towards acting more as a facilitator rather than the owner of knowledge. Teachers with a social role became more a facilitator of knowledge as well as a learning designer of activities and environments (Lund & Smørdal, 2006); the role changes from knowledge transferor to learner (the "sage on the stage"), to being a facilitator in the learners' knowledge construction (the "guide on the side") (Pereira et al., 2007). Teachers' role can guide the learners learning, adjust the stage and prepare contextualized activities, as well as plan the learning structure and materials. The most important level of work will begin when learners can construct their knowledge and meaning over the process (Lamb, 2004). This idea emphasizes that the interaction between

teacher and learner in present day learning situations foster these situations and impact the learners' performance and learning outcome.

Although learning occurs through the collaboration among learners, it basically considered an individual action. Knowledge is culture-based exists first between learners and then in an individual learner (Vygotskij, 1978) and learning needs social-cultural scaffolds. The main perspective of constructivism is that learning is an active process, and therefore the emphasis should be on learner-centered activity rather than teacher-centered (Dalgarno, 2001, p. 184). Constructivism emphasizes the setting of learning environment which will encourage learners to construct knowledge by themselves via participating in the learning process. Individuals who came from different cultures and prior knowledge can work together in groups in order to acquire a general goal. They can exchange their prior knowledge with the others to construct their meaning and knowledge. In the recent perspective of constructivism there is an approach pays more attention to the construction of knowledge through the collaborative activities that occur among learners and between the learners and their peers and teachers (p. 185). Collaborative knowledge sharing and construction, supports learners to develop meaningful knowledge by facilitating knowledge construction process through "co-construction" with peers and through reflection of their text-based contributions. Formulating activities under this condition of knowledge and meaning construction, required a shift in the learning practice towards the authenticated and contextualized situations, also a shift to the meaningful activities and deeply thinking about the most suitable way to exchange, data delivery of learning materials through the new technology (Kenny & McNaught, 2000; Fuchs-Kittowski & Kohler, 2002). Fitting with this, learners should be engaged in authentic and meaningful activities so that the active learning environment provides realistic problems that are relevant to learners' needs and experiences (Vonderwell & Turner, 2005), which allow them to create personalized meaning through this context (Ally, 2004). More recent perspective of learning draws on the theory of constructivism, especially social constructivism, and explains learning as an interactive process in social contexts.

There are indications that self-directed learning (SDL) is a desirable aspect for online learners (Shapley, 2000). SDL implies that learners play an active role in planning, monitoring and evaluating their learning process (Ertmer & Newby, 1996). Through self-planning strategy, the learner has the opportunity to decide the time of participating the learning environment and anywhere, the way that most suitable from his/her point of view to contribute the learning situation, the topic he/she wants to participate in such time adjusting his/her own plans to make changes according to his/her own priorities. Monitoring process

implies that the learner have the ability to recognize the task as a whole from the beginning till the end and have the awareness of what he/she is doing and anticipates what he/she will do in the next step through self- monitoring process (Dolmans et al., 2005, p. 732). The learner can implement the plans that has been determined while self-planning strategy and re-plan them according the new aspects of learning situation (the interventions of teacher and other learners). After finishing the task or even while taking part through it, evaluation process takes place of both the process and the product of the learning process to judge the learners' learning and the effectiveness of the learning process. The learner has the ability to monitor his own performance and the opportunity to ask help when needed (Vonderwell & Turner, 2005).Self-regulation involves not only cognitive self-regulation but also motivational self-regulation to promote and sustain self-regulated learning, and both cognitive and motivational self-regulations are mixed aspects of self-regulated learning (Pintrich, 1999). Finally, the nature of the tasks also influences the learning context and thus learners' learning.

As stated above, bringing the technology tools into educational institutions alone will not solve the problem. New learning situations have emerged coupled with the rapid use of new digital technologies. Educators should pay attention not only to include the new technologies in their classrooms, but also to think about the most pedagogical aspects that can promote the learning outcome through the use of these tools. They should consider how to design the teaching situation, how to determine the relation and the role of both teachers and learners, etc. These aspects can change the practice and contribute towards creating the new learning culture. Considering the new knowledge society and the rapid use of web 2.0 technologies, especially social networking software such as Facebook, MySpace, Wiki, etc., educators should seek out the most suitable tool with the appropriate pedagogical setup to be including in teaching and learning situations, as such social networking software provide ample opportunities to enrich learning situations.

It recently scored an increasing use through using networking social software such as Facebook, Twitter and Wiki as collaborative writing-based tools that support the users' ease of accessibility to any internet resources; another one of these tools is Flickr, which stores over 100 million shared images produced by over four million users all over the world. In addition to this is the increasing use of blogs. There are currently over 70 million blogs in existence, and on average of 100,000 blogs are created every year. These technologies are being adopted by "digital natives", who are the new users of these technologies. According to a recent workshop at Penn State, 80% of learners carry laptops, 85% watch online videos though YouTube or Google videos, 75% use MP3 players, and 82% use text messaging. In

addition, more than 33% of all college learners have blogs; post on ‘MySpace’; 67% of teenagers play interactive games online, and 20% have avatars in virtual reality sites (Moore, 2007).

Recently, attention has been focused on the social interaction settings using web-based environments, such as those mentioned above; these tools have become the essence of many adults’ daily lives. Moreover, adult learners consider online learning as the means to accomplish the growing need for acquiring knowledge and skills. These technologies reinforce the social interaction between two nodes in a way that does not require synchronization. Educational institutions have also begun to embrace this trend with most educational institutions now utilizing such to foster interactive learning situations. The most important advantages of web-based courses to learners is the ability for learners (individually or in groups) to actively participate in the learning process by sharing the new knowledge using their prior experience and using it to construct new concepts and cognitive structure (Massa et al. 2005; Hitlz & Goldman, 2005).

Social networking technologies provide learning with ideas and principles about learning that have important meanings for the construction of technology-supported learning environments. The facility of using social networking technologies in teaching and learning situations encourages learners to acquire the competence of using new technologies in which teachers can use them as a base to design their teaching and learning situations. Social networking technologies facilitate learning by providing ample avenues for learning, including tools that facilitate distance and self-learning (Maureen, 2000)**.** Additionally, they offer ideas and principles about learning that have important meanings for the construction of technology-supported learning environments. These technologies allow learners to work in groups and share ideas, edit, delete, or modify academic content. Learners also have the ability to interact with their peers through powerful features such as posting comments, responding to existing comments, sending e-mail alerts, RSS notifications, search boxes, synchronous and asynchronous tools, chatting sessions, and so forth.

This leads us to ask how to foster self-directed learning in learning-teaching settings using social networking software ensuring better learning outcome? This question can be answered thusly:

Slavin et al. (2003) reported that the effectiveness of learning in small groups has three major components. The first is the cognitive perspective, which values learning through the interaction among learners and between learners and teacher, and through stimulating learners to explain ideas in their own words and ask critical questions regarding the tasks.

Learners who work in small groups have the ability to summarize the task, ask deep questions, clarify ambiguous parts and correct misconceptions, all of which are cognitive activities that allow the development of shared cognition (Visschers-Pleijers et al., 2006; Yew & Schmidt, 2009; Van den Bossche et al., 2006). The second perspective is the collaborative perspective. This refers to the extent to which cohesiveness within a group has a positive influence on the group's and individuals' achievement. In order to make collaborative learning successful, learners should work together in teams. They should be independent, but share common goals, and each should know his role in the group, with all the roles being integrated to accomplish the main goal (Van der Linden et al., 2000). The last perspective is the motivational perspective. Motivation is essential factor in the learning, since highly motivated learners achieve much better success in learning situations (Slavin et al. 2003). Situational interest is somewhat related to motivation, and academic achievement is positively affected by learners' situational interest (Hidi & Renninger, 2006).

One of the most common social software is wiki. Wikis are powerful collaborative learning tools; however, they include many features to facilitate multi-author interactions. They allow participants to use activities and make contributions, supporting collaborative learning with a lot of opportunities such as comments, edits, and notifications by e-mails or RSS, which help monitor learners' participations and contributions (Judd et al., 2010). There is a rapid growth in the educational uses of wikis and the absence of real reinforcements and insufficient group support (e.g. teacher scaffolds) are often considered challenges to using wiki in an effective educational manner (Grant, 2009; Bruns & Humphreys, 2007; Robertson, 2008; Neumann & Hood, 2009).

The most challenges encounter emerging wiki in educational institutions rounded the idea of distance. These challenges are as follows: first learners did not interfere with other learners' work. Secondly, learners do not want other people to add to or change their work. The third, they do not be sure to publish their work into a public domain; and did not want their work to be subject to evaluate, scrutiny and judgment, thus may lead to frustration and enrich the feeling of isolation by learners who engaged through social networking software such as wiki (Bruns & Humphreys, 2005). Once online learners' sense falls in isolation or they did not get sufficient attention, they may become unengaged from their learning situation. Depth investigation suggests that these frustrations are caused under the condition of poor online teacher-learners' online interaction (Thurmond et al., 2002). Collaborative learning through wiki may face some problems, as reported by Blank et al. (2005). First, learners can fear feeling as though they are interfering with other peers' work and so often

avoid modifying, editing and commenting on their colleagues' work. Secondly, learners similarly do not want other peers to add to or change their own work. A third problem is that, even aside from the issue of active interference, learners can avoid publishing their work into a public domain out of not wanting it to be subject to evaluation, scrutiny and judgment by others. These issues may lead to frustration and may cause learners to disengage from the learning situation even though they are already a part of the learning community (Bruns & Humphreys, 2005). Some other challenges and opportunities in using wiki in educational settings have been discussed by Schroeder (2009), who stated "All professors reported that initially students were uncomfortable with the unstructured, open nature of the wiki and editing other students' work. Faculty members felt that students' limited experience with self-directed work in an online setting required more specific directions from the instructor … for all professors, it was difficult and sometimes impossible to get students to critique and make changes to other students' work, even when they knew that these changes could be reverted, using the revision feature of the wiki" (pp. 187-188). It may therefore be necessary to make sure enough time is provided for learners to adapt to this initial discomfort, modeling behaviours and solutions to unstructured problems and solutions. It is necessary to support learning with wiki, it must be co-operative but it will not establish without teacher support. Teachers often used wikis to support learners' learning, through managing their activities, determining learning goals and group work collaboration such as collaborative writing assignments, glossaries, manuals, textbooks, discussion and review, projects, reflection, presentations, formal and informal assessment and all other resources and activities of an academic content (Ben-Zvi, 2007; O'Shea et al., 2007; Zeinstejer, 2008).

This is the most frequented challenge to using wiki, where teachers need to provide more social interaction with their learners, and assist with and scaffold productive interactions among learners to support their processes of exploration and learning (Lund & Smordal, 2006). Judd et al. (2010) argue that wiki, with additional educational and pedagogical support, provides learners with ample opportunities in supporting online collaboration, since they can use wiki to share, edit, delete, draft or redraft academic content without any prior experience in writing web pages. By facilitating the expansion of knowledge construction through the interactions of peers, wiki provides a powerful tool to support the process of knowledge construction.

Multiple studies have advocated techniques to enhance interactions between learner and content, learner and the teacher, learner and the other learners. All of them are critical for successful learning outcomes in web-based courses and is considered a key element in active

learning. The majority of the findings from these researches reported that the best level of interaction usually occurs between the teacher and the learner (Stocks & Freddoline, 2000). The researches' findings demonstrate that teacher–learner interactions promote and improve learning and are important factors in academic achievement, personal development and learners' satisfaction (Barkley et al., 2005). Learners with access to highly valued interaction with the teacher scored higher achievements (Rhode, 2009). Similarly, learners expressed greater satisfaction following a course with high levels of all three levels of interactions (Anderson, 2003). The researches findings in this approach also reported high relation between the average numbers of responses made by the teacher and the interaction between him/her and his/her learners (Jiang & Ting 2000). Learners preferred learning from the teacher rather than through the internet, they enjoyed their interaction more and paid more attention to their teacher and their peers (Faux & Black-Hughes, 2000; Aase, 2000). In a face-to-face setting they can develop a relationship with and feel more connected to, the teacher (Ehrlich, 2002)

On the other hand, some researchers have found that the quality of teacher–learner interactions in online courses were the same or better than those in face-to-face settings (Lenhart et al., 2001a).

The interaction through learning situations in both face-to-face learning settings and web-based learning, or even through mixed situations, promote the product of learning and improve the quality of this learning. This interaction has its potential features and types. Most researchers reported some of these types which can be categorized into four main interaction types: learner-content interaction, learner-interface interaction, learner-learner interaction and finally the interaction between educational institutions administrators and educators from one side and the learners from the other side is an important aspect of these interactions. Each one of these learning interactions has its potential advantages that promote the learning quality.

There is no clear agreement in the literature reviews with respect to the degree to which social networking software, especially wikis, support self-directed learning ensuring better learning outcome. In the study by Rhode (2009), the results indicated that all of the learners valued interaction with the teacher most highly. Similarity, Anderson (2003) found that learners felt a course with high levels of all three interactions (learner-learner, learner-content and teacher-learner) would be likely to be more satisfactory. In their study Jiang and Ting (2000) reported strong correlations between teacher–learner interactions and the average numbers of responses made by the teacher concerning the learners responses (the responses of the teacher of each learner) and the average numbers made by the learners themselves through

the coursework. The results of Faux and Black-Hughes' (2000) study indicated that learners preferred learning from the teacher rather than through the internet. Similarity reported by Aase (2000) where the learners enjoyed their interaction more and paid more attention to their teacher and their peers in an online course. Ehrlich (2002) reported that learners stated that they could more easily develop a relationship with, and felt more connected to a teacher, because they felt free to approach the teacher and could use non-verbal cues to assess the relationship. On the other hand, some researchers have found that the quality of teacher–learner interactions in online courses were the same or better than those in face-to-face settings (Lenhart, Lytle, & Cross, 2001).

In the study of Elyahya (2009) using social networking wiki, the results reported that wiki can support group work and interaction by facilitating collaborative work. Learners, who actively participated in course discussions, were provided with the ability to access their teacher anytime and anywhere (Thurmond et al., 2002). Engstrom and Jewett (2005) reported that the learners accomplished high scores in posting information, but there was low level of sharing information or exchanging ideas. Judd et al. (2010) argue that wiki allow users to share, edit, delete, draft or redraft an academic content, and facilitate knowledge construction among peers' interactions without any prior experience in writing web pages.

As stated above there are a lot of studies that dealt with points raised by new media and the application of ICTs in the knowledge society, as well as studies on collaborative learning, learning interaction and particularly on teacher-learner interaction. All of these studies reported important aspects. There is however, a certain scarcity with respect to the main aim of this research, concerning the influence of teacher-learner interaction level in social networking software, particularly with ICT media like wiki, and the influence of this kind of interaction on learners' performance and satisfaction and whether this online interactive learning improves the learners' final product.

There are some important observations regarding the previous studies which are summarized in the next key points:

The majority of studies were carried out in recent years (between 2004 & 2012) and most of them adopted the quantitative approach for the experimental design, as some of them mixed between the quantitative and qualitative methods. Through these studies, several statistical treatments have been used and the most frequented tools were Cronbach alpha, measuring the reliability, t-test, Kai-square, analysis of covariance ANCOVA. There was a differentiation in the sample group in the study of Coutinho & Junior, 2007 study, which included 16 students, to Rayn's study in 2007 of 400 students. Two studies measured the influence of collaborative

learning in web-based learning; one study found that there are significant differences at the level of (0.05), this study used the collaborative learning based-blog blended with traditional learning in the classroom (Kosiak, 2004). The other study found that there is no influence of the collaborative learning on the learners' achievement as stated in the study of Vise (2007), which used collaborative learning based-blogs and wiki.

Building on the literature and the previous studies, several aspects have been acquired by the researcher such as:

Utilizing from the future researches recommendations included in the current study procedures, to be aware of the importance of the teacher's role in motivating learners in collaborative learning environments (e.g. Coutinho & Junior, 2007 and Ebner et al., 2008); the importance of social networking software, particularly wiki in promoting the learning outcome (e.g. Elyahya, 2009; Ryan, 2007; Schroeder, 2009 & Coyle, 2007); identifying the learning interaction types and establish a deeper understanding of the teacher-learner interaction and determine the main aspects of this interaction (e.g. Stocks & Freddoline, 2000; Rhode, 2009; Anderson, 2003); and finally the barriers that may arise in order to avoid them. Additionally, identifying how to use the web 2.0 tools in educational institutions, identifying collaborative learning strategies based on online environments. Identifying the content analysis approaches to analyze the teacher-learner interaction, the way and unit of analysis for each approach of coding the content, and the obstacles confronting the use of each approach to avoid them when applying the content analysis method. Use of the web 2.0 technologies, especially social networking software which have been used in the previous studies, such as Wiki space and PB Wiki. Paying attention to the results as described in the previous studies through adopting their recommendations. Students will not directly engage themselves in collaborative learning situations and the interaction among learners and between them and the teacher will not score a high degree of interaction. Some studies have indicated that the level of interaction was low. Recognize the importance of the role of group leader in collaborative learning environments on the group' members as reported by Chou (2002), therefore group leaders received precise instructions from the teacher and their performance has been followed up to be sure that they apply their duties and tasks accurately.

In higher education not nearly enough attention is paid to professional development in teaching and learning to meet quality standards (Laurillard, 2011, p. 64). The findings of the studies that dealt with the interaction between teacher and learner are very important, but really they are not enough for answering the question of how to find additional forms of teacher-learner interaction with higher level features. The central question of this research will

therefore be to ask how to foster self-directed learning in collaborative learning-teaching settings using social networking software Wiki.

All the above leads us to report that e-learning has encountered a lot of challenges and is hardly immersed in traditional educational settings. Regarding the rapid change in this society, a new learning culture can also hardly be developed through this kind of traditional settings. New digital media far away educational activities enriched with pedagogy do not lead to a new learning culture. A new learning culture must correspond to the requirements of the knowledge society and has to be acquired in adequate pedagogical settings. Therefore we have to look for adequate settings of learning and instruction and for adequate approaches to emerge, utilize and investigate the potential advantages of using e-learning through new approaches of educational settings (Giest, 2010, pp. 373, 369). This study will be underpinned by the results of literature, and is an attempt to investigate the influence of using different levels of interaction in social networking software technologies on the learners' achievement and satisfaction, through learning the basic skills of a learning management system. E-learning using powerful tool, with the problem being that media alone is not enough to create a new learning culture, new learning and teaching, but educational settings are first needed in order to exploit the potential of digital media e.g. wiki. As an attempt to broaden the research on the teacher–learner interaction, the frequency and methods of teacher–learner interactions are examined in a very specific rather than general manner. The study does not focus on a single communication function, but rather on all communication functions types used in wiki online social networking software. In addition, the teacher–learner interactions were classified by the content of the wiki course as analyzed by the content analysis tool, the contents of messages sent by the teacher and the wiki small group members, the quality of individuals' final course product, the learners' responses on the achievement test, attitudes scales, satisfaction scale, and finally a classroom community scale.

The purpose of the study is: to find out how to foster self-directed learning in collaborative learning-teaching settings using social software in higher education in order to accomplish better understanding of the influence of improving learners' performance and satisfaction. To recognize the main aspects of interactive-based software approaches that service online, group work, problem solving, contextualized, authentic learning situations.

2. Theoretical background

The last century is known as the era of ‘industrialization’. Different names have been employed to describe the variety of major forces that have shaped the society in the last decades. The most frequented used names, and those most reflected upon, are ‘information’ or ‘knowledge society’, referring to the ways in which new digital media and computers have brought about new shapes for society (Rosvek, 2011, p. 98) by considering media as means of social communication that dependent on cultural context (Giest, 2010, p. 368). Through such changes, deep transformations have occurred in our society. In recent decades and after the World Wars, the ‘baby-boom’ generation was one of consumption and social achievement, through the processes of reconstruction and economic development with which the wars’ effects were faced. Of course, not all the expectations and hopes were met.

From the 1960s decline of the colonial Empires until 1989 and the fall of the Berlin Wall, attention focused on the economic crisis and the increase in unemployment. From this period came what some people call ‘generation X’ (Cornu, 2011, p. 11). Then in the 1990s came the revolution of information and communications, in which increasing usage of desktop personal computers raised the individual’s ability to communicate (Levy, 1997, p. 5). As laptops and the use of the internet became easily and commonly available, demands of connectedness were increased even further (Rosvek, 2011, p. 98). Communications and interactivity are the most salient characteristics of the new media arising from digital convergence, globalization, and virtuality (Silverstone, 1999, p. 10). Interactivity is not a characteristic of the medium, but rather is a result of the combination of media, message and user (Kerr, 2000, p. 289).

Following these developments came the generation of technological revolution, where the focus on the balance between professional and private life became more important (Cornu, 2011, p. 11). These new digital features increasingly took advantage of publishers of books, music, films and, of course, the main news networks trying to expand their publishing and distributing markets (Rosvek, 2011, p. 99). Within no more than a few years occurred a knowledge explosion in communication, with the growing number of internet services, mobile networks and more advanced mobile phones, known as ‘smart phones’, with which users have the ability to access the internet anytime and anywhere (Rosvek, 2011, p. 98). This continued further with the growth use of new social networking software like Facebook, Wiki and MySpace. In addition, the watching or uploading of YouTube videos has become a normal aspect of daily life not only for individuals of all ages, but also for businesses’ and organizations’ employees, who use these tools as part of their work. Through these new media

tools as well as other new media opportunities, cultural diversity can be achieved in a powerful and meaningful way, and should also be accessible not only to this new generation but who live with (Rosvek, 2011, pp. 99-101). Humans give meaning to life and the world surrounding them through the signs and images around them, so that it is impossible to separate human beings from their environment. Similarly, we cannot separate the world's artificial components from the ideas and technological objects involved, or from the humans who invent, produce and use them (Levy, 1997, p. 4). As a result of all of these factors, combined with recent years' transformation of the world into a global village, there has been an emergence of what are termed 'digital natives' or 'generation Y'. The internet and its applications, especially web 2.0 and social networking software, have become in their lives like a mother tongue for this generation, where all their day life activities are strongly linked with these applications (Cornu, 2011, p.12).

2.1. Knowledge society

Because we live in a society characterized by an exponential growth of information resources and a rapid and continuous generation of knowledge, or as it can alternatively be described, an explosion of knowledge, many important changes have occurred in our society which can be characterized by the transition from the industrial society to our current knowledge society (Giest, 2010, p. 366). The need to acquire new digital competencies and Information and Communication Technology (ICT) skills occurs as a natural development of living in a knowledge-based society driven by the wide range of increasingly multiplying ICT tools (Coutinho, 2007, p. 1). Accordingly, the importance of our perspective shifts from one of acquiring the innate knowledge and skills into one of acquiring the competencies in this new society (Giest, 2010, p. 367). Networking and collaboration through ICTs in this knowledge society provide the entire field with new ways and develop new concepts of co-operation (Cornu, 2011, p. 14). The rapid development of ICT is considered one of the key technological developments of the last three decades, and the wide use of ICT applications has significantly affected all the fields (Cort &Volmari, 2004, p. 13).

Because of the digital revolution in our knowledge society, digital media has become the leading media in this evolving society. Communication, production and society's system as a whole has been changed due to this new and leading media which impacts all elements of our societal life (Giest, 2010, p. 368). Communication and technology applications such as ICT included a cultural dimension, bringing other dimensions of emotions and affection and the spirit of sharing and caring to the process. For example, the internet does not

automatically promote social understanding and integration; this kind of social dimension required another factor to support it (Varis, 2011 p. 80).

2.2. Knowledge society and its requirements

The terms ‘data’ and ‘information’ are more familiar terms to deal with than ‘knowledge’. Questions of what data, information and knowledge are, what the differences between them are, or what they mean, are fundamental ones. They are certainly not interchangeable concepts; “Knowledge is neither data nor information” (Davenport & Prusak 1998, p. 1). To make sense of our modern society, we have a more public awareness of information that has a generic and explanatory value, and differs from data and knowledge. The word ‘data’, meaning a set of separate and objective facts about events, refers to facts and abstract propositions or separated differentiated units. It is described as being structured records of transactions (Davenport and Prusak, 1998, p. 2), while information refers to data that has been processed, or the structured data that can be understood in a certain context. Davenport and Prusak (1998, p. 3) defined the information as a message which appears in the form of a document or an audible or visible communication, where this message involved a sender and receiver. Data becomes information when its creator adds meaning and value to it (Davenport & Prusak, 1998, p.4). Information not only becomes important and ought to be acquired by people, but also requires them to process it (Thai Ha, 2007, p. 26). Knowledge includes the beliefs and values of human beings that have been generated through their daily life activities and unintentional group work. Conversely, data is considered a set of facts and if the data is processed, we can then garner information which can be transformed to become generated knowledge. That can be used to build the human beings’ cognitive structure when it comes to how we approach solving a problem. Then they can use this cognitive structure to eventually evolve, allowing us to interpret the new situation using our base of prior knowledge acquired through the daily activities of life.

Knowledge has been addressed in literature through two main ideas or perspectives. The first refers to knowledge as an ‘inexhaustible and unlimited’ resource, and considers our society to have such a vast array of opportunities for knowledge that the problem has become now not only to acquire knowledge, but also to know from where to get it and in particular to know how to use it. It is not exactly in our society what it was for previous generations (Cornu, 2011, p.13). The second approach of knowledge considers it with regards to the human capacity to acquire knowledge as the limitation. Humans have a limited memory, and thus should not and cannot retain all the information they need in their minds (Aceleau, et al.,

2010, p. 946).

There has been a huge accumulation of knowledge, and over time it is getting more and more complex. Davenport and Prusak (1998, p. 5) defined knowledge by emphasising the characteristics that make it valuable as: "a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and it is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms". Analyzing the term knowledge from Davenport's and Prusak's perspective suggests that knowledge includes experience, beliefs, and values, how we feel, evaluating new experience, motivation, and contextualized information (Thai Ha, 2007, p. 45). It can be obtained from individuals, groups of knowers, or sometimes in organizational routines. It is delivered through structured media such as books, documents, and peer-to-peer contacts ranging from conversations to apprenticeships (Davenport & Prusak, 1998, p. 6).

From the previous, knowledge is a deeper, broader, and richer notion than the terms data and information (Davenport & Prusak, 1998, p. 5). It "brings the human experience overtly and explicitly to the fore, and can be thought as the human experience of information" (Dunn & Morgan, 1987, P. 18). Since information derives from data, and knowledge derives from information, the transformation process from information into knowledge can be described as occurring through the following steps:

- Comparison: to what extent does information about the given situation compare to other situations?
- Consequences: what implications does the information have for decisions and actions?
- Connections: how does this unit of knowledge relate to other units?
- Conversation: what do other people think about this information? (Davenport & Prusak 1998, p. 6).

In the last decades, a lot of attention has been focused on dealing with the terms 'knowledge', 'knowledge society' and 'knowledge economy'. New perspectives on knowledge are related to developments in the technologies of knowledge (Thai Ha, 2007, p. 44). In the knowledge society, information continually becomes more and more. This increasing growth in information requires looking forward new ways, and requires new people with high levels of ability in dealing with this information and processing it to face the new challenges in this new society.

In this society and throughout the progress of time, generated knowledge continues to

increase. The nature of our current society supports a rapid generation of knowledge due to the existence of several digital media platforms.

Knowledge society has been defined by UNESCO's World Report as "… a society that is nurtured by its diversity and its capacities" (UNESCO, 2005, p.17). Previously, there was usually only one way to access a person or to access information, but modern society ICT, and particularly the internet and its applications, bring totally different and new ways of processing and thinking, accessing people and acquiring information. Networks and the social networking software are everywhere (Cornu, 2011, p. 13). In this present, many changes are affecting our society. One of these is the increased demand for, and demands of a highly skilled workforce to face the gap of the work market, in contrast to the past, where more job opportunities were available without the requirement of such high academic skill levels. In the knowledge society, competencies-based training has become a high priority process (Tran Thi Thai Ha, 2008, p. 27). The variables of the labor market in the knowledge society have brought about a new working culture that emphasizes the importance of lifelong learning, and thus companies are beginning to provide their workers with the means to customize and direct their own learning experiences and so keep continuously up-to-date in their profession. In the knowledge society's working life and training, everybody is becoming more responsible for ensuring the development of the knowledge and acquired skills that he/she needs (Varis, 2011, p. 81). This knowledge society has a number of key guiding precepts:

- Knowledge-based societies are much wider and richer than the narrower "information societies";
- Knowledge-based societies must foster the sharing of knowledge;
- They can offer new and relevant opportunities for the developmental countries and societies and;
- Their ICTs' applications provide new opportunities for achieving the sharing of knowledge (Meek et al., 2009, p. 13).

Recent growth in communications and telecommunications tools has led to an increasing usage of electronic services, electronic networks, and the World Wide Web. This has made communications easily accessible by anyone, either from their own home or while at work. Telecommunications tools include e-mail and internet access and recently the web 2.0 promote the effect of online collaborative discussion groups; electronic peers work group, and group work projects as they are more readily available and easy to access.

2.3. Knowledge society and digital media

There has been a quantitative technological revolution in human knowledge. While we are still focusing on recent technologies, new ones are already being established, highlighting the flow of ideas and practices in recent years (Levy, 1997, p. 8). "The technologies that have emerged in recent years, principally but not exclusively digital technologies, are new. They do new things. They give us new powers. They create new consequences for us as human beings. They bend minds. They transform institutions. They liberate. They oppress". This passage neatly summarizes the key characteristics of new media (Silverstone, 1999, p.10).

In our modern society, humanism and new media are inseparable as a result of the formation of a technological civilization, a knowledge society, an information explosion, and a media culture (Varis, 2011, p. 81). New media and online environments enable us to access a far wider range of information resources compared to past eras, prompting us to expect information to be immediately available and further to be able to act immediately on it (Gehl, 2011, p. 1234). Whether the influences of technologies and new media are seen as positive or negative, the reasons are not rooted solely in the technology itself. They also depend on the complexity of social phenomena, and on the quality of human relationships of the person using these tools, rather than only on the systematic particularly of the new media technology (Levy, 1997, p. 10).

It is necessary to achieve greater awareness of the new media in order to promote new media literacy. This media awareness would help us to evaluate the importance and influence of the new digital media in our everyday lives, and to develop the competencies needed to use the communication technologies in line with human goals and values (Varis, 2011, p. 83). No one is able to predict the development of new media and technology in our knowledge society, or the development of personal computing and interactive graphical user interfaces, which are software programs that allow us to create virtual environments, hypertext, hypermedia, and the World Wide Web (Levy, 1997, p. 9). Although these developments cannot predicted, staying aware of them must be one of the main objectives of educational and communication settings. Technology is one way of analyzing socio-technological systems; it is the perspective of the material and artificial components of human phenomena. While technologies are born from particular visions, they are developed within social movements, involving both actual projects and imaginary schemes, and they carry with them highly varied social and cultural implications (Levy, 1997, p. 4, 9).

New media are considered a critical component in the development of knowledge societies, and various aspects are also related to other fields, such as:

a) Critical thinking and the new opportunities involved in selecting and processing information;
b) The problem-solving setting; and
c) Improvements in communicative and interactive settings (Varis, 2011, p. 83).

An important question that is often posed is "What's new about new media?", which revolves crucially around the relationship between continuity and change. Answering this question requires an investigation into the complexity of innovations as both technological and social processes, using some of the fundamentals of social science (Silverstone, 1999, p. 10). There are also other related questions, such as: "Do new media create new meanings? Do they enable or disable the social and culture change?"(Silverstone, 1999, p. 10). The question of the 'impact of new information technology on society or culture' is often raised today in conference announcements and in many research studies and articles in the mass media (Levy, 1997, p. 3). In trying to answer the above-mentioned questions with regards to the new media, it is likely that digital media supports:

- Knowledge construction. Knowledge can be generated by transforming the information that has been presented from the digital media through the mental construction process to be integrated into cognitive structures to give it meaning.
- Simulation, interaction, cognitive tools. Digital media supports the mental construction process with ample opportunities by:
    - Making information easily accessible to anyone, anywhere, both at home and at work;
    - Offering different cognitive tools that support mental construction and supporting simulation and interaction.
- Independence from time, place and institution. New media allows users to use it anywhere anytime.

New media provides a new means that preserves the diversity of cultural identities in an increasingly global media environment (Kerr, 2000, p. 287). They "pose new analytic challenges, but also reinforce old ones" (Silverstone, 1999, p. 10). Generally, civilizations and cultures have had very different patterns of communication. Through the global knowledge society, more attention should be given to the cultures' diversity and the co-existence of different cultures and civilizations (Varis, 2011). Culture is "a set of meanings, and values shared by a group of people" (Alvesson, 2002, p. 29), and human beings within a culture have the ability to follow their personal intentions and act as knowledgeable persons (Giddens,

2004). If we suppose the presence of technology, culture and society, then technology could be addressed as a product or useful artifact of a society and culture. Here, the culture is the dynamic representation and the society includes the people and their interrelations, exchanges and relationships (Levy, 1997, p. 4). In this intercultural society communication serves different values and cultural behaviours.

In our knowledge society, communication relations changed as a result of the digital media that now dominates the society. People who are interested in freely navigating their social networks are the nodes of these networks. They need to cooperate without limitation by authorities (Giest, 2010, p. 372). Telecommunications networks with new digital media enable users to communicate through low-cost services and to create new spaces even through temporal and physical distance (Kerr, 2000, pp. 288-289). New media support people in this knowledge society with a lot of information that wants to be transformed into knowledge. New digital media also support the process of knowledge construction rather than knowledge transfer. Further, it supports the process of simulation with its potentials in some subjects using its cognitive tools.

2.4. Knowledge-society and education

In order to investigate the influence and use of e-learning and social networking software in learning, we should pay more attention to the powerful mutual influences of knowledge in this modern society (Thai Ha, 2007, p. 44). Many terms are used to describe the way that learners use technology, from e-learning to internet learning, distributed learning, networked learning, tele-learning, virtual learning, computer-assisted learning, web-based learning, and distance learning. These all have in common that they can be used to define the process of a learner using some forms of technology (usually a computer) to access the learning resources. It seems difficult to develop a generic definition, but we can use all these terms as an indication to the approach that engages the learner at a distance from the teacher, facilitator or tutor, usually in an online environment and using self-directed and collaborative strategies (Ally, 2004). The future of learning in the knowledge-based society needs to be understood as linked to the idea that learning will become a lifelong activity through different learning generations (Coutinho, 2007, p. 1). Online instruction as one of the fastest growing forms of distance learning is considered the most suitable method to meet the rapid growth of “life-long” and “outcome-based” learning (Gallagher, 2003). It provides more educational opportunities and facilitates the accessibility of teaching and learning processes as well as making them more individualized (Hartley & Bendixen, 2001).

Regarding the nature of a knowledge society, new approaches towards learning should be supported. New knowledge is generated daily. The methods that were used in the past for learners are no longer suitable to use in our contemporary society. Educators should pay more attention to the fact that society requires learning as a continuous process that will span a lifetime, is self-directed and the role of social interaction, which has all helped to create the new learning culture.

Knowledge society provides people with availability of exchanging low-cost information and data storage, and transmission technologies (Soete, 1997, p. 11). Since learners are changing and evolving decade after decade, education should be dramatically changed in order to adapt to the new generations of learners (Cornu, 2011, p. 11). Learners should be actively involved in their education, and should be stimulated towards sharing their existing knowledge, making explorations that build on it, and acquiring new knowledge, thus developing their own cognitive structures. This leads to a deeper and richer understanding and better use of knowledge, which in turn increases the outcomes of learning (Harris & Alexander, 1998).

The people and culture surrounding an individual impact his or her perception and awareness of the world. The "Net Generation" or the first "digital natives" are the people who were born during, or after, the mid 1980's (Thorne & Payne, 2005). They are heavy internet users and the internet has had a positive impact on their lives, increasing cohesions with their both their peers and their teachers (Schroeder, 2009). The same meaning has been reported by Coyle (2007), where online spaces of this generation have become their own "places." They have grown up in digital era and are usually involved in daily life collaborative and communicative activities where collaboration is considered an essence of this generation. When the "Net Generation" is compared to previous generations by employing the Schroeder perspective (2009), members of the Net Generation can be described as heavy users of smart phones for text messaging, Bluetooth service, e-mail access, wireless and Wi-Fi internet availability. They expect immediate feedback and communication and their needs to be met. Similarly, Dziuban and Maskal (2005) stated that net generation learners want to be engaged in learning experiences environments. They are high achievers and want to perform well, and their satisfaction decreases even while their achievement scores are significantly increased (Schroeder, 2009).

B. Cornu (2011, p. 12) made the following astute description of the new generation of digital natives:

> "Plenty of them have a kind of intuitive mastery of informatics and computers, of electronic devices, of mobile equipment. They don't need to read the user manual, and they don't ask for lessons how to use a

> computer (only teachers ask for such courses!). The way they play videogames and electronic games from their early childhood, the way they write 'sms' involve specific abilities. This generation is the generation of 'Web 2.0': interactivity, community, communication, collaboration. This gives them a new vision of time and space: I can communicate with any person, at any time, in any place; I can access lots of information. Permanent accessibility to people is now considered as normal. Immediacy and mobility are two keywords of this generation. They are used to a multiplicity of communication modes, they are permanently connected, even over-connected, in a kind of digital hyperactivity. Multi-tasking makes it difficult for them to concentrate on one activity for a long time".

Cornu went on (2011, p. 14) to formulate eight challenges that digital natives have brought for teachers in this knowledge society:

1. Teachers have to pay more attention to understanding the new characteristics of the digital native generation; they should take into account their abilities and be aware of their altered relationship with knowledge.
2. Teachers have to take into account that knowledge is not only a list of items in a curriculum and also not only the knowledge that learners acquire from educational institutions. They should be aware of the new roles and values of these educational institutions, and should seek to increase learners' levels of competency within this new knowledge society. The new forms of rapidly generated knowledge attained in this setting, with its complex components, are crucial for addressing the main questions of the next century.
3. Teachers in knowledge society must work in networks as a normal node, such that they have some other administrative responsibilities rather than operating as the center of the network. They must act as one normal member in order to participate in the development of a human network for learning. While taking part in these collaborative networks, teachers can exchange their experiences, ideas, activities and problems, and can thus better address their demands.
4. The knowledge society's educational institutions need 'collectively intelligent teachers', meaning that teachers should participate collectively, take part in collective missions, experience collective learning and develop collaborative activities.
5. Teachers must not only engage with digital tools, resources, materials and technology in their teaching and learning designs; they also have to emerge the pedagogy, integrating ICTs as tools of pedagogical enrichment. Through using the technological materials they should act as an 'e-teachers', thus working within the domain of the digital natives' generation. They should look for innovative ways of managing time

and the space and all the possibilities offered by ICT in distance or presence, and in synchronized or asynchronized settings.

6. Teachers have to act as 'blended teachers' mixing e-learning designs with face-to-face ones, mixing distance with presence, and digital activities, resources and assignments with non-digital ones.
7. Teachers have to be 'LLL-teachers', meaning they must be involved in a lifelong learning environment. They should also engage their learners in the same environment by preparing them to use their entire life as an opportunity for continual learning.
8. Teachers also have a political role with respect to changing educational institutions; they do not have to wait for guidance from policy-makers, because they are the people already most familiar with the learning situation (Cornu, 2011, p. 17).

In many countries more and more adolescents have become aware of the importance of further education during the course of their work lifetimes, and many in-services people need continual support to improve their likelihood of pursuing lifelong learning. To accomplish this aim we need to looking for new and different types of teaching, using more critical thinking, problem solving and case study-based methods (Tran Thi Thai Ha, 2008, p. 27). If we are agree, however, with Ashram's claim that "Change may not be easy, but it is necessary, inevitable and often beneficial" (Arsham, 2002), then the learning process should face this transformation in the new knowledge society. The above illustrates that the knowledge society affects the nature of the people who live in it. The net generation or digital natives, who are heavy digital media users, where the online space (especially social networking software like Facebook and MySpace) has become their own space, spend much of their spare time working, sharing data and exchanging ideas using these medians. These kinds of learners do not need to be emerged in the traditional educational settings or even acquire competences and skills from unqualified teachers; they need their teachers who have in their minds the nature of this new digital media. Knowledge does not mean paper curriculum, they need to improve their competencies. They do not need the traditional teacher policies, but they need their teacher to act as a collaborative teacher.

These aspects and more, such as the responsibility of emerging ICTs in teaching and learning situations with suitable pedagogy in order to support then in constructing their learning, lead to questions about the profession of teaching and teacher training programs, especially vocational training of teachers in knowledge society.

The education for all goals is at risk! That was what the Education for All Global Monitoring Reports argued. This report confirmed that the quality of teachers and teacher

preparation are confronting serious systematic challenges all over the world, especially due to the knowledge society (Khoroshilov, 2011, p. 19). During modern history, all countries have returned to focus on economic development, human security and other related factors. In our contemporary world, new ways of development that integrate human life, such as knowledge complexity and cultural diversity, are required. They must become an important part in this knowledge society (Aceleau et al., 2010, p. 945). In his book 'Cyberculture', Pierre Levy acknowledged the inherent potential of new information and communication to expand and enhance the human cognition (Levy, 1997). In the new knowledge society, paying more attention to capital accumulation cannot ensure the maintenance of sustainable economic growth. Attention should be focused on the development of human beings' potentials and the investment of people rather than the investment of the organizations and society. Over time the results of this kind of investment become clearer, as they are effective and inexpensive because in general ideas, information and knowledge can be used and re-used indefinitely. Furthermore, to what extent they are used determines if they will be re-used or if we will use other ideas or knowledge instead (Aceleau et al., 2010, p. 946). In this respect, in order for: "the investment to be made in education and training people in the future, the reward is so great that, in balance with the effort, it highlights the highest economic efficiency but also the social and human one that exists in our world" (Popescu, 1999, p. 121).

The term 'learning' in our traditional classroom setting differs from learning in contemporary society. Our traditional educational settings answer the question of "What do we learn?", while in this knowledge society educational institutions are pushed to answer the question "How do we learn?" This knowledge society needs competent people who are able to understand the new processes of learning being generated by all of these technological devices and tools (Thai Ha, 2007, p. 26). In traditional settings, learning often refers to what the learners learn in their schools from their standard textbooks, as human knowledge prepared by specialists that is necessary and basic for learners' graduation. In contemporary society, however, where so much knowledge has been generated as a result of the age of knowledge explosion, universities and instructional institutions should pay more attention to this flow of knowledge (Thai Ha, 2007, p. 25). In our traditional teaching and learning situations, most classrooms evaluate the performance of one individual regardless of the classroom context. Most traditional approaches adopt a teacher-centered learning setting, but collaborative learning approaches are fundamentally different. There the learning structure is learner-centered rather than teacher-centered, and knowledge is viewed as a social construct, facilitated by peer interaction, evaluation and cooperation (Pereira et al., 2007).

School-based acquisition of knowledge in our knowledge society has become far from the only way of acquiring and accessing knowledge (Cornu, 2011, p. 13). In his book "Seven Complex Lessons in Education for the Future", the French philosopher Morin (1999), described seven aspects of essential knowledge that should be taught in education in order to meet our society's needs, in every culture according to the means and the rules appropriate to that society and culture. These aspects can be summarized as follows:

1. Detecting error and illusion: education aims to transmit knowledge, and is blind to human knowledge and its errors and illusions. Education should teach what knowledge is, and prepare the mind to face the stable threats of error and illusion that challenge the human mind.
2. Principles of pertinent knowledge: the different of knowledge should be linked with their wholes, through their context and complexity, in their totality.
3. Teaching the human condition: educators should take into account that the human condition is one of the most fundamental subjects of all education, and should work towards increasing human awareness of complex and shared identities.
4. Earth identity: education is concerned with presenting what has been neglected before, such as the subject of planetary history and emphasizing the concept of earth citizenship.
5. Confronting uncertainties: education is concerned also with teaching the uncertainties in many eras.
6. Understanding each other: the main task of education in the future is to teach mutual understanding among human beings, and also what misunderstanding is and what its effects can be.
7. Ethics for the human genre: the ethics of humanity should be taught to human beings with a narrow vision of moral lessons, in order to prepare those human beings to become citizens of the world (Morin, 1999).

From the above, the term 'knowledge society' can clearly be defined as a concept of a minority. It provides us with the ways to encourage and stimulate creativity and ingenuity, develops the capacity to initiate and to be able to adapt surrounding world changes, and to process information and knowledge in order to maximize the outcomes of learning. It could thus be seen as learning society rather than knowledge society (Hargreaves, 2003, p. 2). Regarding the rapid increase of knowledge in contemporary society, educational institutions should change their policies to encompass the changes that have occurred. Our traditional setting (face-to-face) or even the earlier development in e-learning strategies should be

improved. Emerging new digital media with self-directed learning strategies and other pedagogical settings should be employed in order to allow learners in this knowledge society to promote their learning outcome.

2.4.1. Knowledge society and new learning culture

Information and Communication Technology (ICT) and its applications are considered an indispensable part of the contemporary knowledge society. This kind of new digital media affected all the fields in this society and knowledge, education and learning are strongly linked with society and its development. The field of education has certainly been affected by the influence of information and communication technology all over the world and in particular in developed countries. ICT has made an impact on the quality and quantity of teaching, learning, and research in the traditional and/or distance education institutions (Kwache, 2007). ICTs brought quick and deep changes, which have had a strong influence on knowledge, teaching and learning (Cornu, 2011, p. 11). Furthermore, they have potential features to accelerate, enrich, and deepen competencies; to motivate and engage learners to be more active in their learning; to interlink the school experiences with practices in the market labor; contribute to radical changes in educational institutions; to strengthen teaching, and to provide ample opportunities for more communication and connection between these institutions and the surrounded environment. ICT has brought about rapid technological and social transformation, which has eventuated in a network society organized around ICT (Yusuf, 2005).

Basic knowledge in our knowledge society cannot be reduced to ‘read, write, and count’ or to the addition of traditional school subjects, because of the evolution of today’s learners, who known as digital natives or the Net generation (Cornu, 2011, p. 12). It is important to acknowledge that individuals need to acquire digital competence as a key component of their personal development, active citizenship and social inclusion. This does not only refer to ‘ICT literacy’, i.e. learning to operate the technology, but also to higher-order skills, such as understanding what it means to live in a digital-based and networked society, or to work in online cooperative teams with the possibility to share information and collaboratively construct knowledge (Coutinho, 2007, p. 1). The existence of ICT in educational institutions does not merely bring technological tools into the educational setting; ICT supports education with new concepts and fundamental paradigms that foster our societies with rich potentials, which change knowledge and make the process of accessing knowledge easier.

The UNESCO Assistant Director-General for Education has suggested three main aspects, with sub-guiding aspects, of a philosophy for integrating ICT into teaching design, taking into account the policy implications of ICT for teacher developments. The first set of points is grouped around the principle of avoiding bias toward technology and emphasizing that technology will never replace the teacher:

- Interaction through the teaching design is and will remain critical for education;
- Simply introducing the tools does not guarantee improvement in the learning outcome, thus digital technology must be integrated with pedagogy;
- Technology should be regarded with an objective perspective;
- The minimum infrastructure should be provided to emerge ICT applications in education in poor communities. For example, ICT may not be practical in communities without electricity.

The second set takes a broader view of ICT that involves people and social systems:

- ICT application in teaching designs always involves people and their social systems, not only the wide use of the internet and its applications;
- The variety creates ample possibilities for ICT forms, such as books, films, radio, television and programmed learning. These should be designed and applied at the same time as designing teaching situations.

In the third set of points for integrating ICT into teaching design, it is stressed that a balance should be sought between better teaching and better learning:

- The challenge in emerging ICTs in teaching situations is not to improve teachers' skill levels in technology use, but rather to construct a good teaching design for learners. "It is more effective to concentrate on improving access to learning, improving its quality and decreasing its cost";
- In order to improve their teaching design, teachers should take into account that learning pedagogical skills for using ICT is more important than concentrating on teaching technical skills, since learners may already have a high competence level of ICT skills from their own daily activities far away from the teacher (Khoroshilov, 2011, p. 30).

Among all the benefits of emerging ICT and its applications in the field of education, we should be aware of the risks related to their application in educational settings. Educators are required to look for new ways and methods that may come over these risks. These risks include the following:

- People may be challenged by computer phobia, techno stress, over trust or mistrust of computer data, or anxiety during working with computers;
- Other types of ICT uses in our society include internet addiction, hacking, risks of living in virtual reality, feelings of isolation, transformation of identity, absorption into computer games through individual, group or role internet social games, and poor social intellect;
- Decadence of speech as a result of online social interactions, through the use of a "hybrid of written and spoken language with the use of paralinguistic means";
- Abnormal behavior towards an effect of new applications of ICT;
- Other common risks of using ICT such as the irregular daily schedule of the people who use these applications, and the pathological symptoms such as impaired vision and problems with the musculoskeletal system (Gotskaya, 2011, p. 89).

The instructional and pedagogical strategies influence the quality of learning and not the technology itself (Bonk & Reynolds, 1997). It was similarly reported by DeMarco and Lister (1999, p. 4) in their book "Peopleware," where they highlighted that ''the major problems of our work are not so much technological as sociological in nature". In other words the major problems through learning situations are likely to be more related to sociological problems, and not to look for such a technology tool. The similar experience reported by Gutierrez (2000) who stated that "it is not the new technologies but the basic principles of good practice what make learning occur", the information that can be connected to using the tool not the tool itself (Richardson, 2005). According to Kussmaul et al. (2006) these sociological and psychological problems can be specified into three categories, learners can be strongly motivated by using this setting highlighting the need to inform them that they should experience these issues and how to address them:

- Communication: how should information be presented and feedback provided to others?
- Cohesion: how do learners interact comfortably with other peers, especially if they rarely or never meet in person?
- Collaboration: how can a plan be efficiently and effectively developed and executed?

In order to emphasise the idea that has been stated above, Lund & Smørdal (2006) reported three possible changes that can be made to the new educational settings, summarizing them into three kinds of changes:

  - *Change in task*: learners in traditional learning setting used to sharing such tasks could have been suitable for this kind of face-to-face environment. Tasks that are

not carried out face-to-face may be quite different and require different characteristics to foster learning purpose.

- *Change in teacher practices*: the shift that has been occurred in learning from a teacher-centered to a learner-centered led to making changes to the teachers' practice and therefore the teachers' preparation to adopt the new trend in an institutional setting. The preparation of the online teacher is quite different to the traditional one, where the teacher's presence and the new role of teacher should move to confront the new learners and provide this presence of teacher in a setting that is not face-to-face with the teacher.
- *Change in time, space, and pace:* merely bringing the tool is not enough to use its opportunities to foster the learning situation through its potentials of editing, sharing, participating and constructing such content. All of these opportunities need the basic principles of good practice that facilitate learning (Gutierrez, 2000).

From the above it is clear to state that ICT applications in this knowledge society support all fields in this modern society with a lot of opportunities. Teaching and learning situations are not far from this support, where these situations were supported by ICT applications in order to improve the outcome of both of them. Higher education institutions try to incorporate ICT into their institutions (schools, universities, etc.) as teaching and learning environments and equipments (computer pools, Beamer, Computer Investigation Program (CIP) pools, multimedia equipment, mobile laptop classroom, and software tools). They do this because they expect that by doing so they will reach and improve the outcome of the learning process. Giest (2010) reported that "What happened is that the equipment (Beamer, multimedia equipment, mobile laptop classroom, CIP-Pools) appeared in all spheres of the educational system. Students use computers and the web, there is no doubt. Now each university uses a lot of equipment and software and present on the web but does that change the learning culture at all?" (p. 368), Despite this, the learning outcome as reported in most studies is very limited, because the expectations of self-directed learning are much higher than the reality. ICT and its applications also have a great deal of potential, and educators have to merge these applications and try to utilize them to improve their teaching situations. The teaching profession should also achieve greater success in developing its programs to help foster a deeper development in their members. Teacher training strategies should be changed to be self-learning settings in order to gain basic competencies rather than instruction in order to gain skills (Giest, 2010, 372) and learners in our new digital society are not only new pupils

or only a new step in humankind; they are the new citizens and the main actors in our knowledge society's theater (Cornu, 2011, pp. 17-18).

A new learning environment is more and more rapidly being created with the growth in information and in the ability to exchange in the new knowledge society. This society is tightly connected with challenges that encounter education. These challenges include: " the problems of knowledge management; dealing with uncertainty; overcoming an educational model of transmitting knowledge, beliefs, and values; and the creation of a new learning culture following a model of dynamic transforming and extending knowledge and life-long learning" (Giest, 2010, p. 367). It becomes necessary to increase the effects and the outcomes of the educational system in this new society. Many universities are trying to cover the gap between the rapid growth of information and the task of providing new methods not only for acquiring knowledge but also for critical thinking and problem solving through dealing with the generated knowledge. Some basic courses have been put up on the web all over the world. Universities that have moved into the online era and published their courses through the internet have succeeded in doing their work in a new way, while the others have not (Arsham, 2002).

The school is the place for socialization and integration of young people into their society, and where citizenship is developed. The role of schools is to stabilize the acquired knowledge by different means, and to make it coherent with a wider knowledge base, in order to be institutionalized (Cornu, 2011, p. 16). Schools and other educational institutions, with their usual context of sitting in a classroom with a teacher, are not solely responsible for learning, one of the most important aims of schools has changed to being 'learning how to learn!'. They should do their best to prepare learners to learn, even if these learners are more likely to engage in the knowledge society's new forms of learning like distance learning, e-learning, and blended learning environments (Cornu, 2011, p. 15). In J. Delors' book, "Learning: the Treasure Within", four aims are presented for education and learning:

- Learning to know: through making progress in scientific knowledge and new forms of social activity.
- Learning to do: through acquiring the competencies and skills involved in tasks, missions or work, in order to be able to act as a qualified person in this work.
- Learning to live together with others: through understanding them, their history, traditions and values, and creating a new spirit together.

- Learning to be: through tapping into each individual's hidden or 'buried' treasures and potential capabilities, like the ability to imagine, to enjoy communicating with the others, and natural charisma.

In today's knowledge society, it is stimulated and driven by creativity, and therefore even if schools are not the main place for knowledge acquisition, they are the main provider of the public service of education (Cornu, 2011, p. 16) and as such have to create and support these qualities of creativity and ingenuity. If not, their people and nations will be left behind civilization (Hargreaves, 2003, p. 1).

Teachers' understanding of the nature of the new knowledge society will facilitate the process of preparing their learners. Teachers' preparation, professional development and generally their working lives must be changed as a result of the knowledge society; they must have a deep understanding of the knowledge society in which their learners live and will work (Hargreaves, 2003, p. 2). In our knowledge society there has been a change in the nature of the learner into what we have been referring to as 'digital natives'. Teachers are therefore required to be capable of teaching this generation by acquiring the required knowledge, ways of thinking and acting, and the capacity to use these technologies to meet the educational needs of these new learners (Misra, 2011, p. 42). This type of change to academic teaching and learning is a cultural one, since in order to guide teachers, particularly university teachers, and their practice, the changes should be focused on the norms, values and shared assumptions involved (Roxå et al., 2011, p. 100). Learning can take on new forms in the digital knowledge society. It differs from learning in traditional societies through traditional pedagogy strategies. Schools and textbooks no longer hold the primary position in knowledge acquisition; in this new learning culture the digital natives will have to acquire not only academic and social knowledge, but also new skills and abilities, the mixing of the acquisition of formal and non-formal skills, and the capacity to manage the integration of such knowledge forms (Cornu, 2011, p. 14). The new learning culture must adapt pedagogy to the new learners and to the new technological tools. It should be ready to emerge the digital resources, such that learners are not only taught how to acquire new knowledge in this new context of networks, but that pedagogy is enriched through considering the new knowledge in this knowledge society and the collaborative and collective needs of learners (Cornu, 2011, p. 16).

In order to create a new learning culture through new digital media environments, H. Giest (2010) formulated the features below as follows:

1. Deep structured knowledge. Deep structured knowledge provides the possibility of acquiring a deep transferring and understanding of applicable knowledge and subject depending on the quality of the subject's features or aspects mapped in it.
2. Individualized learning and knowledge construction. Learning from constructivist perspective is a social process. Learners collaboratively learn in groups, share and construct their knowledge together, but they are not relieved from constructing this knowledge individually. Learners can construct their knowledge through using their prior knowledge and cognitive structures in order to build their new cognitive one, basically theses prior knowledge and cognitive structures are considered the individual's experiences, beliefs, values, etc. thus learner model of knowledge transmission is changed to be more dynamic and he/she has the ability to extend the knowledge, what means in other words that individualization of learning is a fundamental aspect of in new models of knowledge construction.
3. Learning over the life-span. There is a rapid growth of generated knowledge in knowledge society because of the continuous production of information and cultures and the rapid changes in daily life activities. Thus, the educational model should be changed in order to accommodate this knowledge explosion and educators are requested to look for new learning strategies to face this new culture that is characterized by the lifelong learning.
4. The constructive nature of learning. The cognitive learning prerequisites (abilities, skills, experiences, beliefs, values, etc.) and the sense of constructing learning that might have been made by an individual are important factors of the collective and individual learning process and its outcomes.
5. Co-construction. Learning as explained earlier is at first related to the individual action and in the same time is socially determined through cultural framework and contextualized situations. In knowledge society learning is culture characterized where learners interact and share learning activities according to their needs and their society prerequisites (p. 367).

Schools in the knowledge society are challenged by new learning forms, and especially with regards the new types of learners, digital natives or net generation learners. Schools must address these challenges. On the other hand, schools' infrastructures are not ready for presenting and emerging digital education where most of them are not connected to networks. Learners in our knowledge society use computers, the internet, and other ICT

applications, etc., but this is outside of schools, not inside. Innovative situations, resources and tools present a good opportunity for developing learners' motivation (Cornu, 2011, p. 14).

Supporting an increase in the level of education seems to be an essential factor in our knowledge society, where continuous training of human potential leads to advances in knowledge (Aceleau et al., 2010, p. 946). Teaching in the knowledge society must cultivate a lot of capabilities for coping with the continuous change and improvement of the society by its learners. The capabilities that should be developed are multiple and highly varied, including: developing deep cognitive learning, creativity, and ingenuity among students; benefitting from scientific research; working in teams and networks in this social and global village; using new learning methods such as self-directed learning strategies through promoting problem-solving; trusting social and collaborative learning; and keeping up with continuous professional vocational training (Hargreaves, 2003, p. 2).

Knowledge society is tightly concerned with the challenges that face education, teachers, learners, and educational institutions. One of the greatest of these challenges is to improve the learning outcome and create a new culture of learning in this knowledge society. Teachers and learners are the responsible of facing these challenges. Through the knowledge society, there has been a completely change in the nature of learners who became digital natives. As a result, educational institutions in addition to teachers should be prepared to face this change in the nature of learners. In order to create a new learning culture in this changeable society we should emphasize the way to construct knowledge and gain a deep and structured knowledge. Educators should pay attention to the social characteristics of learning and the way that support the process of knowledge construction by learners. In the same direction, educators should not only encourage but also design the learning activities that support learners to learn throughout their lifespan. They should be sure that the cognitive learning prerequisites with meaningful learning support learning process. And although learning is an individual activity, the social effect of learning is considered an inseparable aspect of learning in the contemporary society.

2.4.2. Knowledge society requires vocational training teachers

Not surprisingly, the teacher still plays a key role in the educational design settings. With the help of the wiki, the classical roles of "author" and "recipient" and the boundaries between the "active" author and the "negative" users of content are removed (Lund & Smordal, 2006; Fuchs-Kittowski & Kohler, 2002). The role of a teacher in traditional classrooms was three-faceted: cognitive, effective, and managerial. In online environments

however, all these three roles have been shifted into a deeper and more complex cognitive role. The effective role required engaging new tools to express learners' satisfaction, attitudes and emotions. Finally a greater attention to detail, more structure, and additional learner monitoring are required aspects to the managerial role in the online learning environments (Coppola et al., 2001). The teacher's role shifts to that of creating contextualized situations and or setting up collaborative, problem-based and inquiry-based learning activities to engage learners in the activities that can promote the construction of meaning and knowledge.

In the knowledge society a new online facilitator would need to know how to carry out online everyday learning activities, how to build relationships with and between learners, how to encourage their contributions and participation, how to start and stop discussions, and "how to deal with the shy, the dominating, the aggressive and the just-plain-awkward" (Arsham, 2002). The role of the teacher has changed to encompass a new profession compared to traditional institutions. This role has been transformed from being the owner or transmitter of the knowledge, to being the guide, tutor or main actor, or the director of change in educational institutions. The main reason for this transformation is the increasing change in our knowledge society, the digital media and digital natives who emerge from it and will change the educational institutions (Cornu, 2011, p. 14). Teachers' qualities and continuous professional training, whether in-service or even pre-service, is one of the fundamental factors of education, and remains at the core of teacher and education development (Khoroshilov, 2011, p. 19).

Knowledge society in essence requires teachers to be able to act like scientists building new knowledge, adapt their responsibilities to serve their teaching and learning designs, and to become creative agents in teaching and learning situations by gaining much support from the educational institutions. They should also be provided with deep information about their learners and their prior knowledge and skill level, especially with respect to technology use and interest. Finally, they should respect the collaborative learning strategies that are available in this highly connected world with its multifarious means and opportunities for communication. As a result of all of these steps, teachers should improve their capacity to share others' work, and to develop and experiment with the new and adapted pedagogies that become appropriate through new digital technologies and with the new digital natives' learners. "No other profession is in a position to do it for them, nor to do it as well as they can" except teaching profession and its members (Laurillard, 2011, p. 63). They are the key to making any education system a success, especially when they are competent in their own profession. This can be accomplished through Vocational Education Training (VET)

preparation, but unfortunately VET teachers have received less attention than is desirable. They are capable not only of transferring theoretical as well as practical knowledge, but also of initiating new ways of changing their world (Misra, 2011, p. 43).

Using and developing new learning environments may be a precondition for increasing the attractiveness of VET. VET settings develop according to the general movement of a knowledge society, and do not become old or drop behind other educational pathways (Volmari et al., 2009, p. 11). The major importance of VET for individuals and society is widely acknowledged as a key element of lifelong learning (Tessaring and Wannan 2004). According to the Learning and Skills Development Agency (LSDA) of the UK, vocational education can be defined as: "any activities and experiences that lead to understandings of and/or skills relevant to a range of (voluntary and paid) work environments." Thus, many subjects and qualifications can be addressed as vocational education. VET in this kind of training involved hands-on experience and technical training that sometimes involves 'apprenticeship' (Misra, 2011, p. 28). In other words, VET includes all organized or structured activities that provide learners with skills, competences and knowledge necessary to perform a job, whether more or less of these activities lead to a formal qualification or not (Cedefop, 2009, p. 18). VET is independent of characteristics of participants such as age and sex, as people from every age of both sexes can be engaged in VET sessions. It may be specific to a certain job or directed to a wider range of occupations, include elements of general education (Cedefop, 2009, p. 18).

VET has two common forms; these forms are IVET and CVET. Initial vocational education and training (IVET) refers to education and training presenting in most cases for young people and leads to an initial vocational qualification that can be taken in an institution-based system or in apprenticeship training programs (Misra, 2011, p. 29). Continuing vocational education and training (CVET) refers to education or training taken after the initial education and training, or provided by a variety of organizations in-service working life. CVET as well as IVET aims to help people to acquire new skills or to improve existing ones for professional development or retraining, and to support their personal or professional development (Volmari et al., 2009, p. 16).

Both of the initial and continuing vocational education and training teachers are responsible for the learners and their progress. Teaching professionals who work in educational institutions do not distinguish between the two forms. They may have a similar profile as some trainers and training centres in some countries (Volmari et al., 2009, p. 19). As stated above, the term IVET is used to describe education and training in the age of young

people (16+ VET systems). Teachers responsible for teaching using these systems are known as IVET teachers. They aim to prepare learners in this system for specific jobs or profession. Regarding teachers in IVET, there is a distinction between general subject teachers and vocational subject teachers (technical subject/ practical teacher), which can be distinguished as follows:

- General subject teachers have a degree at a 'tertiary level' and a teaching qualification after finishing their higher education level graduation.
- Vocational subject teachers have a vocational qualification, work experience and a teaching qualification.
- The teaching qualification normally divides into two main forms: in-service training or preservice qualification, where preservice qualification usually happens during the preparation of the teachers in the higher education institutions before entering the working life at the beginning of a teaching career. On the other hand, some other countries pay attention to the in-service training as additional training to the teachers while they do their profession in their working life (Misra, 2011, pp. 32-33).

Although the media and popular opinion promote the value of technology and characterize it as an independent aid to teachers, the supposition that this technology has displaced the role of the teacher has been largely discounted. "Not only does this fail to understand the key role of the teacher in using ICT in schools, but by 'disabling the teacher and emphasizing the technology, it undermines the educational potential of the technology itself (Selwyn, 2001). The level of teachers' competence and professionalism is considered to be one of the most essential factors of knowledge society development, since teachers are the main providers of the knowledge, culture, literacy and skills that emanating from the knowledge society (Khoroshilov, 2011, p. 18). Teachers should look towards finding the best ways of using new technologies and also where not to use them (Laurillard, 2011, p. 65). They also need to be aware of their learners' capabilities and needs in ICT and should deal in a skillful way with the fundamental skills of their learners through using computers, internet, social networking software, etc., and through looking for new ways to incorporate these skills in educational purposes. They are dealing with a lot of the challenges that come with the knowledge society. Teachers' position in this society should be to instantiate changes that keep them among the most respected groups in society. They must do their best to change their strategies from teaching in the classroom's citadel towards preparing their learners to be good citizens, including looking for new ways to teach to and face these digital natives'

requirements, in order to ensure that their learners prosper and in order to promote learning in the knowledge society.

Taking this developmental stance, teachers must pay attention to improving their learners' skills and to harnessing their prior knowledge as a digital native for the desirable aims of their teaching. This should differ according to their educational level, which can be targeted by developing the level of vocational education that promotes involvement in the community and cultivates respect and care for the other people, nations and cultures that constitute our world identity that will be there whether we like it or not (Hargreaves, 2003, pp. 2-3).

Learners in our knowledge society need to acquire ICT skills that enable them to be active agents in society and to meet the labor market. This is a motivation for VET teachers to acquire general skills in ICT, but it is not the only reason for acquiring ICT applications. Teachers are also expected to develop these applications into teaching aids. VET teachers are required to look for new ways of using digital media through their teaching to meet their learners' demands and needs in this accelerated world. In this respect they have to be familiar with e-learning, blended learning models, etc., and have to pay attention to and be qualified in online teaching strategies, collaborative work, etc. This poses the question of how best to provide teachers with the technical and non-technical skills they need to utilize all of these potentials of ICT (Cort & Volmari, 2004, p. 13). Although learners in the knowledge society have been born and grown in a digital environment and may be masters in using these technological devices and tools, their teachers may suffer from a lack of sufficient knowledge about the use of the same devices or tools. The majority of VET teachers are challenged in their educational practices by their lack of useful information about the use of technology and about how to emerge new ways of sharing information that will improve their skills with new media. New pedagogical practices in VET teacher training programs are required to make the most out of the new digital media in our knowledge society (Misra, 2011, p. 42).

Some significant challenges confront teachers who hope to update their teaching and learning designs within these new technologies. Whether they are working in schools or in higher education institutions, teachers may face some difficult issues when attempting to develop these new technologies through their teaching. They have to know more about different approaches of teaching and e-learning, including blended learning, and they should also learn how they can conduct and prepare new digital learning resources and online activities or assignments in order to bring ICT fully into their teaching (Laurillard, 2011, p. 63).

As the changes progress in the knowledge society, the role of teachers also needs to change, as must the methods of preparing these teachers to enable them to be qualified to teach learners who are known as digital natives. The continuous training for teachers is it in-service or pre-service has become a prerequisite in this knowledge society. Teachers should improve their skills in their own subject and also with regards to the use of technology in their classrooms. Many countries followed the teacher vocational training programs in order to improve their teachers' skills and competencies and promote their professional performance. This method of VET includes all organized and structured activities that support learners with the required skills, competencies, etc. both of the initial and continuing vocational education. In addition, it includes training teachers on how to support their learners to achieve success in their learning, acquire new skills and improve old ones.

When teachers are qualified in their profession and technology, they can look for new and powerful tools and ICTs with pedagogy. This facilitates creating the new learning culture and guide learners towards becoming active learners, thereby begging the questions: what does learning mean? What is the relation between learning, teaching and digital media?

2.5.Learning and teaching with digital media

In the last decades, there has been rapid attention paid to the differences between instruction, education, pedagogy, teaching and learning. *Instruction* is the essence of education, meaning the process of education that occurs in a period or a so-called session or lecture. The teacher is present, so it may say a teacher or instructor, however it can also refer to something that one person can do to another. *Education* itself comes from the Latin word meaning "to lead forth." While the word *teaching* is a process that requires deep knowledge and understanding in an area or specialist and the ability to synthesize, integrate, and apply this knowledge in different situations, under different conditions, with a diversity of groups and individuals. The word *pedagogy* comes from a Greek verb meaning "to lead," "both imply the active leader herding a flock of passive followers" (Coyle, 2007). *Learning* can have a variety of definitions according to which perspective we mean. It may mean: "the act or process of developing skill or knowledge" (Arsham, 2002) or it can be defined from the group learning perspective as reported by Holt & Morris (1993) as a social activity with meaning being constructed as a result of interaction and shared efforts to make sense of new information.

Teaching and learning situations have received much attention and have undergone significant changes. Recently, the subject of the differences between teaching and learning in computer-mediated learning is becoming more and more of a focus. Since teachers are

attempting to implement more effective education for their learners, it is important to begin with the question: what is the meaning of learning?

During the 1960s and 1970s, reviews emphasized that learning can be defined as a change in behaviour. This behaviourist perspective on learning describes it as an outcome or the end-product of some processes. By contrast, the cognitivist perspective describes learning as an internal mental process (including insights, information processing and memory perception). A third and more recent perspective of learning draws on the theory of constructivism, especially social constructivism, and explains learning as an interaction operation in social contexts. As described by Lave and Wenger (1991), learning is the movement process from the periphery of community and practice to the centre.

One particularly useful description of learning is from Jonassen et al. (2003), who outlined the different components of learning on which we can focus, to summarize their description, in defining learning as:

- A chemical and biological interaction in the brain, according to the biologist;
- A relatively permanent change in the individual's behaviour, according to the behaviourist;
- Information processing, according to the cognitivist;
- A social negotiation between knowledge peers;
- The property of thinking skills;
- A knowledge-construction process;
- The process of changing concepts;
- A change occurring within a certain context;
- The activity of the learner while interacting with a community, as the centre of a process of interlinking prior and new knowledge;
- And distributed via the community.

Building on learning definitions, this section explores further the three theoretical approaches outlined above: the behaviourist, cognitive and constructivist approaches to learning. The behaviourist point of view emphasises teaching strategies that involve frequented patterns of learner responses, whereas the cognitive point of view focus on the cognitive activity and the mental models that the learners form. On the other hand the constructivist perspective shifts the position of the teacher to being a guide to the learner to help those building new or modifying already-existed mental models, through which they construct new knowledge (Dalgarno, 2001). According to Ertmer and Newby (1993), these main three learning theories can in fact be used as taxonomy for answering the questions of what to teach, how to teach it,

and why?. Behaviourism can be used to teach the ‘what’ (facts), cognitivism can be used to teach the ‘how’ (the processes and principles), and constructivism can be drawn upon to teach the ‘why’ (since higher level reflection promotes the construction of knowledge and meaning in the context of authentic learning situations).

The behaviourist perspective towards learning, as developed by Thorndike (1913), Pavlov (1927) and Skinner (1974), describes learning as a change in observable behaviour caused by an external stimulus in the environment (Skinner, 1974 as cited in Ally, 2004). Behaviourism focuses on the study of observed and changed behaviour, which can be affected by a given stimulus to a screened person as well as an animal (Saengsook, 2006), and it focuses on whether or not the learner has learned something, rather than what is going on in his/her head.

The shift to cognitive learning theory was a result of the idea that there is more to learning than a change in behaviour. The cognitive approach recognized that learning uses the gaining and reorganization of knowledge, involving the use of memory, motivation, and thinking, and further reflection plays an important part in learning. This perspective shifts the emphasis toward the internal abilities of the learner, allowing for learners to store information by themselves, and defining learning as an internal process, in which the amount learned depends both on the processing capacity of the learner and on the amount of effort expended during the learning process. Learners in cognitivist models do not act merely as passive nodes who receive the knowledge and practice exercises produced by the teacher. Rather, they are able to explore and search for information through the course materials, and by implication, in more recent times through the internet (Saengsook, 2006; Craik & Lockhart, 1972).

The term “learning” has a lot of meanings and features according to the diversity of perspectives concerning learning theories. The perspective of learning through the behaviorist differs to the cognitivist, constructivist, social constructivist perspective and other learning theories. Each developmental theory explains learning from its point of view and suggests how learning using the principles of this theory occurs. Educators and administrators of educational institutions attempt to raise the outcome, performance and learners’ satisfaction in both traditional and online learning situations. To improve the learning process, educators should pay attention to the most important element in this process, namely who is the learner. The shift from a teacher-centered to learner-centered setting provides a predominance of learner control. Learners in this setting have the possibility not only to participate in the learning community, but to also determine the time, speed, and/or even participate in preparing the learning resources and activities with the teacher according to their priorities.

Learners engaged in all of the learning settings (traditional or modern) using their self learning strategies such as self-directed or self-regulated pattern. Self-directed learning strategies foster the desire for self-planning, self-monitoring, motivation, where the learning is learner-centered. Learners engaged in learning setting using their prior knowledge and a group of learners with different cultures and backgrounds have a wide diversity of prior knowledge; they exchange their knowledge through a process of negotiation in their group work setting. They use their prior knowledge to construct their new one, and then build their new cognitive structure which can then be used as a prior knowledge in the next learning situation.

2.5.1. Towards a learning theory according to the aim of the research

The main learning theories, Behaviourism, Cognitivism, and Constructivism have different perspectives to the learning process. All developmental theorists emphasized that before designing the learning environment, the educational designer has to use an educational theory which explains the way that the learning will happen from its perspective. It should determine the educational strategies that they will be used, and the interaction pattern between learners, teacher, content, interface and computer-based learning strategies. This leads researchers and theorists towards the suitable theory which will be adopted according to their learning aims and design. Constructivism is a fundamental idea of thought about the nature of knowing, learning and teaching focuses on the idea of open ended learning experience (Maureen, 2000), where there is no single answer to the learning demands, no one theory or model of learning can explain all what learners know or what we know about their learning, and to know about the process of learning itself, which consisted of interactive theories, models, sets of principles, and explanations (Merriam, 2001).

In some theories, knowledge is seen as something static and fixed. According to this perspective, learning can be defined as the process of accumulating of this knowledge, and learner stores the knowledge in his/her mind. Constructivism emphasizes the setting of learning environment which will encourage learners to construct knowledge by themselves via participating in the learning process. We can then define learning as “the in-action capacity to continuously, recursively and coherently maintain one’s coherence” (Proulx, 2006), meaning that learning and knowledge are mixed. Saengsook (2006) and Mahnaz (2001) discussed the aspects that constructivist instructional developers should take into account when they decide to design a constructivist environment such as collaboration,

learner independence, creativity, reflectivity and active engagement as a result to new approaches in learning process.

In traditional educational systems, learners were only able to respond to the learning materials as something static and this perspective promotes the idea of being passive nodes, where they store the knowledge in their minds. In recent years, there has been a move to the theory of constructivism, which understands learning as a much more active process (Thurmond, 2003), which comes over this problem and adopts learning approach emphasizes the setting of learning environment encourages learners to construct knowledge by themselves via participating in the learning process (Proulx, 2006). Constructivism theory, especially the social constructivism believes that learning is an interactive operation in social contexts, where individuals who came from different cultures and prior knowledge can work together in groups in order to acquire a general goal, where they can exchange their prior knowledge with the others to construct their meaning and knowledge. Here, learners construct their own knowledge, drawing from a context prepared either by the teacher, the learners themselves or a mixture of both of them, according to their own personal reality and individual priorities, based on their experiences. This constructivist approach has found increasing support in recent years in concurrence with a growth in understanding of what it entails. Constructivism, and especially social constructivism, explains learning as an interaction operating in and through social contexts. This perspective has been found to be accurate at different educational levels among groups of learners. As Dalgarno (2001) has argued, the fundamental principles of constructivism can be defined with respect to three learning perspectives. The first perspective draws on Kant and was later adopted by Dewey, and is that each person forms their own representation of knowledge. In the second, which attributed to Piaget as reported by McInerney and McInerney (1994), the guiding principle is that people learn through active exploration, and that learning occurs when the learner's exploration uncovers an inconsistency between their current knowledge representation and their experience. The final perspective draws on Vygotsky (1978), and is that learning occurs within a social context, and that interaction between learners and their peers is a necessary part of the learning process.

Constructivism is by no means a unified theoretical approach; however, it will be useful to note the major different strands. Following Dalgarno (2001) divided constructivism into three categories:

1. Radical constructivism: with limited support from the teacher, learners are engaged through their learning environment and construct their own knowledge.

2. More moderate constructivism: learners should participate in ‘thought-oriented activities’, which allow them to generalize their own thoughts and concepts in order to construct new knowledge.
3. An approach that pays more attention to the construction of knowledge through the collaborative activities that occur among learners and between the learners and their peers and teachers (p. 185).

As an appropriate framework to the nature of traditional based on pre-constructivist perspectives towards teaching and learning, Moshman (1982, cited in Dalgarno, 2001) identified three categories of constructivism theory interpretations:

- Endogenous constructivism: The core of each learner’s knowledge construction process is the individual nature, and the teacher acts as a facilitator in providing experiences.
- Exogenous constructivism: Where formal instruction with learners’ cognitive and active exercises can help learners to form knowledge representations which they can use it later as a prior knowledge to build their new cognitive structure through realistic context.
- Dialectical constructivism perspective: Learning not only occurs through a realistic experience, but also learners beside the collaboration with peers, require scaffolding from teachers or experts (p. 185).

As stated above, there are a lot of perspectives on learning from the various approaches of each of the developmental theories. The behaviorist perspective depends on defining learning as a change in behavior, while the cognitive theory perspective emphasized on the reorganization, the use of memory, motivation and thinking (the process and principles). Constructivism emphasized the setting of learning as an open ended experience; it considers learning as an active process. Constructivism theory, especially the social constructivism perspective, leans towards learning as an interactive process which occurs in a social context. The growth of constructivism comes over the radical approach of constructivism where the learners can be engaged in learning situations and start constructing their knowledge with limited help from the teacher. More moderate constructivism where learners can generalize their own thoughts and meaningful learning to construct their knowledge. Finally, the category of constructivism where the process of knowledge construction has more attention and more interaction is required beside the categories of Endogenous, Exogenous and dialectical constructivism where constructivism was divided according to its interpretations.

2.5.1.1. Constructivism and instructional methods

Learners in web-based courses have the ability to easily learn at their own pace, access to the information resources anytime anywhere and to communicate with their peers (Massa et al. 2005). Computer-supported collaborative learning (CSCL) describes technological tools to support learning concerning the constructivist perspective. O'Malley (1995, cited in Dalgarno, 2001 p. 190) distinguished among three types of CSCL technology tools that can be classified into: those are general purpose Computer Mediated Communication (CMC) tools; technologies designed for Computer Supported Cooperative Work (CSCW); and finally those have features specifically for group learning. Dalgarno (2001) provided a useful framework which illustrates the implementation of constructivist perspective in teaching and learning situation through computer assisted learning (CAL), attributed by aforementioned Moshman's three categories of constructivism theory interpretations:

- Endogenous constructivist: CAL constructivist materials' (include hypertext, hypermedia, and hypertext environments in addition simulations and microworld) where the first three materials allow learner to control the content navigating and browsing processes, moreover the last two materials allow exploring the virtual environment.
- Exogenous constructivist materials: CAL materials in this term allow the learner to obtain feedback (Practice modules, e.g. quizzes and problem solving exercises), whereas the cognitive tools (mapping tools and hypertext editing tools) assists knowledge construction process, therefore incorporate tutorials include context sensitive pedagogical guidance with learner control .
- Dialectical constructivist: These constructivists approach "emphasize the role of social interaction," in addition to cooperative and collaborative learning strategies. Technological tools are also included to support learner scaffolding in this learning environment. In the same direction in order to describing technological tools to support this learning, Computer Supported Collaborative Learning (CSCL) is used and can be divided into three groups:
    - Tools that general purpose Computer Mediated Communication (CMC) tools;
    - Tools that designed for Computer Supported Cooperative Work (CSCW);
    - Tools that have features specifically for group learning. (O'Malley, 1995, cited in Dalgarno, 2001, p. 190).

Constructivist perspectives, particularly socio-constructivist on learning indicates that promoting what occurs in CSCL activity like communication, and social construction of

learning, can increase engagement in, and motivation towards, learning among learners (Lipponen, 2002). In order to determine such a tool supports the process of collaborative generation of knowledge, the utilized tool should facilitate adding and editing of content in addition to the supply of existing content and a networking of these contents (hypertext) by a number of distributed participants. Moreover, it must be equipped with a minimum of functions requiring very little learning effort regarding the design of the learning environment, where the learning environment pushes the learners to spend all their time working on the content not exploring the learning environment itself. Finally one of the most important aspects that should be provided in the learning environment tool support the interaction among learners and between them and their teacher, this tool must enable free and simple referencing with other knowledge components (Fuchs-Kittowski & Kohler, 2002). Collaboration through wiki can improve the learners' ability to write, edit, and collaboratively conduct such content, provide contextualized environment support the knowledge construction and meaning (Forte, 2006), thus knowledge can be gained from sharing of multiple perspectives through collaborative learning. Improve collaborative knowledge sharing and construction, supports learners to develop meaningful knowledge by facilitating knowledge construction process through "co-construction" with peers and through reflection of their text-based contributions. Formulating activities under this condition of knowledge and meaning construction, required a shift in the learning practice towards the authentication and contextualized situations, also a shift to the meaningful activities and deeply thinking about the most suitable way to exchange, data delivery of learning materials through the new technology (Kenny & McNaught, 2000; Fuchs-Kittowski & Kohler, 2002; Raman et al., 2005; Ben-Zvi, 2007; Higgs & McCarthy, 2005; Watson et al., 2008). The aforementioned requirements for a tool supporting a cooperative generating of knowledge are widely complied with the characteristics of wiki. Through wiki, a co-operative production of content is realized very efficiently by removing the distinction between author and reader. To summarize this section, learning with wikis reported that new media can provide good tools for fostering constructivist learning and for solving the problems of self-directed learning. But now we should further explore the critical issue of learning with new media; what do we know about this approach?

Learners actively construct knowledge by creating hypothesizes and then working to test those hypothesizes. Their understanding comes as a result of their actions and their resulting beliefs. Learners need to explore the environment to make sense of it, and thus the complexity and relevance of a particular environment to them is crucial to the way in which

and degree to which they will challenge their knowledge, encouraging reflection and knowledge construction (Ertmer & Newby, 1993). Learners compare their understanding with that of others (peers/teachers) in order to create revisions to their current structures of knowledge through social negotiation. Learning structures must therefore allow for active explorations and meaningful learning experiences.

Constructivism has a lot of instructional methods. The main instructional methods of constructivism can be categorized into four areas: problem-based learning, cognitive apprenticeships, inquiry-based learning and collaborative learning – which are described as follows:

In Problem-Based Learning (PBL), the use of problems makes learning both a constructive and contextual process (Dolmans et al., 2005, p. 734). The problems used in PBL stimulate learners to actively construct new knowledge, relating to their prior knowledge. The problem becomes the focus for acquiring knowledge and fosters flexible thinking around the information involved in it. PBL can share some of the features of collaborative-learning, since problems may be discussed in small groups of learners, in which learners construct their knowledge and work together to present collaborative explanations of any ambiguous parts of the content (Hmelo-Silver, 2004). Constructivism pays attention to the importance of real life situations and authentic activities, which foster meaningful learning experiences and encourage reasoning and exploration, rather than working from generalized or short and neat answers. It supports the construction of meaning and knowledge through a particular context, via sharing and editing of data to build new cognitive structures for all learners through group work (Abdullah, 1998). The second instructional method of constructivism is cognitive apprenticeships. Learners participate in learning with such support of the teacher as will guide their learning, trying to achieve their learning goals independently. Learners should work in groups with support from their teacher and other peers (Herrington & Oliver, 2002).

In the third one (inquiry-based learning) learners are encouraged to ask questions related to their learning tasks. This is a learning situation that permits learners to ask questions during their knowledge construction process, in order to accomplish good and deep understanding in the learners' minds, thus learners' can develop their cognitive structures as a result of activities and observations and analyzing course information.

2.5.1.2. Collaborative learning

The fourth instructional method of constructivism is collaborative learning. Collaboration is a process in which people work together in social, practical or academic work, and a relationship between a group of learners requiring a positive participation process, where the learner should learn and participate (Johnson & Johnson, 2007). It is not a process of division of tasks among learners, but involves mutual interaction and exchange of knowledge and understanding of the treated problem (Dillenbourg et al., 1996). Collaborative learning occurs when participants have a common goal, share responsibilities, are mutually dependent, and at the same time interact to reach mutual knowledge exchange (Dolmans et al., 2005, p. 733; Van der Linden, 2000). Whereas collaboration happens in both small and large groups, cooperation refers primarily to small groups of learners working together (Coutinho, 2007, p. 1). Learners are responsible for one another's learning as well as their own. Thus, the success of one learner helps the others to be successful learners (Coutinho, 2007, p. 1). It depends on the learner's self skills and the ability to use these skills in while participating in a social context. There is a new trend of collaboration, so-called E-collaboration; it is a term in which the internet collaboration with the help of computers is central. E-Collaboration gives the opportunity to communicate and cooperate with groups or colleagues at a distance to more efficiently organize collaboration and group work (ETH Zurich, 2006). Cooperative learning strategies in contrast to competitive learning strategies allow learners to participate in the learning context as active learners to share learning content and to edit it with the others in group manner. The successful leaning situation is related to this participation of all the group members, and at the same time each person is responsible for his/her own work. This kind of learning strategies does not require harmony between the groups' members to share such content. Each learner should exchange his/her prior knowledge with the others in the learning context as it guarantees a high level of interaction (Johnson & Johnson, 1991; Mclintyre, 2003). This makes it likely that it will end up being more effective to use the competitive situations incorporated into the collaborative learning context, in an attempt to convert the competition into collaborative group work to accomplish the social and individual success by involving all, and integrating them in order to gain the desired outcomes. Collaborative and cooperative learning as forms of collaboration should be encouraged to facilitate constructivist learning. The most important elements in structuring cooperative learning are (1) positive interdependence that can be successfully structured when the group members believe that they swim together and a group member cannot succeed unless everyone succeeds. (2) Promoting interaction; learners prefer to work together in the real world in

which they promote their success by sharing resources and helping, supporting, and encouraging, their efforts to achieve their certain goal. (3) Individual and group accountability. In cooperative course structure, individual and group accountability must be structured. Individual accountability can be highlighted when the individual's performance is assessed and then related to the group. The group accountability exists in achieving its goals. (4) Interpersonal and group skills. Leadership, decision-making, trust-building, communication, and conflict-management skills scaffold learners to manage successfully their teamwork. The fifth basic element of cooperative learning is participative assessment. It exists when group members believe in how they are achieving their desired goals and maintaining their relationships of effective work (Coutinho, 2007, p. 1).

In particular, collaborative learning has a great potential to support learning by providing learners to: (a) share the learning contexts; (b) use variety of opportunities to compare different perspectives as they participate in different communities; (c) use, create, and share information; and (d) a communications medium (Goldman-Segall & Maxwell, 2003). Slavin (1995), in his research on cooperative learning and achievement, stated: "what we know, what we need to know". As suggested by this claim, he and a wide range of researchers have a general consensus about the positive effects of cooperative learning on achievement. Slavin (1995) specifies four aspects of cooperative learning, based on existing learning theories and models, which can explain its educational advantages: motivation, social cohesion, development and cognitive elaboration. In a collaborative learning environment, learners learn through interacting with one another, by explaining the materials to peers, by asking and answering questions, and through the discussion, sharing, drafting and redrafting of ideas. Learning takes place in small groups, in which learners learn to work together, which may help them to become better collaborators in future. In collaborative interactions situations, learners do not impose their viewpoints from a position of authority, but rather share, negotiate and attempt to convince his/her partners in the group community of this point of view, and may modify his/her perspective according others' point of view. In other words, there is a much greater emphasis on negotiation and genuine collaboration than on giving instructions (Dillenbourg, 1999). This form of learning has led to a revival of social constructivist ideas on the essence of learning being a process of social interaction through which meaningful knowledge is acquired, in contrast of the traditional point of view which looks at learning as an individual process (Pereira et al., 2007).

Group work involves the completion of such a project and leads to understanding the whole work process while continually working to transform and improve that process through

collaboration with others and with technology (Gee, 2000; Hargreaves, 2003; Lankshear & Synder, 2000; Sorenson & Marchu, 2006). This is important because teachers will work in settings which involve social networks. They will teach learners how to learn and work in the knowledge society, which involves social networks. There are a variety of reasons for a focus on collaborative learning formulated by Boud et al. (1997):

1. Collaborative learning involves learners working together and developing skills of collaboration that let them practice planning and teamwork as a part of a learning community.
2. There are increased possibilities for learners to engage in reflection and exploration of ideas when the authority of the teacher does not exist.
3. Learners gain more practice in communicating in the subject area.
4. Collaborative learning involves a group of learners taking collective responsibility for identifying their own learning needs. In addition, learning to cooperate with others to reach mutual goals seems a necessary prerequisite for operating in a complex society.

2.5.1.2.1. Zone of Proximal Development

Vygotsky (1978) emphasized the notion of mediation where teacher mediation is critical as one of the interpretations of the Zone of Proximal Development (ZPD) which promotes thinking and supports learners to conduct new meaningful knowledge and build new cognitive structure. Peers assist performance by bridging the gap between what the learners know and what they need to know. This gap between unassisted and assisted performance is where the term ZPD originates, where the transfer of functions from the social negotiation to the cognitive structure occurs within the ZPD. Vygotsky (1978) defined it as "The difference between the child's developmental level as determined by the independent problem solving and the higher level of potential development as determined through problem solving under adult guidance or with the help of more capable peers." In other words, the process of social interaction can be explained in the development of children using the concept of the zone of proximal development, where "What the child is able to do in collaboration today he will be able to do independently tomorrow" (Vygotsky, 1987 as cited in Kozulin et al., 2003). In the same direction, interaction among students or between them and the teacher can be explained in the highlight of ZPD.

Lave and Wenger (1991) classified ZPD interpretations in three categories, the first two interpretations focus on an individual learner in a social context, whereas the third focuses on collective learning as follows:

1. Scaffolding interpretation: the teacher provides support that is necessary for the learner during the initial learning phase, but which exchanged when the leaner engaged in collaborative context. This led to distinguishing two phases of the ZPD as the distance between problem-solving abilities exhibited by a learner working alone and when the learner is collaborating with more experienced people.
2. Cultural interpretation: ZPD is the distance between understanding knowledge (cultural knowledge provided by the socio-historical context) and active knowledge (everyday experience) of individuals.
3. Collectivistic perspective: ZPD can be defined through the distance between everyday actions and new forms of social action that can be collectively generated.

Similarly, in order to develop the Zone of Proximal Development (ZPD), where the context changed from one of a teacher providing educational resources and preparing activities for the learners to the role of knowledge facilitator. Concerning constructivist perspective, the teacher role in online environments has new positions such as "a guide on the side", he/she services as a "News master" than "newscaster", works as a person who manages a flow of information rather than being a person who is a source of information.

Collaborative learning is one of the constructivism instructional methods, where learners work together for academic or practical work. In collaborative learning situations all the group members are responsible for the group's success as they individually are responsible for their own work. Collaborative learning situations support the interaction among learners and between them and their teacher. It can also illustrate positive interdependence among the learners; promote the individual and group accountability and interpersonal and group skills (Coutinho, 2007). In collaborative learning, learners interact with their peers through the sharing of ideas, asking or answering questions, etc. Learners may change their viewpoints according the others viewpoints; they prefer to negotiate the ideas of others. Collaborative learning situations allow the learners to use their meta-cognitive skills. Working in groups benefits learning as follows: Learners can share, draft their knowledge with their other peers and teacher, they can use the strengths of the other learners, exchange their ideas and use them parallel with their prior knowledge to represent new cognitive structure (Ally, 2004).

2.5.2. Social constructivism

Social constructivism is considered a variety of cognitive constructivism in which the culture, context and people surrounding the learner affect the way that he/she develops understanding of what happens in society, and constructs knowledge accordingly. Both the learner and the surrounding environmental aspects are essential factors in constructivism (Ertmer & Newby, 1993). Learners construct new knowledge through group work, since cooperative activities provide many ways of negotiating meaning. Learners therefore draw on their prior knowledge to build new knowledge in this group-based social process. In the social constructivist perspective, learners are understood as sharing knowledge and participating in the give-and-take manner of two-way communications. Because of the key roles of participation and negotiation, the generation of knowledge in constructivism is intimately linked with the context in which it is being built. Laurillard (2011, p. 65) has argued that teachers as well as learners need to learn how to learn. The principles of good teaching can be improved as teachers continue to work to meet their learners' needs, thus improving their professional development. Social constructivist, social learning, and collaborative learning pedagogies will all be important for teachers exchanging their experiences with peers, other teachers and experts. Faculty members recognized that peer interactions are significant in learning new innovations and strategies (Nicolle & Lou, 2008).

Building on this discussion of constructivism, we can begin to link it with the characteristics of the knowledge society and online learning environments that were described earlier. Ally (2004) outlined the essential benefits for both teachers and learners that can be provided by using online learning environments:

> "For learners, online learning knows no time zones, and location and distance are not an issue. In asynchronous online learning, students can access the online materials at anytime, while synchronous online learning allows for real time interaction between students and the instructor. Learners can use the internet to access up-to-date and relevant learning materials, and can communicate with experts in the field in which they are studying… For the instructor, tutoring can be done at anytime and from anywhere. Online materials can be updated, and learners are able to see the changes at once. When learners are able to access materials on the internet, it is easier for instructors to direct them to appropriate information based on their needs".

In our knowledge society, distance learning becomes necessary for new learners, as they have to be able to learn and work at a distance (Cornu, 2011, p. 15) and interaction becomes an important component of the success of distance learning (Zheng et al., 2003; Gunawardena, 1999). It is the core of learning from the perspective of constructivism. Various learning communication types, including interactive, co-operative and collaborative

learning, are each an important element in the success of face-to-face as well as distance learning (Oxford, 1997).

Social interaction motivates learners to construct knowledge through their social context, where learners exchange prior knowledge with their peers and the teacher is one of these peers (Fuchs-Kittowski & Kohler, 2002). In online learning, instruction can engage learners in interactive activities which facilitate the process of knowledge construction through providing learners with the opportunity to learn and interact with other learners as well as the teacher (Murphy & Cifuentes, 2001).

Social constructivism encountered the new challenges in today's instruction, where challenges of learning are seen as a constructive process in a contextualized situation. On the other side, an authentic and meaningful setting for activities promote the potential opportunities of the new educational technologies, where its uses in education may help move from owning knowledge to knowledge as a construction process and the teachers' role of knowledge facilitator. Learning should be meaningful for learners by engaging them in meaningful activities which benefit their learning settings. The perspective that constructivists adopted claims that learning occurs through meaningful activities, which can be achieved by enriching the learning resources with models of the previous experience that allow new learners to reflect and construct their knowledge via simulated experiences. Constructivism adopts the new perspective of the concept of education process being within a socially-based environment and not as knowledge transference. The main principle of constructivism is the shift from the idea of transferring knowledge to constructing new knowledge through collaboratively using the learners' prior knowledge. Learners should construct their knowledge rather than being passive recipients of the learning messages or accepting those given by the teacher whose learning style may differ than theirs.

In online instruction, learners have the ability to experience the information in contextualized and personalized setting surround themselves (Ally, 2004). Constructivism, and in particular socio-cultural theories such as social constructivism, adopt the ideas that knowledge construction can be facilitated through the social context and "embrace learning environments and approaches where learners take control of their own learning, make connections with peers and produce new insights and ideas through inquiry" (McLoughlin & Lee, 2007). Computer-supported constructivist environments should not only use knowledge to guide and structure the learning processes, but should also create situations and tools that provide learners with the capacity to improve their own knowledge construction (Saengsook, 2006). Tharp et al. (2000) have formulated five standards for effective pedagogy in a generic

sense. Together these standards determine under which conditions learners' achievement can be improved in order to face the challenges which can occur in the diversity of educational situations, learning styles, economic settings, and cultural backgrounds that may be met as follows:

- Teachers and learners producing together: this focuses on the idea of involving both teachers as well as learners, through productive assignments and activities in the educational settings.
- Developing language and literacy across the curriculum.
- Making meaning by connecting schools to students' lives: this standard takes into account that generating and constructing knowledge and meaning will happen in the context of the learner's life, rather than individually or even in a classroom that is separated from the socio-cultural communities' context.
- Teaching complex thinking: learners should be provided with different opportunities and solutions in the same context, and should be encouraged to use these opportunities to reflect their thinking regarding the curriculum.
- Teaching through conversation: learners can also be engaged through debate sessions and dialogue discussions related the course's topics and ideas.

To achieve the desired goals, learning designers must create meaningful and authentic activities that enable learners to be engaged in an activity to link new knowledge to existing one, and to use their metacognitive abilities. In other words, activities should provide learners with ample opportunity to use their existing cognitive structures to develop and construct new and meaningful knowledge.

There is general agreement that the main perspective of constructivism is that learning is an interactive process, and therefore the emphasis should be on learner-centered activity rather than teacher-centered (Dalgarno, 2001, p. 184). The learner is not a passive recipient of knowledge, but is an active participant supported by learning strategies that give the learner control. Learning must be viewed as a cognitive, active, constructive and collaborative process (Schellens &Valcke, 2005; Wittrock, 2010). Fitting with this, learners should be engaged in authentic and meaningful activities so that the active learning environment provides realistic problems that are relevant to learners' needs and experiences (Vonderwell & Turner, 2005), and which allow them to create personalized meaning through this context (Ally, 2004).

From the above it should be clear that the concept of learning is a complex one with many approaches. Learning has its central meaning and a complex variety of definitions

according to different perspectives. It would be wrong to deal with learning from a limited perspective instead of a wide perspective that takes in individual satisfaction, differences, attitudes and motivation, all of which they should involved in the designing and implementing of learning activities. While the insights of behaviorism and cognitivist can be useful for developing learning situations, the emphasis in social constructivism on the learning context, as detailed above, adds an important dimension to this process. Educational institutions are accomplished in widespread usage of e-learning in their institutions, such as universities, schools and vocational training programs (Giest, 2010, p. 368).

The new knowledge society demands change, and this may lead us to consider learning as a main part of individuals' work and spare time. It could be self-directed or could take place in different forms of directed learning (Tran Thi Thai Ha, 2008, pp. 27-28). Modern approaches that involve a deep understanding of the mission of educational institutions - as organizations of teaching and learning designs - emphasize that learning should be a constructive, self-directed, collaborative and contextual process (Dolmans et al., 2005, p. 733). This can be subsumed under the term self-directed learning, which existed even as far back as the classical era and plays an important role in the life of Greek philosophers such as Socrates, Plato and Aristotle.

2.5.3. Self-directed learning

Learning form the constructivist perspective is situated; it cannot be separated from the context in which it happens. This perspective emphasizes that learning is an active process in which learners participate in the construction or reconstruction of their knowledge networks (Dolmans et al., 2005, p. 732). When learners are viewed as taking an active role in constructing their knowledge, learning is necessarily contextual. Because of this contextualized quality of knowledge, the characteristics of the learning situation are crucial in determining how and to what extent the processes of generation and transformation of knowledge is encouraged (Billet, 1996). The transfer of knowledge can be facilitated by engaging learners in meaningful contexts, and by revisiting content at different times in rearranged contexts for different purposes; from these different perspectives and contexts new knowledge may also be generated (Ertmer & Newby, 1993).

In addition to the online learning context influencing the learning process, it also impacts on a learner's perception of his or her level of self-direction (Song & Hill, 2007). Self-directed learning can be thought of as "a way of life" (Brockett & Hiemstra, 1991, p. 18). It refers to a more learner-centred learning strategy, in which learners play an active role in

planning, monitoring, progressing in and evaluating their learning process (Ertmer & Newby, 1996; Caffarella, 2000). The increasing growth of online communities, as well as educational institutions' access to web-based learning tools, is improving learners' capacity for and enriching the value of self-directed learning in these environments (Candy, 2004).

Learner-centered learning is one of the most contemporary approaches and models of learning to promote learners self-directed attitudes while at the same time discouraging their dependency upon the teacher through their learning setting (Milheim, 1993). Learners should be given control of the learning process. There is consensus that teacher-centered learning should be shifted more towards learner-centered learning, where learners have the initiative to lead contributions to the learning situation with the guiding role of teacher as facilitator. Learning as an active process supports the strategies of learner control (Ally, 2004). Moore (1990) acknowledged that recent learning theories adopted the claim that teachers will assist their learning to become self-directed and independent learners bridging their gaps with the new learning features. Computer mediated instructional environments affected teaching experience in teacher preparation as well as a new type of learner, self-paced, self-motivated, and skilled in the use of new communication technologies (Gutierrez, 2000). Constructivism and computing technology approach may be used in which the challenges that my face learning, both together provide the learning with strategies, opportunities and possibilities support learning including distance and self-learning strategies (Maureen, 2000).

Web-based learning environments provide new tools for self-directed learning, and also support learning with new types of activities. Online learning requires learners who have different skills and cognitive abilities of articulation, self-regulation, self-evaluation, and who use different learning strategies (McLoughlin & Marshall, 2000). Along the same lines, Jonassen (2000) argues that online learners need to be self-regulated and disciplined, and to know how to learn and explore different sources and strategies of learning. Self-regulation is being able to plan and adjust learning strategies to achieve a goal or complete a task, and self-regulated learners are thus able to plan their own learning experience, adjust their goals, set and regulate their learning activities in the pattern they want. Further to this an articulate learner is aware of his and others thinking (Vonderwell & Turner 2005).

Self-Directed Learning (SDL) can be discussed according to three conceptual topics:

1- Independent learning: independency means that learning occurs in isolation or far away the other contributors to the learning community, in traditional as well as web-based learning settings. The learner controls the learning process and decides the

content, goals, timing and evaluation of the learning process. Others' interventions and assistance are accepted or rejected according to the learner's discretion.

2- Distance learning: this is where there is temporal and physical distance between the members of the learning community. The responsibility for learning is distributed between learners and their teacher. According to this conceptualization, the learner can make decisions with regards content that has been prepared by others, and may use activities according to the other two patterns' perspectives.
3- Psychological control: in self-directed learning much attention must be devoted to the psychological characteristics of the learner, specifically their degree of self-control and discipline. This is in addition to the social or curricula elements, which can of course not be discounted (Long, n.d.).

In the study by Harding et al. (2007), the aim was to identify the relationships between learners' awareness of their abilities in self-directed learning and of their level of learning motivation. The results reported significantly higher scores of the test group on two types of motivation that are correlated with learners' use of self-regulated learning strategies. Some aspects that may be contributed by self-directed learning include the growth in knowledge and information technology and its applications in educational institutions (e.g. web-based learning environments, computer-mediated learning environments, etc), and the new conceptions of the learning process that are involved in self-directed learning (Mok & Cheng, 2002). In their study on self-directed learning in Asia pacific countries, Mok and Cheng (2002) found that learners were satisfied with the self-directed strategy in the classrooms and enjoyed the interaction between teacher and learners. Through building an online learning environment in which learners may participate and share using multiple nodes, learners are motivated and stay involved in this learning environment with as much engagement as possible with their teacher. To keep the teaching and learning design 'high tech and high touch', and to guarantee the success of the online course, teachers should encourage their learners to introduce their own prior knowledge, experience and reactions. Because the teacher cannot see his/her learners in an online learning environment he /she must use other methods to maintain a high level of engagement (Arsham, 2002). They have a positive impression of self-directed learning, and it also has a lot of attributes of traditional instruction (Naomi & Maxine, 2005).

Some goals in particular can act as strong motivators for learners to use self-directed learning strategies:

1. The desire to learn: the starting point for motivating self-directed learning is to promote the desire to learn any academic content and its related skills.
2. The enhancement of self-direction in learning: by changing the roles of both of the learner and the teacher. Self-directed learning develops individuals' capacity direct their own learning and to be open to influences from the interaction between information and the information provider (Choo et al., 2000; Caffarella, 2000).

The increasing use of technologies in today's learning environments can facilitate self-directed learning. In current online learning environments, the technologies of connection and communication have a positive impact on learning through creating a lot of potential opportunities. Self-directed learners operating in this kind of online environment can keep in touch with other learners through e-mails, group discussions, chat rooms and other web 2.0 technologies, and even through social networking software such as Facebook, wiki and blogs. These different means of communication and different types of input can support learning and influence the construction of new knowledge into the learners' existing patterns of experience. In contrast to older forms of self-directed learning, where learners could only use limited activities such as physically visiting the library, listening to radio, sending and receive letters or later using floppy disks or CD ROMs in his/her computer, the increasing use of web-based environments provide an entirely new arena for self-directed learners to draw on. Their learning activities and resources draw on different modes of communication that are already part of their daily experience, but these activities and resources can be prepared by the teacher or learners can prepare them by themselves (Candy, 2004).

2.5.3.1. Self-directed learning and teachers

One form of self-directed learning is PBL, in which a key feature is that the teacher's role is that of a facilitator. The facilitator has the essential role of stimulating learners towards self-directed learning. In order to stimulate this, the teacher should not transfer his/her own knowledge as the owner or the expert to the learners, but rather should stimulate learners' knowledge by encouraging specific kinds of cognitive activities (Dolmans et al., 2005, p. 734). The facilitator is always attentive to how to best keep the learning process going, how to stimulate the learners to generating knowledge, and how to ensure that all learners are actively involved in the learning process. Therefore continually monitoring the educational progress of each learner in the group and adapts the circumstances to achieve better learning designs (Barrows, 1988). These designs should act as a scaffold for learners' learning, stimulating their elaboration and integration of knowledge, the interaction among learners, and the

interaction between the tutor and learners. One way of achieving this is by providing a lot of opportunities for asking questions, asking for clarifications or asking for applications of the knowledge (De Graveet et al., 1999).

In general the teacher in self-directed learning strategies has a very important role, and acts to facilitate learners in starting their learning experience, as well as discussing their learning goals, strategies and evaluation criteria. The teacher supports learners' educational needs as much as they allow learners to determine what objectives they should achieve and reflect on their experiences in previous situations, through providing examples of prior work and offering a variety of options for successful performance. Teachers should focus on whether the learners are aware of their learning objectives, strategies, activities, resources and evaluation criteria, but allow learners to conduct this self-evaluation by themselves (Mok & Cheng, 2001; Sergiovani, 2000).

Mok & Cheng (2001) formulated five factors affecting the use of self-directed learning, which can be categorized as follows: cognitive; control; affective; procedural; and content. The cognitive factors involve understanding the learning tasks, and having understanding and awareness of the new cognitive structures that the learner is trying to build on his/her prior knowledge. Factors of control concern the efforts that learners do to control their own learning experience and accomplish the desired learning outcomes. The affective factors include the learner's motivation and behaviour towards learning.

The using of self-directed learning strategies can be brought to traditional learning environments as well as to online settings, but the online learning environment, demands more fundamental changes to learning principles. The design and engagement of new educational tools, with specific educational and pedagogical theories, can significantly enrich the activities and support of self-directed learning strategies in online settings. The shift from individual self-directed to social self-directed learning strategies provides active learning with more opportunities and new ways of constructing cognitive structures. White and Weight (2000) reported that learners with patterns of social self-directed learning may have a greater ability to exchange their learning experiences through meaningful relations in that context. This therefore promotes the process of knowledge construction rather than individual self-directed learning.

Garrison (1997, as cited in Mok & Ching, 2005) used a "collaborative constructivist" perspective to interpret self-directed learning. Here, the decisions and responsibilities of learning are controlled by the learner and he/she can construct his/her knowledge and meaning with support from the other peers (including both learners and the teacher). It is clear

that the main frame of self-learning starts from the learners' motivation, and that it develops with tutors according to the learning strategies they use to achieve performance goals, and that all of these processes in relationship to the social context; learning starts from the learner and their use of the social environmental context. This process of knowledge construction can be supported by engaging the learner with web 2.0 technologies. The use of a wide range of these technologies, including bringing easy access to information resources or academic online content, sending e-mails alerts and engaging in discussion groups and chat rooms sessions, is increasingly become a standard for self-directed learners (Candy, 2004).

In Mok and Cheng's study (2005) they aimed to develop student teachers' competence in self-directed learning, including their attitudes, knowledge and strategies. The results showed that the student teachers were able to develop this competence, with the most significant changes in the student teachers' capacity for control of the learning process. Small signs of growth were indicated in meta-cognition. It should also be understood that self-directed learning is not a static phenomenon, and may change according to the nature of the task.

2.5.4. Towards contextualized self-directed e-learning model

Many studies have used models to describe self-directed learning (SDL). Some of the key contributions are Candy's four dimensional models (1991), Brockett and Hiemstra's personal responsibility orientation model (1991), Garrison's three dimensional model (1997), and Song and Hill's conceptual model for understanding SDL in an online context (2007). The model that this research will use is that of Song and Hill (2007), since the increasing growth in web-based learning demands new perspectives on how learners' experiences in this context are affected by teacher–learner interactions and SDL. Most SDL literature has used the four models listed above, but most, especially the first two models, have been conducted through traditional learning environments and face-to-face settings. Moreover, although the second two models have been carried out in web-based settings they neglected the influence of context (e.g. Garrison model, 1997). Song's model pays attention to this aspect, but both Song's and Garrison's models neglected the influence of learning interactions through contextualized learning activities. While there are indications that self-directed learning is a desirable aspect for online learners (Shapley, 2000), we do not have an adequate understanding of the impact on learning performance of teacher-learner interactions through specific learning contexts like web-based courses.

In order to use the model that explains the learning process, a contextualized self-directed learning model will be represented with regard to a conceptual model for understanding SDL in an online context (Song & Hill, 2007 model) (see figure 6). The model incorporates SDL as a personal attribute and the interactive learning process focuses on the teacher-learner interaction as pointed out by most reviews of literature of SDL and teacher-learner interaction. Another dimension has been added to the Song and Hill (2007)'s model is the level of teacher-learner interaction to indicate the impact of teacher-learner interaction on online collaborative environment via wiki.

Because this model pays attention to the prior knowledge as a node of knowledge interaction, as well as the treatment to the individual differences where this is considered very important to the classification of individuals before their engagement in the learning, the link between the self-directed learners and the peer interaction which consider the main idea of this research and the importance that the model concentrates to the feedback and motivation because of their role in learning.

The exploration process of the model can be analyzed from the researcher perspective from three main elements: self-directed learning, interaction through the context and learning outcome as follows:

Self-directed learning:

The key point of this model is the learner' learning with technology which is supported by cognitive constructivism, which focuses on making an internal meaning of learner (Piaget, 1970). Digital media can be a very useful tool to support the process of learner' knowledge construction by supporting him/her with flow of opportunities to allow the learner to select the relevant information, manipulate different representations of knowledge, and conduct virtual experiments (Davis & Linn, 2000; Reiser, 2002). Self-directed learning focuses on the aspects of self-planning, self-monitoring, self-evaluation, and the main input of this model is the learners' prior knowledge, learning resources, and Motivation.

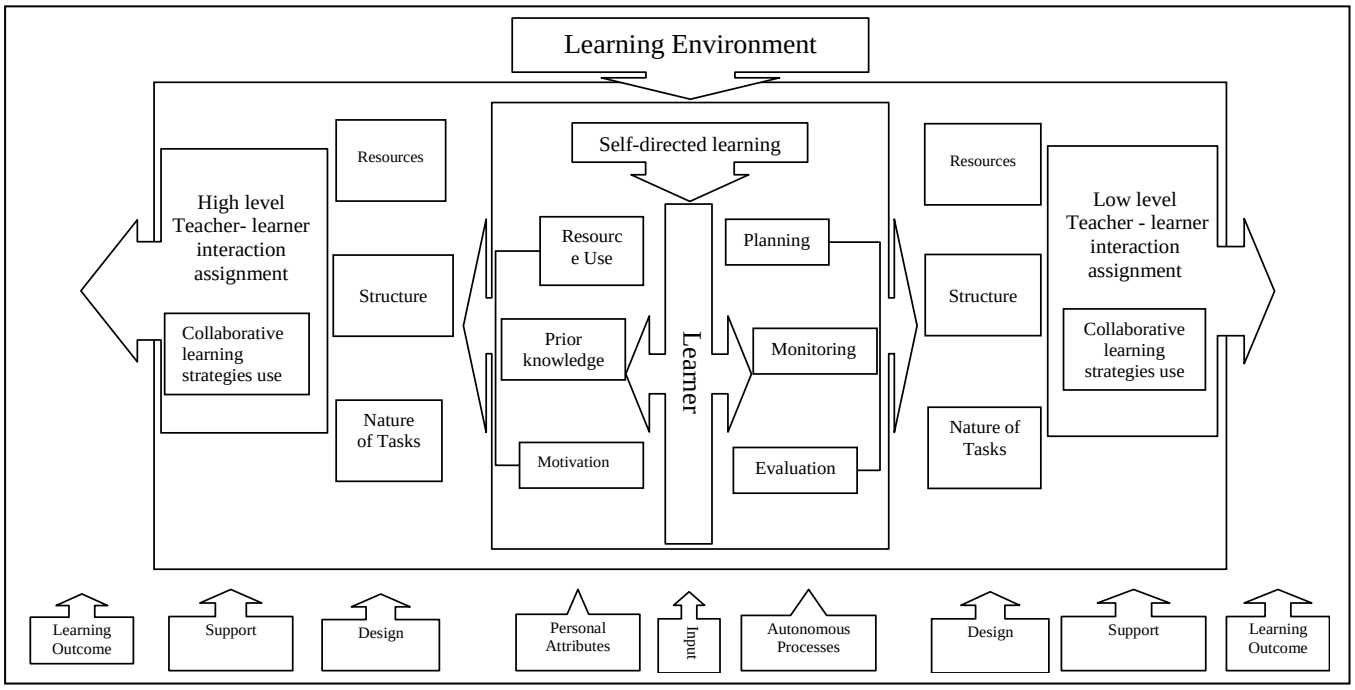


Figure 6: The research Model according to Song and Hill conceptual model for understanding SDL in an online context (2007).

The constructivism perspective of learning focuses on the process of constructing knowledge. It is not possible to construct new knowledge without having some structure developed from prior knowledge to build upon. Prior knowledge means the knowledge that is pre-existing with an individual before engaging in a knowledge-based generation setting (Cohen et al., 1999). Using this prior knowledge, learners, while working in contextualized framework (enriching, meaningful, authentic and real life activities), can construct their new knowledge and meaning and build their own cognitive structure. Therefore, they can use it in any future situations as prior knowledge. It is considered a key prerequisite for self-regulated learning because it is required to start planning the learning goal and monitor the learning process (Boeckaerts, 1997). Learners should be stimulated to regulate or direct their learning process from a motivational and a cognitive perspective; they should be informed with the essential role of their prior knowledge in contextualized situations. In the same direction, they should prepared to become lifelong learners who are able to acquire new knowledge and skills throughout their life (Dolmans et al., 2005, p. 733).

Self-directed learning implies that learners play an active role in planning, monitoring and evaluating their learning process (Ertmer & Newby, 1996). While the planning process means that learner deals with a variety of ways to understand a task, he or she sets a clear goal of this task, determines the closest strategies for achieving this goal and identifies potential

obstacles that may impede achieving success. Through this model, the learner is able to develop, design and implement realistic strategies to solve learning problems or achieving goals. With a self-planning strategy, the learner has the opportunity to decide the time of participating the learning environment and anywhere, the way that most suitable from his/her point of view to contribute the learning situation, the topic he/she wants to participate in such time adjusting his/her own plans to make changes according to his/her own priorities.

The monitoring process implies that the learner has the ability to recognize the task as a whole from beginning to the end, and be aware of what he/she is doing and anticipate what he/she will do in the next step through self- monitoring process (Dolmans et al., 2005, p. 732). This strategy is more related to the previous one, where after setting learning priorities from his/her point of view the learner is allowed to assess the use of these strategies in achieving such a goal. The learner can implement the plans that were determined during the self-planning strategy and re-plan them according the new aspects of learning situation (the interventions of teacher and other learners).

After finishing the task, or even while working through it, the evaluation process takes place of both the process and the product of the learning process to judge the learners' learning and the effectiveness of the learning process. One of the most essential aspects of self-directed learning strategies is the process of self-evaluation. The learner has the ability to monitor his own performance and the opportunity to ask help when needed (Vonderwell & Turner, 2005).

Through self-directed or lifelong learning, learners can plan, monitor and evaluate their own learning and direct or regulate their own learning process. Self-regulation involves not only cognitive self-regulation but also motivational self-regulation to promote and sustain self-regulated learning, and both cognitive and motivational self-regulations are mixed aspects of self-regulated learning (Pintrich, 1999). Most reviews related to the effects of using individualized instructional programs reported that learning and motivation can be promoted through offering learning control to the learner, and providing him/ her with the suitable opportunities for activity and reflection, guidance, and informational feedback (Mayer, 2005; Moreno & Mayer, 2007). Motivation can be seen as "a matter of design" which encourages learners to behave towards achieving desirable attributes including understanding of ways in which the knowledge can be used and generated through learning situations. learners can be motivated to share the course by using some issues such as communication with their peers and teacher with ample opportunities of high support with immediate feedback, the cohesion among learners and between them and their teacher in online learning environments and the

collaboration in these learning environments and how can be panned to be effective (Kussmaul et al., 2006).

Through learning situation learners are provided with activities, learning materials and resources. According to this model, learners are not only permitted to use the resources that the teacher provides, but also to upload and add any additional resources and materials that add to the topic of the learning situation or even transform it into a collaborative situation with the peers through the course sessions. Learning context focuses on surrounded socio-culture aspects, especially the level of teacher-learner interaction, the environmental factors and how those factors affect the learners' performance and satisfaction. There are various factors in learning context that can affect learners' performance and satisfaction. Regarding the model, there are another two sections related to the contextualized setting of the model can be categorized in design and support elements. While the design section includes the resources, structure and nature of the tasks, the support section includes the level of teacher-learner interaction in the context of collaborative learning strategies use in the learning context (Song & Hill, 2007). The teacher as a facilitator can design the learning resources embedded in the learning context, encourages learners to exchange their learning experience and prior knowledge. Similarly, the course structure can be also designed and facilitated by the teacher to serve the process of constructing knowledge. Finally, the nature of the tasks also influences the learning context and thus learners' learning.

Another set of elements in the learning context is the support in the learning context. With regards to the model, this kind of support relates to the aim of the research which is the level of teacher-learner interaction with its two sub-levels (high/low level teacher-learner interaction). The teacher supports learners through the learning process by providing sufficient time to interact, immediate feedback and respond to the learners' questions. An online teacher can encourage the collaborative construction of knowledge, and may create meaningful activities to engage learners in a group setting (Wang, 2007). The model presents the interactive relationship between the self-directed learning and the learning context elements that affect learners' learning under the condition of teacher-learner interaction. This model is adjusted to be used through the learning settings that promote the influence of teacher-learner interaction with its two levels low and high. Learners through the learning context are provided with the group work availability, where they can share, edit, delete, and add …etc. to the course content, posting their questions, comments through e-mail alerts to their peers. Through exchanging their prior knowledge and meaning they can construct their new one.

We can ask the question about why the learning outcome predicted by this model? The learning outcome of this model addressed through measuring the learners' performance and satisfaction. Learning performance is related to what extent the learners constructed knowledge. Although the model incorporate SDL as a mainly personal attributes (prior knowledge, motivation and resource use) and autonomous processes (Self-planning, monitoring, evaluation) as an evidence of self-directed learning as a key feature of learning, the model does not neglected the role of social relations of the learner (the interaction). Knowledge is culture based exist first between learners and then in an individual learning (Vygotsky, 1978). If the learner is able to do the task, then he/she does not need anything to learn. But if he/she has to learn, then he/she is not able to do it by him/her self. Thus he/she need help from others. This help can be provided by interacting with someone else. Because they will have common goal and they will exchange their knowledge and understand each other through acting concerning this common goal or subject. This model pointed to the interaction what is necessary and important as a key feature of group learning in traditional classroom. In this direction the interaction supports the learners learning concerning the Zone of Proximal Development.

2.6. Learning Interaction

A recent search of the Education Resource Information Center (ERIC) database using the keyword "interaction" produced over 43,000 articles. Literature on teaching and learning in higher education acknowledges the importance of interactivity within the educational process (Muirhead, 2001b), while the concept of interaction has no common consensual definition in the literature (Anderson, 2003; Soo & Bonk, 1998). Thurmond (2003, P. 4) defined interaction as follows:

> "… the learner's engagement with the course content, other learners, the instructor, and the technological medium used in the course. True interactions with other learners, the instructor, and the technology result in a reciprocal exchange of information. The exchange of information is intended to enhance knowledge development in the learning environment…Ultimately; the goal of the interaction is to increase understanding of the course content or mastery of the defined goals".

The most frequented types of learning interactions are learner–content interaction, learner-technology or interface interaction, learner-learner interaction, and teacher-learner interaction. Learner-content interactions are those which happen between the learner and the subject of study. Learner-technology interaction describes the interactions between the learner and the tools needed to implement tasks. The learner–learner interaction occurs when learners work or communicate together in small or large groups, while teacher–learner interactions occur when

the teacher and learners work and communicate together (Vonderwell & Turner, 2005; Thurmond & Wambach, 2004; Ehrlich, 2002; Navarro & Shoemaker, 2000; Rovai, 2002; Swan, 2001). The teacher's role in online environments has already changed. In traditional environments the teacher was the owner of information and knowledge, but in online environments the teacher manages, tutors, and facilitates the exchange of information and production of knowledge, supporting learners through helping and providing learning tools that the learners then use to create content. The teacher acts as mentor, guide or coach to support the learning activities (Strachota, 2003; Vonderwell et al. 2007).

The main challenge in online learning situations is the temporal and physical distance between most of the learning community's members. Most educators therefore search for new learning tools, and enrich them with the suitable pedagogical and instructional settings in an attempt to overcome the problem of social cohesion in these situations. Teachers with a social role in online environments can create an interactive learning environment "to promote group cohesiveness and build up a virtual learning community". They can encourage the interactive building of knowledge, and create meaningful activities to engage learners in contextual and authentic learning situations (Wang, 2007). Teacher–learner interactions occur through face-to-face as well as web-based encounters. In web-based environments, the teacher–learner interaction is a fundamental factor that affects the learning quality. At the core of teachers' work is preparing learning materials, planning content to be produced in a more interesting form, and trying to motivate the learners to learn (Jiang & Ting, 2000). The teacher tries to design and investigate new ways to promote learning through electronic means, such as e-mail alerts, forums, blog comments, chat sessions or networking software functions.

2.6.1. Interaction and interactive learning

As far back as 1916, John Dewey (as cited in Anderson, 2003) defined interaction as an educational process that occurs when the learner transforms the inert information passed to him/her from another, and constructs it into knowledge with personal application and value. Interaction is central not only in traditional classrooms but also in online learning experiences in creating a sense of presence and a sense of community for online learners, and to promote transformational learning (Murphy & Cifuentes, 2001; Takimoto, 1999). Researchers reported that interaction is important for a variety of learning, and in particular for the satisfaction of learners (Baker, 1995). It is the core of distance learning where the lack of face-to-face interaction and the geographic separation between the learner and teacher is a fact (Appana, 2008). Among some of the of literature which discusses the

concept of interaction in distance education are Billings et al., 2001; King & Doerfert, 2000; and Muirhead, 2001a, 2001b. They categorized some factors which describe the interaction concept such as communication, collaboration and active learning (Kenny, 2002). Oxford (1997) distinguished between three types of learning communication which can be categorized into co-operative learning, collaborative learning and interaction. The first meaning that a particular set of learning techniques promote the predominance of cognitive and social development while the second refers to the way that two or more persons work together to conduct such a learning aim through the learning context where learners have the possibilities to construct their knowledge and meaning. Finally, the last one is interaction which refers to personal communication, which also involves work in groups and promotes the learners' ability to construct their knowledge through a contextualized, authentic and meaningful learning environment. Both collaborative and interactive learning are the conditions for learning activity development (Zheng & Smaldino, 2003; Gunawardena, 1999). It is a fundamental key of online learning activity (Brown, 2004; Oblinger et al., 2001). Interaction in an instructional distance setting has a desirable and positive effect on the effectiveness of this setting; however, there is no evidence to indicate that interaction improves the quality of learning in most distance programs (Kearsley, 1995).

Active participation promotes the effectiveness of learning, which depends upon five factors showing the complexity of the concept of interaction and its critical role in determining the quality of learners' experiences as follows:

- The continually communication of learner-content promotes the learner's desired goals to be achieved.
- In order to ensure deep and easy understanding, some conditions are required such as the course design, structure clarity, to what extent the course structure and learning materials sequence are logic and the time that provided is enough to construct the meaning.
- Providing adequate time to finish the learning assignments and also enough for learner's knowledge construction and meaning reflection is a fundamental point recent learning situations.
- Participation enables learners to construct their meaning and knowledge through discussion activities (Oxford, 1997).
- Interaction could be improved through sequenced content delivery methods and authentic activities structure (Thurmond, 2003).

Active learning is often considered an instructional approach in which learners actively participate in their learning process. Although the functional definitions of interaction as explained above, the challenge to define when interaction has pedagogical or educational value still remains (Anderson, 2003). The most frequent aspect that was highlighted by literary reviewers was the social presence in learning situation (Beard & Haper, 2002; Gunawardena, 1995; Sutton, 2001). Learning should be interactive to promote higher-level learning and social presence, and to help develop personal meaning (Ally, 2004). The social interaction and actual social presence are created through communication (Mäkinen, 2008). Therefore, the process of constructing new knowledge always occur through the context of social interaction (Fuchs-Kittowski & Kohler, 2002), and the forms of social interaction are the forms of knowledge which formed of "transferability in social interaction process." Knowledge can be constructed when the opportunities for learner interaction designed into a web-based course in social way (Sabry & Baldwin, 2003). Fuchs-Kittowski & Kohler (2002) refer to the social interaction or so-called "companionship" as the core of motivating feature for the distribution of knowledge in the community. This kind of social interaction can be constructed through the social context, when the learners exchange their prior knowledge with their peers.

Chickering and Gamson (1987) reported that there are seven principles of good practice in education settings. These principles are: encouraging learners-faculty contact; developing an exchange of knowledge and cooperation among learners; engaging learners in active learning situations; providing them immediate feedback; emphasizing the amount of time suitable for a task; communicating high expectations; respecting the diverse methods of learning and encouraging active learning and learning interaction. The authors continued that good learning occurs when it is likely to be a team effort. Learners must discuss what they are learning, write about it, relate it to past experiences, and apply it to their daily lives. Learning in this manner often increases involvement in learning, sharing and responding the ideas of others thereby sharpening thinking and deepening understanding. Similarly attributes were reported by Collis (1998) who addressed six instructional principles that should characterize distance education as follows:

1. The learner as well as teacher plays an active role in distance education setting.
2. The process of knowledge construction requires a high element of human interaction with continually development and acquired interactive educational model to evaluate it.

3. Recent learning approaches support learner-centered learning which encourages self-assessment, personal reflection, and provide opportunities to learners' awareness of his/her own and others thinking pattern.
4. An interactive learning environment should promote meaningful and reflective knowledge through context through a variety of prompt feedback.
5. When the teacher prepares and monitors the quality of learners' learning, this maximizes their learning and their self-regulation.
6. Learners want more support and guidance from the teacher in time and feedback energy, thus this promotes their higher skills, disciplines or motivation.

Interactive learning provide learners with a lot of opportunities to support their social and group collaboration, where learners can interact with their interface, peers, teachers, and may also interact with the content itself (Rhode, 2009; Ehrlich, 2002; Navarro & Shoemaker, 2000; Rovai, 2002; Swan, 2001). Anderson and Garrison (1998) described only the last three types of interaction learner-learner; teacher-learner; learner-content. In the distance education situations, the majority of the studies found that both of teacher-learner and learner-learner interaction are the most essential interactions through the learning process, where learners have the ability to interact with their peers as well as their teacher to construct their meaning through social context. They consistently identified different types of learners' online interactions. Indeed, none of these learning interactions can be independently addressed. Swan (2001) explained the relation between three interaction types' learner-learner interaction, learner-content interaction and teacher-learner interaction and the learning process. While the learner-learner interaction promotes the social presence of the learners in faceless environments, the learner-content raises their cognitive presence, finally the teacher presence can be found in the teacher-learner interaction setting (see figure 5).

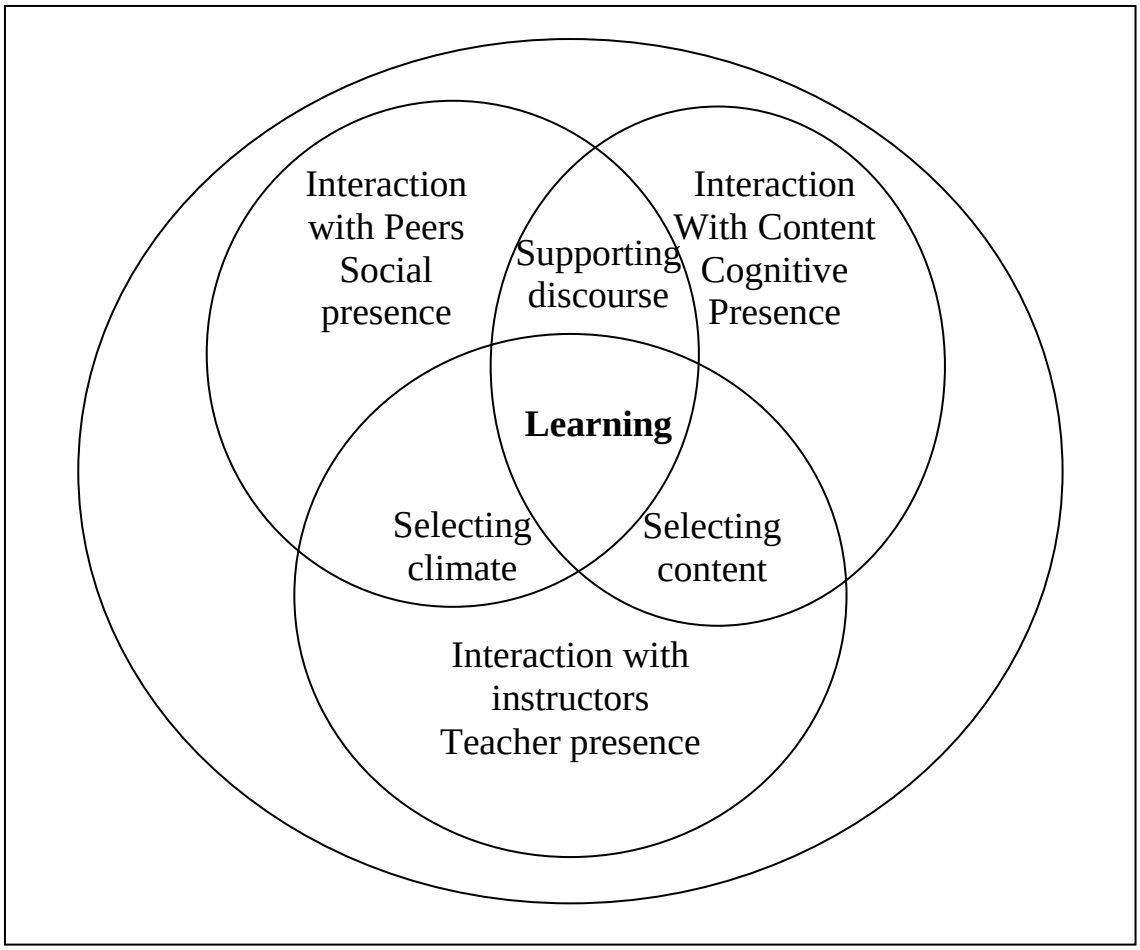


Figure 5: Relationships between interactions and learning in online environments (Swan, 2001 Model).

According to Swan's model, all of these three interactions can be promoted through the use of suitable technology under the condition of pedagogical and theoretical support to foster the interaction among learners and between them and the teacher, as well as the interaction between learners and the content itself.

For example, interaction among learners occurs under the condition of teacher presence and is also supported by the content and the interventions of to what extent the acceptance and accuracy of the technology to the learning situation and the individual learning styles (Swan, 2001). Learner-learner interaction occurs when learners work or communicate together in small or large groups, while teacher-learner occurs when the teacher and learners work and communicate together, learner-content interaction is intellectual, between the learner and the subject of study, and learner-technology interaction describes the interaction between the learner and the tools needed to perform the required task (Davidson-Shivers, 2009; Strachota, 2003; Wagner, 2001; Palloff & Pratt, 2001).

2.6.1.1. Learner-interface interaction

One of the most negative barriers and challenges in online learning environments is an ambiguous learning interface. Learners face many difficulties when dealing with course technology interface (Schrum & Hong, 2002; Soon et al., 2000). The technology interface enables learners to create projects with hypertext links, to collaborate on projects, and to interact with teachers and experts (Ehrlich, 2001).

Due to the learners' ability to access their online course anytime anywhere, learners have a positive perception of interaction with computers (Kenny, 2002). Thurmond and Wambach (2004) summarized the major factors impacting the learner interface interactions as including: computer experience, learners' perceptions regarding the technology, and the access to technology. Learner's computer experience may affect their learning in online learning environments, and computer proficiency is required to allow learners to participate effectively in online course. In the study of Ehrlich (2002), 25 graduate students participated in a study that was teacher-led and web-enhanced, and was broadcast over two sites via interactive video. The results identified that there were few learners with much real experience participating in threaded discussions, synchronous chat rooms, or other interactive instructional web sites (less than 2%). There were some issues that challenged learners through the course such as using the course schedule, solving the course problems with technology, and dealing with system difficulties. There was also a consensus among the majority of learners (90%) who recommended that continuous tutoring and hands-on experience should be part of any online course. Ehrlich (2002) reported that when there was a problem with technology which interfered with the learners work and the leaner was punished by the teacher, either in changes to the assignment requirements (e.g. changing due dates, deadlines being more flexible with when the technology was not working properly). The study reported that successful completion of online courses is often dependent upon the ease of use of the interface and the learner familiarity with technology. In this respect, Soon et al. (2000) reported in his research that the majority of learners had difficulties with the online environment interface because firstly the access to the online courses and secondly, most of the course subjects (60%) were new to the course. A successful distance education course only occurs when taking into account to what extent the learners are familiar with technology and the ease of using the interface (Ehrlich, 2001; Palloff & Pratt, 2001; Susman, 1998). Learners' technology interaction promotes learner independency and fostered assigning and distributed responsibility. Through web based courses, learners are able to overcome the frustration and technical difficulties associated with the computer technology and scored high

satisfaction with the course. DeBourgh (1999), and other researchers Leong & Saromines-Ganne (2002) & Thurmond et al. (2002) found contrary to the previous studies that the learners' experience in dealing with computers did not influence their own satisfaction with the course.

2.6.1.2. Learner-content interaction

Learner-content interaction occurs through working with the content in face-to-face as well as online web-based course, includes how learners interact with the content presented in the course (Thurmond & Wambach, 2004). Although there is a rapid increase in content that is shared through online environments, the information is not learning itself (Swan, 2001). In the study of Ehrlich (2002), learners in the beginning of an online course tended to meet face-to-face and only used the online content as a support pattern. However, they felt at the end of the course that approximately two-thirds of the course content could be successfully delivered via the internet. Thurmond and Wambach (2004) emphasized some factors which affected learner-content interaction, including continuous contact with content, clarity of content design, time, participation in online discussions and mode of delivering course content. Whereas in online and web-based courses, that support continuous contact with the content, constantly encouraging learners to work on the course content and improve their achievements (Leasure et al., 2000). When teachers pay attention to the quality of the course's structural design, with assignments and course materials being presented using a similar format for each content area, learners may have easier awareness of the learning in online courses (Swan, 2001). Other researchers have investigated the factors that affect learner-content interaction through online learning. One of the most essential factors supporting or hindering this kind of interaction is the time that is provided to the learners to participate through online courses, where in order to increase the interaction between the learners and the content they may need more time to complete the course assignments. Atack and Rankin (2002) confirmed the same findings, that a lack of time available to promote the course' negotiation is one of the biggest barriers facing learning in the online environment. The majority of the study's sample (57 participants) reported that their work was not an ideal environment for learners-content interactions because of the lack of time to access the content.

Miyazoe (2009) set up a study that was carried out through a blended learning setting in higher education in Japan and Taiwan, and involved four universities and four teachers seeking to understand the priority of interactive elements among the teacher, learner, and

content to determine the learners' perception of learning quality. The study results indicated that with the priority order of interaction as scored by learners, a higher value was related to the teacher-learner interaction in the face-to-face setting and learner-content interaction in online courses setting.

2.6.1.3. Learner-learner interaction

Interaction among learners is one of the most influential interactive features and an important factor in the success of online courses; it can happen between one learner and another or among several learners (Thurmond & Wambach, 2004, Swan et al., 2000). Ruberg et al. (1996) emphasized that to accomplish successful online discussion, share ideas, distribute participation, and collaborative thinking, strategies provided through an environment of social interaction is required which in turn encouraged peer interaction through structuring the learning community and supporting the learners' learning. Group work, or collaborative learning situations, involves learners work together in groups to complete their learning assignments. Damon (1984 as cited in Slavin (1995)) illustrates Piagetian, Vygotskian, and Sullivanian perspectives concerning peer collaboration:

1. Mutual feedback and debate, service peers motivate one another to give up 'misconceptions' and look for better solutions.
2. Communication between peers can help 'child master social processes', such as participation.
3. Collaboration of peers can provide a forum for discovery learning and can encourage creative thinking.
4. Peer interaction can promote children's knowledge generation process.

There are four types of learner-learner interactions as defined by Alavi (1994) and Palloff & Pratt (2001) included: (a) participation, (b) response, (c) feedback, and (d) short, focused messaging. Additionally, Larson and Keiper (2002) examined the discussions through an electronic discussion session as an effective medium for debate as well as the qualitative data gathered from face-to-face discussions. They reported that some learners participated in online discussions more than the others in discussions sessions. Fredericksen et al. (2000) reported that learners who accomplished higher levels of perceived learning had greater interaction with their peers in asynchronous learning. Similar findings were reported by Muirhead (1999) where the study indentified 44 students, (47%) of their online learning

discussions were negatively influenced by those who were late with their weekly online comments.

On the other hand, other researchers have stated differing results; Thurmond and Wambach, (2004) and Thurmond et al. (2002) reported that learners, who were required to participate collaboratively in online course scored less satisfaction with the course. The authors continued that the reason may have been due to completing the course assignments without face-to-face meetings. Lenhart et al. (2001b) also reported that the quality of the learner-learner interactions in online courses were similar to those in the face-to-face setting, the authors continued that the interactions were sometimes increased in the online course setting.

2.6.1.4. Teacher-learner interaction

A teacher has to engage, monitor and motivate learners. Regarding the monitoring and contextualizing functions for which teachers become responsible for are designing the process of social interactions including: "recognition, greeting students, soliciting comments, prompting, opening discussions, and setting norms and agendas" Ehrlich (2002). Web-based learning is a more effective learning experience, as the learner is participating in learning process and receives individual feedback from the teacher. Teacher-learner interaction supports learners learning through clarifying ambiguous points and reinforces a correct interpretation of course information. This kind of interaction occurs in traditional classroom setting, in a face-to-face, physical meeting as well as in the web-based courses through electronic means, such as chat discussions or e-mail communications (Thurmond & Wambach, 2004). The use of instructional technologies for computer-mediated instructional environments has changed the characteristics of the teacher-learner interaction (Gutierrez, 2000). In web-based learning environments, the teacher and the learner are temporally and physically separated; this participation in learning is in itself a positive learning experience where this kind of distance learning allows more effective interaction between the learners and teacher (Arsham, 2002). Learning interaction encourages distance teacher to adopt new and varied methods to foster the learning experience through existing and new teachers in online learning environments, and to investigate creative ways to promote their skills through online setting, to address the new needs of online learners. Teachers with variety of learning strategies and experience in a range of technological tools can employ learning through the interactivity in promoting formal and informal development opportunities such as sharing ideas with their learners (Muirhead, 1999).

Fuller et al. (2000) identified four challenges for online teachers to help the implication of instructional design in a learning environment as follows:

1. Overcoming the faceless classroom,
2. Adapting to a student centered teaching approach,
3. Managing time and techniques, and
4. Establishing the learning community.

In order to support the previous point, Ehrlich (2002) formulated some needs that teachers should take into account in order to create a community of learners in the following manner:

- Build a community which facilitates the ability for learners to get to know one another;
- Motivate learners through a learning community to participate in discussions; and,
- Raise learner confidence levels and promote a feeling of trust.

The main feature of the online environment is the faceless opportunity, where distance learning is occurring. Learners in this kind of environment may feel isolated which may cause frustration, so bridging the gap of the faceless situation can support the process of learners' construction of knowledge and expressing the personal experience of each participant. In addition, the shift that is taking place from teacher-centered teaching to the learner centered teaching through web-based learning environments is rapidly increasing where the class time and spacing are at the disposal of the learner. Online learners can access their online courses anytime anywhere and in their own space. In a face-to-face classroom setting, the teacher often takes center stage and becomes a lecturer; while in the online setting, the teacher becomes more of a facilitator (Gutierrez, 2000). The teacher's role is changed to build the learning community at first, tutoring the learners learning, the course time, techniques…etc.

In the study by Rhode (2009), experiences and preferences were examined for adult learners concerning the various interactions that they encounter in a self-paced online course. Rhode examined learners' interaction preferences for formal and informal orientation. The study's learners were encouraged to use both "Blackboard" as a learning management system and "Elgg" as an open source social networking engine. The results indicated that all of the learners valued interaction with the teacher most highly. Similarity, Anderson (2003) found that learners felt a course with high levels of all three interactions (learner-learner, learner-content and teacher-learner) would be likely to be more satisfactory.

In Jiang and Ting's (2000) study, similar reports were found using a sample size of 19 courses. There were strong correlations between teacher-learner interactions and average numbers of responses of that made by the teacher concerning the learners' responses (the responses of the teacher of each learner) and the average numbers have been made by the learners themselves through the coursework. The results of study of Faux and Black-Hughes (2000) indicated that learners preferred learning from the teacher rather than the internet itself, they were unable and uncomfortable to learn through the internet and they preferred listening to the content rather than reading it form the online course interface. The similarity reported by Aase (2000) where learners have enjoyed their interaction and attention more from their teacher and their peers in an online course. Similarity was reported by Ehrlich (2002) where learners stated that they could more easily develop a relationship and felt more connected with a teacher in a face-to-face setting, because they felt free to approach the teacher and could use non-verbal cues to assess the relationship. In the study by Fredericksen et al. (2000), which was based on a wide range of learners (1,406) enrolled in an asynchronous web based course, results reported a significant correlation between the learners' level of interaction with the teacher and level of perceived learning. Learners who felt they did not have a suitable access level to their teacher felt that they learned less than those who interacted with their teacher at a high level. A similar finding was reported by Swan (2001), where students' perceptions of their interactions with their teachers were positively related to the percentage of their course grades that came from participation in the course discussions.

On the other hand, some researchers indicated that the quality of teacher-learner interactions in online courses were the same, or better than the same kind of interaction in the face-to-face setting (Lenhart et al. 2001b).

The literature on teacher-learner interaction has been linked to a lot of variables such as teacher's presence, timely feedback, face-to-face encounters, performance, and learners value the interaction with their teachers. When learners interact with the teacher, the most frequent variable is sending prompt feedback (Thurmond & Wambach, 2004). Learners become active participants in social communities and construct their knowledge and meaning as it relates to those communities (Smith & Hardaker, 2000; Moore, 1996; Hannon & Adkins, 2002).This kind of interaction among the community members is more motivated and provides a better learning experience, helps learners to think, reflect and show ideas and information that directly relate to the content (Zhu, 2003; Garrison, 1990; Oliver & McLoughlin, 1997). As far as Lave and Wenger (1991) are concerned, interactive

participation is the reason for learning in community and practice, it cannot be explained out of the learning context because learners must be engaged in the learning environment in groups. These groups have been supported with community participations, contributions and sharing their prior knowledge, beliefs and feelings with the community members (Mäkitalo, 2006). Formulating good interactive online instruction facilitates the process of construction of knowledge, and good interactive online instruction provides learners the opportunity to learn and interact with other learners as well as the teacher, under the condition of learner-centered learning setting (Murphy & Cifuentes, 2001).

"Digital native" generation's teachers need a deeper understanding of the role of collaboration and interaction among learners and between them and the teachers to present the most effective learning goals. Thurmond et al. (2002) note that learning interaction significantly influences web-based learning., with the teacher presenting learning materials and planning the course content in a more interesting form in order to stimulate learner's interest and motivation; organize application of learner learning; support, and encourage each learner to learn (Miner, 2003). Increased interaction in online courses is associated with higher achievement and learners' satisfaction, however, the lacks of teacher-learner interaction or once learners feel isolated or that they are not receiving sufficient attention, or that the teacher did not respond on time, may increase frustration or anger, or may even force learners to disengage from the learning process. The lack of interaction in online instruction can cause learners to disengage from the learning process, resulting in decreased learning. They may feel discouraged and their participation may face hesitation, thereby decreasing the learners' motivation (Byers, 2000; Miner, 2003; Riccomini, 2002).

Online as well as face-to-face interaction occurs through learners experience in participating "mutual interdependence," while learners share information and receive feedback with their community members, and the teacher is one of the community members. Teachers' feedback by the establishment of guidelines, availability, and how feedback will be provided for the discussion is often a critical factor to shifting the teacher-learner interactive learning to a deeper level and to guide learners through a problem-solving process (Ehrlich, 2002). Feedback can be defined as the process of information exchange between learner and teacher with regards to an action, event, or process that results in enhanced learners learning (Thurmond & Wambach 2004). Feedback is the essence of teacher-learner interaction and is a relatively fundamental feature in web-based courses because of the physical and temporal distance between the learner and teacher. Receiving prompt feedback is the most frequented factor which impacts the learning interaction process (Vrasidas & McIsaac, 1999). Thurmond

et al. (2002) stated that the most frequent factors which directly influenced learners' satisfaction were "timely comments" from the teachers, whereas a teachers lack of expertise with web-based technology and pedagogy may add to their teaching time and effort (Davidson-Shivers & Rasmussen, 2006).

Teachers should provide their learners with prompt feedback to keep them engaged in the learning environment. They should also allow for additional time to be spent in dealing with their learners concerns as well as helping each learner to understand how his or her course is set up and function (Davidson-Shivers, 2009). Learners should be the given time and opportunity to reflect on what they are learning means. When they reflect upon anything they have learned, it becomes a product of repeated thought (Ally, 2004).

Time is one of the most common variables that influence online interaction, and providing learners with enough time help to engage the materials and resources and to reflect on their learning (Thurmond, 2003). Moreover, "An increase in time and effort may also be due to teacher-learner the high levels interactions" (Davidson-Shivers, 2009). Teacher-learner interaction feature scores significant differences regarding the amount of time spending in mutual interaction using Tomei's scale to calculate time spent on e-mail communications (Davidson-Shivers, 2009) where high levels of teacher-leaner interaction generally require contributions to be considered an active participants and through working in interaction situations (Anderson, 2003). Another variable that most greatly influences this kind of interaction is the amount of e-mails per online course (Cavanaugh, 2005; Tomei, 2004). Of course the number of mails depends upon a variety of factors, such as the number of learners in the learning community and the amount of content and its materials, resources and the number of activities. Cavanaugh (2005) estimated number of mails that had been posted through the learning community with an average between 300 to 600 e-mails. With a sample of 18 pre-service teachers, Jin (2005) also in his study scored teacher-learners interactions over a semester course with totals of 374 e-mails received and 434 sent by the teacher.

Between seven strategies that the teachers should take into account while designing their teaching situation, Bruns & Humphrey (2005) determined a time plan for the participation process as one of these strategies besides involving the discussion between the teacher and the learners to assess the progress in any given task. Providing sufficient time for participation reinforces the learners' learning experience (Schroeder, 2009). DeVries et al. (2002) identified another seven principles of constructivist teaching, with one of these principles being providing "adequate time," meaning the amount of time that has been allowed during the day, week and even months for the learner; they cannot construct

knowledge if it was limited. Vrasidas and McIsaac (1999) in their study included face-to-face and online sessions, reported that among several major factors influencing interaction was receiving timely feedback. Similarly the researchers indicated that when the learners felt that they did not have timely feedback they became less motivated and this discouraged their contribution.

Providing a high level of teacher-learner interaction aspects through online learning environments such as prompt feedback may enhance learners' satisfaction (Leong, Ho, & Saromines-Ganne, 2002). As a result of 60 learners' feedback, Soon et al. (2000) reported the same findings while they were examining the learners' satisfaction with an online course. The results illustrate that the low level teacher-learner interactive feedback caused negative response from the learners. Another essential factor in examining satisfaction of 120 students enrolled in an online course was timely feedback from their teacher (Thurmond et al., 2002). If learners do not receive enough feedback and reinforcement from the teacher, they will not be sure if they have a clear understand of their subject matter or not (Muirhead, 2001b). They may feel hesitant and discouraged regarding their own participation. Similar findings reported by Soon et al. (2000) indicated that learners' satisfaction was affected by insufficient feedback from their teacher to their questions, as reported though their negative feedback comments. Providing more prompt feedback may enhance learners' satisfaction (Leong, Ho, & Saromines-Ganne 2002).

In the study of Fraser et al (2010), a questionnaire on teacher-learner interaction data from 422 university students was analyzed. The study focused on perceived teacher-learners interaction and its impact on the achievement and attitudes of the learners. The study found that there were significantly positive interactions in terms of leadership, helping/friendly and understanding behaviors between two groups of learners from a management department, relative to students from a computer science department. The results also reported a simple correlation and multiple regression analyses which revealed positive associations between learners' achievement and attitudes and teacher-learner interactions (i.e. higher scores on the QTI scales with a positive connotation and lower scores on the QTI scales with a negative connotation). Similar findings were reported by Maulana et al. (2011), where this study examined the interpersonal teacher behavior based upon learner and teacher perceptions and investigated the relation between learner's perceptions of teacher interpersonal behavior and his or her motivation. The majority of learners agreed that their teachers were directive or authoritative.

2.6.1.4.1. High versus low level teacher-learner interaction

There is limited evidence from empirical research which has been carried out relating to the ways in which teacher-learner interactions are promoted in learning situations. Thurmond & Wambach (2004) formulated several factors that highlight the importance and the need for timely feedback in online courses. First, due to the lack of face-to-face interaction, a learner receiving written comments from the teacher becomes even more crucial. Second, the geographic separation between learner and teacher foster a sense of isolation (Atack & Rankin, 2002; Billings et al., 2001). Third, the flexibility of online courses allows learners to work ahead. Anderson (2003) reported that because of the individuals' differences between participants through the learning community, this fosters difficulty when describing or assessing through a group of participants in traditional as well as in online learning environments. As a result, educational designers' courses involve activities that encourage this kind of interaction during planning or development purposes of the course.

Distinguishing between the two levels of teacher-learner interaction (high and low) is a quantitative exercise in which a researcher, developer, or the even participants themselves count the number of times they are actively engaged with the other participants or content (Anderson, 2003). Diggins (2004, p. 56) distinguished between a number of key themes related to what is currently being taught regarding communication in social work which can be used as a highlight while describing the high level teacher-learner interaction, as follows:

1. Moving from dominance of interviewing and interview skills to communications in the social learning situations.
2. Pay more attention to the importance of writing in the social software: Computer competency as well as writing competency is becoming equally as necessary for educational institutions in the modern workforce, to adopt computer literacy requirements for their learners (Arsham, 2002). Writing supports reflection on and integration of new knowledge with existing knowledge (Forte & Bruckman, 2006).
3. Pay more attention to the communication skills training, including:
    - Increasing user involvement, with users coming in to deliver teaching and also being involved with assessment;
    - Increased assessment by observation as well as written assessment.
4. Emphasizing the experiential learning principles, reflecting on the participated learning activities such as group and collaborative learning situations followed by exercises and feedback.

5. Make effective contact with individuals and organisations for a range of objectives via the electronic means. However, there was no systematic approach to teaching and learning about ‘making effective contact’ that distinguished between individuals and organisations or different objectives, teachers should pay more attention to the idea of interlinking with the individual through the learning situation.
6. Clarify and negotiate the purpose of such contacts and the boundaries of their involvement.
7. Listen actively to others, engage appropriately with the life experiences of service users, understand critically their viewpoint and overcome personal prejudices.
8. Use non-verbal cues in an effective manner to guide interpretation, where ‘non-verbal communication’ is a key skill of the benchmark of such a study about the respondents refer in their learning situation.
9. Identify and use opportunities for purposeful and supportive communication with users within their everyday living situations.
10. Follow and develop an argument and evaluate the viewpoints and evidence of others.
11. Write accurately and clearly in styles adapted to the audience, purpose, and context of the communication.
12. Present conclusions in an electronically structured form, which is appropriate for the participants for whom they have been prepared.
13. Make effective preparation for, and lead online sessions in a productive way.
14. Communicate effectively across potential barriers resulting from individual differences.

2.7. Social networking software

Online communication technology is one of the most important elements of modernity’s knowledge society. Education has not been able to keep up with the developments continually happening outside the schools walls (Downes, 2005). This is made all the more clear by the recent national American survey by the Kaiser Family Foundation, which reported that most American adults spend every waking minute except the time in schools using electronic media. From this modern context have emerged online versions of social support, known as Computer-Mediated Social Support (CMSS), which are rather different from traditional forms of social support. This new kind of social support is realized through online communication and interaction, and is especially suitable and valuable for people in environments with a lack of opportunities for face-to-face social support (Chen & Choi, 2011, p. 1068).

Online instruction and computer-supported learning with tools promote the learning outcome such as Computer Supported Collaborative Learning (CSCL) and web 2.0 technologies, in particular social networking software. CSCL has enabled and facilitated the online environment by providing more and more opportunities for collaborative strategies to be incorporated into online environments. Utilizing this form of e-learning depends on the learners' prior skill and confidence in their ICT uses, as well as depending on what extent this use of technologies can take them above and beyond how they would normally use it in an intellectually way. It depends on a teacher who is not only adapted to the social constructivist perspective towards learning, but who also understands how to exploit the digital technologies to support this perspective (Laurillard, 2011, p. 65). CSCL should not only use knowledge to guide the learning processes, but should also create contextualized situations and offer tools that encourage learners to construct this knowledge and reflect their meaning. CSCL tools, especially web 2.0 tools such as Blogs, RSS, Facebook and wikis, support learning situations with powerful interactive discussion functions facilitate the social construction of meaning. Learners from a variety of locations and cultural backgrounds can contribute to these CSCLs and exchange their prior knowledge. They have the ability to write for real audiences who respond synchronously or asynchronously to the other posts and contributions through these situations. Learners with low prior knowledge can utilize the stronger ones in the same online community; this helps them to understand both their culture and the culture of others.

Social networking software aims to store as much content as possible, which is generated by current users and added to by new users. In order to grow the content of social networking software, contributions are required from a growing number of participants, such that the content's value grows as more participants edit, share, draft and redraft it. Through social networking software, users do not merely send messages to their peers, but also play games, share virtual gifts, make synchronous/asynchronous chat sessions, comment on others' activity, share media objects and YouTube files, and display their status (Gehl, 2011, p. 1239). Through these multifarious online interactions, participants are able to share and exchange ideas in a variety of forms, and can in this way act as factors of support that decrease a user's sense of isolation and relieve the psychological and physical pressures that can happen in the process of intercultural adaptation (Chen, 2010). Interaction and contributions through social software is often (but not always) asynchronous, meaning that participants often interact by sending a contribution and then closing their account. Other participants logging in at a later time then make comments on or 'like' the desires, images, videos, habits and stated needs of the users whose activity they are able to access. Thus, what

social media site users are interacting with are digital objects that have meaning within the context of social connections (Gehl, 2011, p. 1239). Social networking software, such as Facebook, includes basic opportunities or applications that allow participants to post text, share photos, and comment on other users' profiles, such as the 'wall', an area for users' comments (Gehl, 2011, p. 1239).

Social networking software are designed to contain potential features, such as interactive examples, animations, videos, narratives and written texts that provide learners with a 'self-help' learning resource to complement the traditional textbook style (Arsham, 2002). Now, it is even more exciting, with the appearance and development of new tools which have become collectively known as 'Web 2.0'". According to Freedman (2006) "The web is, and always has been, an exciting place for education in terms of the possibilities it offers for research and collaboration. Web 2.0 supports users with new ways of finding and manipulating digital content. The absorption capacity of social software allows for continually increasing growth of users and their generated content, which is hidden under the smooth interface of these social media sites. At the same time, users are protected by Terms of Service agreements and intellectual property regimes (Gehl, 2011, p. 1238). For example, the PbWiki TOS states:

- Your stuff is yours; we don't own it when you post it.
- Your secrets are safe with us; we'll defend them as best as we can.
- We don't police you, but if the police tell us to take your stuff down, we will.[1]

Web 2.0 infrastructure refers to a combination of hardware, software, services and organizations. Together, this provides a wide range of services for global research communities, such as: high performance computation services; data, information and knowledge management services; observation and management services; interfaces and visualization services; and collaboration services (Atkins et al., 2003). The interfaces of the popular Web 2.0 technologies, especially social networking software, ask users to react and to present his /her current 'statuses'. The users of social networking sites are prompted with various questions: Facebook asks 'What's on your mind?'; Twitter wants to know 'What's happening?'; and MySpace users are asked 'What are you doing right now?'. To participate in these social media, the user is encouraged to update his or her status, check on his or her friends, send new friendship requests and look for new social connections (Gehl, 2011, pp. 1232-1237).

[1] Available at http://pbworks.com/terms-of-service?utm_campaign=wiki-link , last accessed 8 February 2012.

Franklin and Van Hamelen (2007, p. 4) have argued that the full implications of web 2.0 for learning and teaching need to be viewed in the light of media and technology contributions. They highlight a number of particular factors that should be considered:

1. The increasing growth of web 2.0 as a result of and in parallel with new media, particularly with regards to the new communications opportunities that have raised through telephony and the broadcast media and knowledge explosion era.
2. As a result of the increasing use of broadcast media, web 2.0 technologies will be adopted with greater audience participation and audience-created content.
3. Content will be created, shared and consumed in a variety of means that differ from desktop browsers, such as 3G telephony, i-pads, etc., which will encourage a move to greater mobility in browsing.
4. The computing era is changing our everyday digital and media environments, such that the world is becoming a small village communicating and interlinked in new ways.
5. The social presence of the web will increase, and will aid communication between people in different and new ways (Franklin & Van Hamelen, 2007, p. 4).

Using e-learning in nowadays learning and teaching environments fosters these situations. The new trends of digital media, ICT, web 2.0, and social networking software, support learning and teaching with a lot of potentials. Learners already use these technologies in their daily life; they already use Facebook, twitter, MySpace etc, but the challenge is how to merge these tools into their learning situations. To understand more about this point, we should first understand more about web 2.0 and one of the social networking software (wiki) and its characteristics, and then exploring its potentials as a social software tool.

2.7.1. Web 2.0

One of the increasing growth aspects of distance learning is online instruction which makes education and training more accessible and more individualized, while providing greater educational opportunities (Hartley & Bendixen, 2001). Web 2.0 technologies as online instructional tools provide users with the ability to access many different types of information resources that help them understand not only their own culture, but the cultures of others.

Web 2.0 is a term used to describe a second generation of the World Wide Web (www) which enables users to read and write web. The first generation of www has been defined as web 1.0 (Spivack, 2006), where the core interest of this term was on web construction and making it easily accessible to the users. During this phase, the focus was on

protocols such as HTTP, the first Web browsers, Web development platforms and tools, Web-based software languages such as Java and Java script, and the creation of simple Web sites.

The term web 2.0 describes internet tools that include new trends and a wide number of social networking software that enable users to create, publish and share online content such as Wiki, Blogs, podcasts, and RSS feeds (Judd et al., 2010; Moore, 2007). Most of these sites are driven by databases and encourage interaction between users (McFedries, 2006, p. 68). Franklin and Van Hamelen (2007) defined web 2.0 as a technology with the great potential to make a change to higher education. This allows learning to enhance its quality through the use of web 2.0 technologies to make it more appealing, giving learners a greater sense of independence and autonomy, while increasing collaboration and pedagogic efficiency. Web 2.0 refers to the shift of static web documents into documents that have the ability to be changed by other nodes (Roush, 2005, p. 49).

Web 2.0 virtual learning environments provide learners, as well as teachers, with ample opportunities to create useful educational resources, manage these resources, and post contextualized activities through learning environment. Even the well known PC applications, such as word processors and spreadsheets, come to a new life in the web 2.0 world. Learners can produce, and upload new resources or edit existing ones to their peers while they are sharing these environments (Nikolov, 2011, p. 53).

Social Networking software is the main feature of Web 2.0 technologies, which present a flow of tools that foster the social interactions between users. This includes blogs, wikis, podcasts, file-sharing services, MySpace, Facebook, Web-logging sites, and three-dimensional virtual environments such as Second Life and Active Worlds (Alexander, 2006). All of these tools are increasingly being used to support learning and they provide collaborative learning in particular with a lot of opportunities (Hughes & Narayan, 2009; Kennedy et al., 2009; Judd et al., 2010). Among the best known of social networking software, wiki is considered one of the most powerful tools for supporting online collaborations with many possibilities and opportunities (Spivack, 2006).

2.7.1.1. Wiki: a new digital media

Wikis can trace their roots to 1995 to the work of Cunningham (Chawner & Lewis, 2006; Wang & Beasley, 2008). They have been coined by Ward Cunningham through his wiki "WikiWikiWeb", and also known as "Ward's Wiki" or "TheOriginalWiki". Cunningham (1995) defined wiki as the simplest database that can be used through the networks. It is the simplest web-based asynchronous collaborative software (Désilets & Paquet, 2005; Rick &

Guzdial, 2006). Wiki is known as an example of a fast and simple web page or set of web pages that can be easily and interactively edited by anyone, anywhere who have the ability to access it. Any internet user can change, draft, edit, and add content to the web page, even anonymously. Indeed, the particular advantage of wiki-approach is offering valuable and powerful functions that foster the collaborative and group work setting, they provide users with more visual editors, tracking pages, adding comments, participating discussion and chat sessions, posting e-mail notifications and using subscription RSS feeds; search textboxes; unstructured tagging; and documented information about participants' statistics (Schroeder, 2009; Judd et al., 2010; McFedries, 2006; Lih, 2004; Fuchs-Kittowski & Kohler, 2002).

Wiki can be used for a host of purposes and a variety of forms such as: it can be used as a repository of content as well as a tool of frequent developing of course content, group work page and collaborative problem solving tool. It likely to be a simple, quick and easy way for posting, comment, sending e-mail alerts and RSS feeds, or to be as an easy access content editing tool (Schroeder, 2009).

Recently, the use of wiki has seen rapid growth. It has a huge number of users through the online learning community. Figure (1) shows the statistics for worldwide users of wiki starting in 2004[1]. The wiki sites indicate ascending login ratios which are evident in the diagram and indicate an increasing use of the wiki from 2007 until 2009.

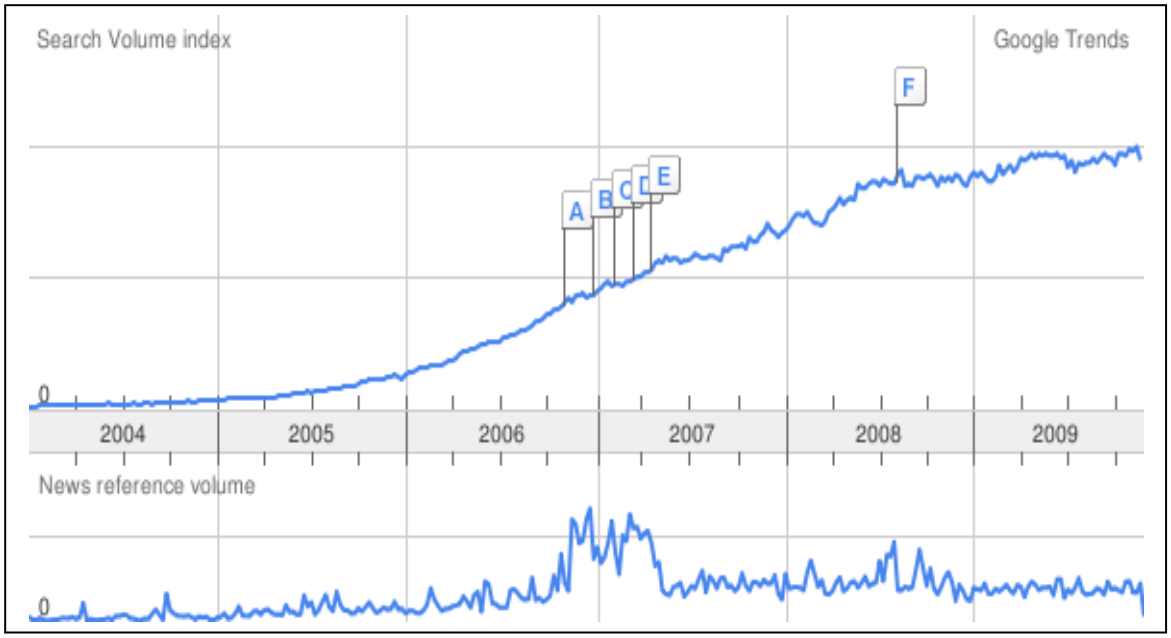


Figure 1: The statistics of the users of wiki all over the world.

This diagram explains the rapid attention of this web 2.0 technology, which can be seen in the large number of international conferences that have been held concerning this new approach

[1] Retrieved on 2 nd Dec. 2009, from http://google.com/trends?q=Wiki

of new media. Some have been academic, such as the Annual Conference of e-Learning 2.0 which began in 2007[1], while others are international initiatives such as the European Union's initiative in the learning 2.0 which was held in Italy from 13-15 July 2007[2]. There are also private initiatives such as the O'Reilly Media conference, which inaugurated "web2.0"as a new term in October 2004[3]. In addition to these are more international conferences that have been held in the past decade and focus on e-learning and the term e-learning 2.0, such as the annual web 2.0 summit [4] and the Web 2.0 Expo [5].

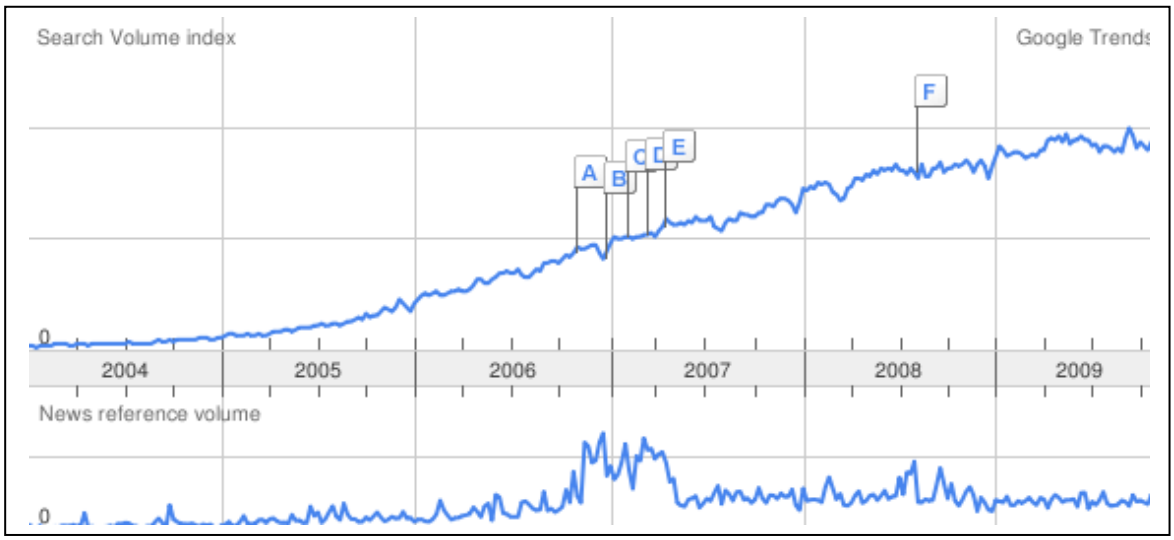


Figure 2: The use of wiki in Germany.

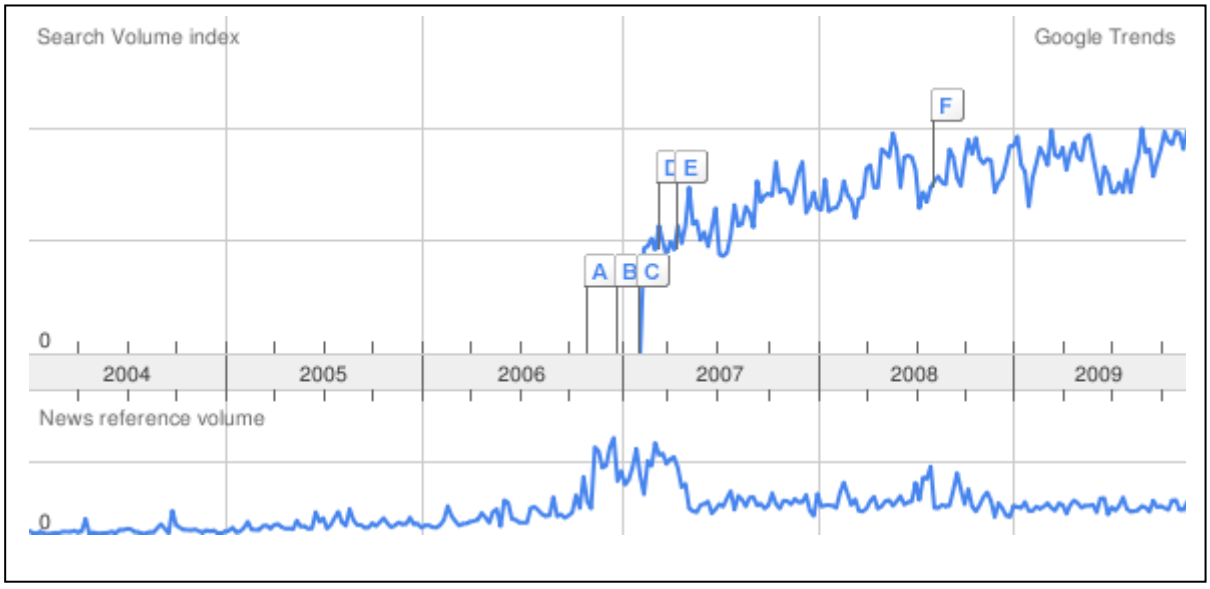


Figure 3: The use of wiki in Egypt.

[1] Retrieved on 2nd Dec. 2009, from http://www.drexel.edu/irt_new/eLearningConf2009/index.html
[2] Retrieved on 2 nd Dec. 2009, from http://www.eden-online.org/eden.php
[3] Retrieved on 2 nd Dec. 2009, from http://oreilly.com/web2/archive/what-is-web-20.html
[4] Retrieved on 2 nd Dec. 2009, from http://www.web2summit.com/web2009
[5] Retrieved on 2 nd Dec. 2009, from http://www.web2expo.com/

Moving from the international field into the local in both Germany (see figure 2) and Egypt (see figure 3) and by comparing the two figures, the use of wiki in Egypt began later in 2007, while it started in Germany in 2004.

Most wikis have an edit button displayed on the screen and users can click on it to easily access option to edit the wiki text, change or even delete the contents of the page while the old version of the text can be saved. The moderator of the wiki can review it and review the changes that the learners may have made (Augar et al., 2004a, Judd et al., 2010). Hypertext-style can be used to link between pages to create a navigable set of pages.

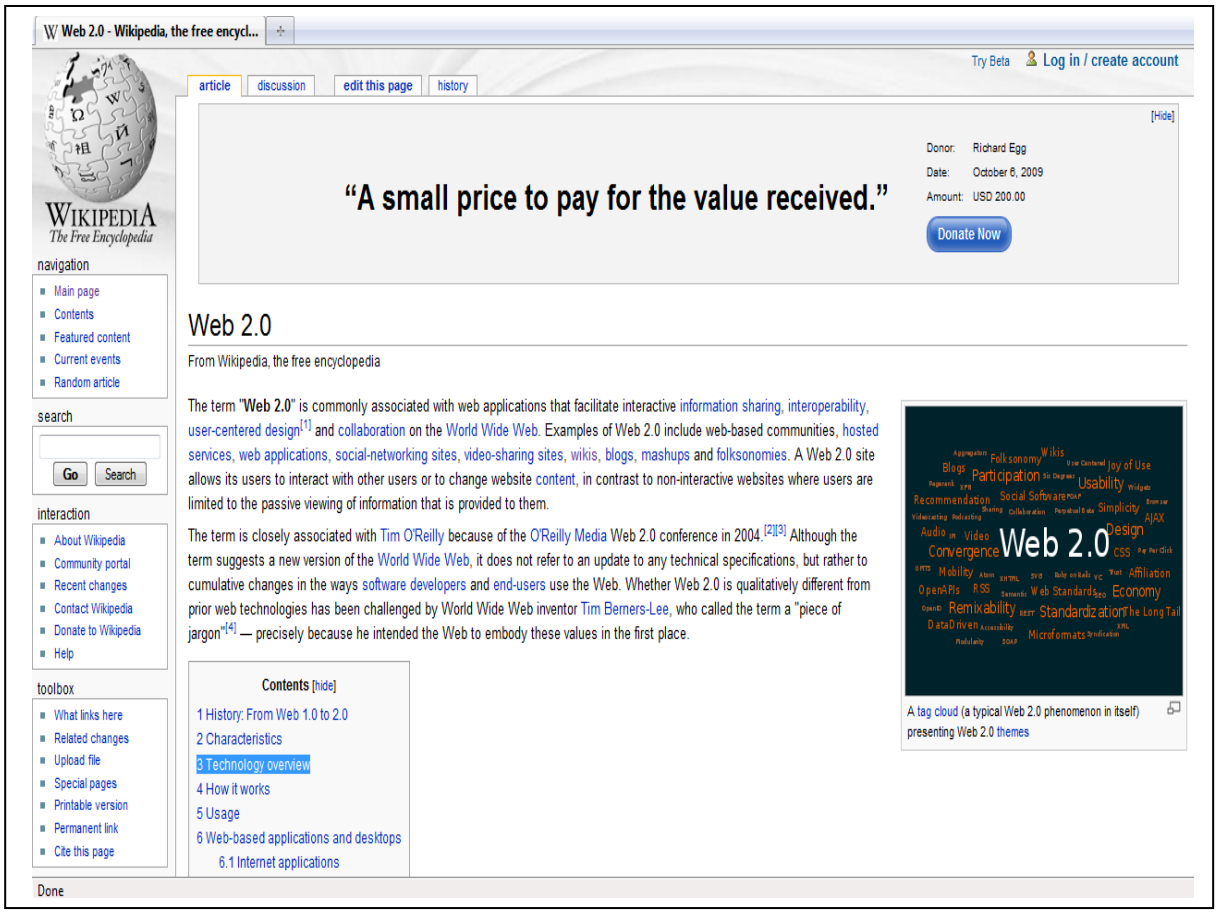


Figure 4: Wikipedia the most popular wiki.

2.7.1.2. Wiki characteristics

All wikis share some general characteristics, but at the same time each wiki has its own unique set of potential features which can make it more suitable to be engaged as an online learning environment. Most wiki providers' websites support wiki with two working modes, '*view*' and '*edit*'. By default, wikis are represented in the '*view mode*', where the wiki page looks like a normal webpage. The wiki user turns to shift to the second wiki mode, the so-called 'edit' mode when he/she wants to edit the wiki page. To edit a wiki, users first have to log-in to the wiki and then click the tab style format or button entitled "Edit," which is

featured on each wiki page or a similar button. Consequently, most wikis use so-called wiki syntax that helps to format the content (e.g. bold, underline and hyperlink text formatting). Wiki pages are easy to create and edit without any prior experience in writing web pages. New users do not need to learn how to format tags and only require nominal understand. Some wikis, such as Wikipedia, do not require the user to know wiki syntax. Rather, an editing toolbar is provided, so the user can format the wiki content using this toolbar. Moreover, wiki formatting opportunities are very limited, resulting in being as a very "plain" asynchronous text-based (Bold, 2006; Bryant, 2006; Fuchs-Kittowski & Kohler, 2002; Lamb, 2004; Raman et al., 2005).

Augar et al. (2004a) formulated two different writing styles regarding to Leuf and Cunningham's perspective (2001) on using wiki. The first is so-called '*document mode'*, where wiki participants collaboratively create documents and wiki administrators leave their additions to the wiki document unsigned. As time passes, the document' content becomes a representation of the shared knowledge or beliefs of the wiki participants. Similar experiences are reported by Schroeder (2009) where teachers in wiki learning environments can quickly and easily set up a course wiki and send invitations to enroll students as contributors, thereby allowing learners to edit wiki course pages and act as active collaborators. As time passes and changes are made to wiki pages, new versions are created. Teachers can offer to revert to previous versions and the ability to restore a page to any version is available. The second wiki writing style is '*thread mode,'* where wiki participants' post their edits like signed messages and their peers respond, leaving the original messages as it is.

2.7.1.3. Digital wiki as a learning tool

The most challenges that are encountered by emerging wiki in educational institutions involve the idea of distance. These challenges are as follows: firstly, learners do not directly interfere with the work of other learners. Secondly, learners do not want other people to add to or change their work, they do not like for others to interfere in their own work. Thirdly, they are unsure as to whether or not to publish their work on a public domain, and do not want their work to be subject to evaluation, scrutiny and judgment. This may lead to frustration and heighten the feeling of isolation by learners who are engaged through web 2.0 technology tools, and particularly social networking software such as wiki (Bruns & Humphreys, 2005).

Once an online learner feels isolated, or that they did not receive sufficient attention, they may become unengaged from their learning situation. In-depth investigations suggest that these frustrations are caused under the condition of a poor online teacher-learner

interaction (Thurmond et al., 2002). Perhaps the cause of frustration is related to the limited or even lack of, new experiences for online learners within the online learning situations. Working in online learning environments requires more support for the learner as the physical absence of a teacher with his/her nonverbal and body language leads to wide feelings of isolation and promotes continuous frustration. In a traditional setting where courses often are teacher-centered, most learners find that classrooms measure the individual's work rather than as a group, while in web-based setting learners may not feel the teacher's presence because of the lack of real face-to-face interaction and contact, which reduces the interaction between learners and teacher in web-based learning situations (Atack & Rankin, 2002; Billings et al., 2001). Schroeder (2009) further formulated and categorized a list of ten practices and strategies for successful teaching and learning settings in wiki networking software. These strategies provide a helpful guide that teachers should take into account when planning and implementing successful collaborative learning situations. The first two practices concern basic skills regarding setting up a wiki and making it ready to use, and the remaining eight practices are strategies that should be engaged during the wiki experience. The ten guidelines are outlined below.

The first guideline is to include detailed wiki instructions or a link on the home page and provide time for practice. Providing clear and explicit instructions about the course structure, topics and resources and on how to use wiki software will help to make the learning outcome more significant, especially for users new to wiki. It also provides suitable time for contributions and participation, thus reinforcing the learners' learning experience. Linked to this, the second guideline is to post wiki conventions and require participants to abide by them. Teachers have to inform the wiki contributors of the wiki guidelines and course deadlines, and they should ensure that all the participants take into account these rules or conventions, putting all these guidelines in a visible and reachable place (e.g. the wiki front page or a page entitled 'Guidelines' or 'Course conventions'). The wiki thus ensures in advance that it can accomplish its aims and it is made a more attractive and effective learning environment. As a third guideline, teachers must be patient with learners and realize that they may require technical assistance as they learn how to participate in a wiki environment. Teachers should be aware of that not all learners are familiar with the wiki and that for most of them may even be the first use of wiki. They may want initial technical support as well as support in learning interactions. Once they acquire a good level of experience with the wiki, they can improve both in terms of content achievement and in their satisfaction regarding the course, through feeling comfortable in a wiki learning environment. Arsham (2002) reported

some key steps that aid in learners' learning process, starting with the recognition of learners' prior knowledge level of the prerequisite(s) topic(s), which can be found by giving questionnaires for them to fill out and then by analyzing the data and updating the content to meet their needs. The rest of Arsham's points are as follows: provide the course materials with an overview and ask the learners to write an essay about the topics, with the aim of encouraging reflection on the course content and motivating them and interesting them in the course; review the homework assignments at frequent intervals to recognize learners' weak spots; ask them to re-do the parts that seem inadequately discussed and if they repeat the mistake give feedback with encouragement; make a FAQ based on the last class' most frequented questions and common mistakes to encourage learners to ask more deep and critical questions and to avoid falling into the same mistakes; and finally formulate in the final exam some open-ended questions to make all the learners write a short paragraph that shows to what extent they understood the topics.

The fourth of Schroeder's (2009) guidelines is to create a culture of trust within the wiki. The role of the teacher is being radically changed, in a shift that includes disseminating the culture of trust among learners and between them and their teacher. Once the learners feel comfortable and trust each other, feelings of fear and frustration may be dissolved, and avoiding editing others' work will no longer be such an issue. When (especially shy) learners avoid editing others' work, they cannot utilize all the advantages of the collaborative learning settings and the group work features that have been outlined above. Teachers may build a culture of trust by providing more real-life activities at the beginning of the wiki course (e.g. preparing to make a trip and involving the learners in some of the decisions) before using activities related to the content.

The fifth guideline is to provide clearly and explicitly the expectations learners should have from the course. The learners' understanding of course expectations is a fundamental factor in successful learning in both face-to-face and online settings, as well as in blended learning situations. As a sixth guideline, the activities that are assigned should be both meaningful and authentic. Creating and implementing meaningful and authentic activities through the wiki software supports the wiki learning experience, since they help to mitigate the distance felt between the learners because of the existing temporal and spatial distance between them. Formulating activities with these qualities that are based around problem-solving and critical thinking can promote the wiki learning outcome.

The seventh step is to include a common goal for the collaborative activities. Determining a common goal to the type of activities outlined above can increase learners'

motivation towards the learning experience and encourage interaction among learners and between them and the teacher. The eighth step is to define and identify students' roles, activities, and assessments. Assigning wiki users' roles (e.g. as administrators, editors, writers or readers) as well as formulating activities that are close to real life activities is an essential factor affects the success of collaborative learning. Ninthly, students should be reminded of course deadlines and schedules. Although the core of the wiki learning environment is allowing a wide range of freedom to users, sometimes students need to be reminded of requirements and deadlines. The final guideline from Schroeder is to provide model examples of collaborative activities. As most of the learners will have never participated wiki collaborative settings, teachers are required to model and simulate recent and previous experiments and sessions from these environments, and to represent them to the students so that they may use it as prior knowledge in their learning.

Text-based asynchronous wikis collaboratively allow learners to socially interact, share data, exchange ideas, and enable them to continually develop online content in "an open, public, and participatory" way (Alexander, 2006; Jenkins, 2006). They differ to the other collaborative generation and construction of knowledge attributed to the forms of content/document management systems, discussion boards and chatting sessions, as well as the results of communication (Fuchs-Kittowski & Kohler, 2002). Providing a huge source of information allows each individual to contribute their own knowledge, experience and disseminate content, while constructing the meaning and knowledge with others from within the same community (Clark, 2006; Hughes & Narayan, 2009). They have some essential characteristics and fundamental principles that may impact teaching and learning situations as reported by Lamb (2004):

- *Anyone can change anything.* Wiki allows users who have access to this wiki to share, edit, delete, post a comment and even edit the content. They use the same functions of editing the wiki using the two modes of *view* and *edit* using the buttons with the same name or something similar.
- *Wikis use simplified hypertext markup.* As stated above wiki does not need any prior experience with programming or writing web pages, and wiki users may need to learn a few formatting tags. Some wikis, such as Wikipedia, do not require knowledge of any additional programming skills (Augar et al., 2004a).
- *WikiPageTitlesAreMashedTogether*: Mashing is the process of combining a mix of Web page titles to allow ease in the creation of new pages. The titles of the wiki pages

often eschew spaces. Wiki software also allows users the ability to easily interlink separate Web pages into one that has the same idea.

- *Content is ego-less, time-less, and never finished:* content editing often occurs with anonymity or at least from a group of participants where the same text may have a many different authors, so the authorship in wiki "can be radically alerted" (Lamb, 2004, p. 38).

Wiki provides a means for dialogue and the interactive discussion feature leads to the social construction of meaning, where learners have the opportunity to contribute to an academic content with other peers and professionals in communities often far from their classroom space. Wiki encourages and facilitates users' collaboration, supports users' opinions sharing, and develops the active online communities on the web (Wang et al., 2005); where wiki supports learning situations with powerful possibilities encourage the interactive learning strategies and the active contributions of net generations. These possibilities promote the ease access of information, support learning with synchronous and or asynchronous discussion sessions. To adjust wiki to serve as a collaborative tool, several educational and pedagogical ways are attributed by Mader and Rooke (2006) in the following manner:

1. An easy way to create simple websites: wiki with the simplicity of its functions does not hinder learners' learning. All the learners focus on the course assignments and continually work on content development.
2. Project development with peer discussion: wiki is project-based software; supports group work and the interaction of peers. Learners and other peers can edit, share, and submit such as a task, tracking pages, adding comments, participating discussion and chat sessions, posting e-mail notifications and using subscription RSS feeds; search textboxes; and unstructured tagging (Schroeder, 2009).
3. Group authoring: wiki supports a feeling of community among the learners. Each learner is responsible for the successful work of the group while at the same time he/she is responsible for his own work. They collaboratively share and edit the wiki page content, overlap the individual problems that may appear by asking each other or the teacher to solve these problems.
4. Track a group project: in order to adjust a wiki to enhance social interaction among learners, teachers should pay attention to both the authentication and tracking through teaching and learning settings (Augar et al., 2004a). Wiki supports the educational institutions with the way to track learners' work, it gives the teacher documented information about participants' statistics (Schroeder, 2009), and allows immediate

access to the recent version of the document. Teachers are responsible on the process of reviewing the old versions of the wiki page text, thus revert to the best one.

5. Data Collection: wiki is considered an easy way to collect data from the learners by sending comments, replies, posting e-mails, and participating synchronous or asynchronous sessions or even through editing the wiki page itself (Mader & Rooke, 2006).
6. A reference of encyclopaedic and bibliographic format: Most of the wiki's work is related to the core idea of Wikipedia in sharing the content with the others. Learners also have the possibility to gather an unrestricted number of external websites related to the main topic of the course and organize them according to their prior knowledge (Barton, 2008).
7. A handbook or textbook: learners collaboratively can build their own guide to improve the wiki page text, through the process of exchange the experience among them and /or between them and their teacher.
8. Wikis are authored by communities, not individuals, where group work is the essence of the wiki learning (Mader & Rooke, 2006; Barton, 2008).

It is remarkable that the new media of this rapidly changing society have been generally ignored by educators, despite their huge potential for enriching teaching tools. These new media include the wide use of internet and its applications, social networking software, and the increasing use of laptops, smart phones, i-pods and i-Pads. Teachers can adapt these technologies to existing pedagogical approaches and use them as a means to support learners in navigating common and new learning environments with familiar structures and ideas. It is, however, extremely important when incorporating these applications and tools in education to know when and how to use different technologies and also to decide when they should be shut off (Rosvek, 2011, p. 100).

When it used in educational institutions, wiki presents an innovative approach that facilitates collaborative learning, through positively affecting learners' attitudes towards group work, promoting peer collaboration and supporting interactive learning situations. Interactivity, and in particular interactive learning, occurs through the use of synchronous or asynchronous communication tools, both of which are possible with wiki (Lavooy & Newlin, 2008). However, wiki and its synchronous or asynchronous communication tools are not themselves collaborative. Wiki would need additional educational and pedagogical support in order for educators to perform the role they usually aim to do in enriching the learning situation with collaboration among learners and also between them and their teacher (Judd et

al., 2010). Wiki is a repository of information that supports collaborative learning by allowing each learner to participate in group work, thus enriching group work with opportunities and possibilities that serve the construction of knowledge, experience and meaning (Clark, 2006). It generally acts like other social networking software, offering learners with new ways to interact, share, edit, draft and redraft online content with their peers and the surrounding world's culture (Bryant, 2006).

Higher education institutions are inventions or centers of teaching and research (Nikolov, 2011, p. 47). A virtual university (virtual campus) can be seen as "a metaphor for the electronic, teaching, learning and research environment created by the convergence of several relatively new technologies including, but not restricted to, the internet, World Wide Web, computer mediated communication" (Van Dusen, 1997). As a result of the development of our knowledge society, the online higher education environment is changing quickly. Since the time Web 2.0 technologies appeared, and with the increasing use of computer and internet applications, the instructional development for teachers in higher education has become an important topic. These technological tools have been involved in teaching and learning design, and are inducing changes in the map of education. Education can overcome demographic, economic and geographic boundaries, and promotes new forms of learning such as lifelong and personalized learning with the wide perspective of Open Educational Resources (OER) (Nikolov, 2011, p. 44). Lifelong learning will be an imperative for all professions, and needs to be addressed by the education system. Learners themselves have to be lifelong learners, to be able to handle and use new technologies, tools, devices, and learning materials, whenever they are available. It becomes vital for the learners in this knowledge society to be innovators, creators and if we were determined by our traditional way of teaching, this is not likely to occur to its greatest potential. As learners become more and more qualified in using these new technologies, knowledge acquired on graduation from a traditional educational setting may be 'dead on arrival' (Rosvek, 2011, p. 100).

2.7.1.4. Challenges in using wiki in education

In the study by Lund and Smørdal (2006), based on their recorded materials and on talking with teachers during their projects, they summed up teachers' roles and the challenges of wiki learning. Their conclusions can be grouped into two main points. First is the move from an individually-acquired to a collectively-created knowledge context. Learning through wiki provides functions that make the teacher continually monitor his or her learners' work to determine which learner has edited, shared or modified a text. They also monitor statistical

information about learners' accessing time to the wiki, their prompting time through e-mail alerts, RSS notifications, or reverting to versions of wiki page histories. All of these potential aspects of wiki-use bring the teacher closer to the collective production of knowledge, and assist and scaffold productive interactions among learners and between them and the teacher. The second major conclusion from Lund and Smørdal's study was that with wiki features the teacher needs to adapt themselves to be more able to work with wiki using those new activities. Teachers with wikis are supported with ample opportunities to expand their experience, thus bridging the gap between the traditional areas of teacher expertise and lesson-planning and the concepts of design in online settings, where the ability to add multiple dealings to activities involve a greater variety of interactions between human and non-human resources. This kind of design involves knowledge of the constructed tasks and assignments that are irreducible to individual problem-solving.

Building on these ideas, Schroeder (2009) formulated various aspects of effective use of wiki in educational settings. He divided these ways of making wikis' impact more powerful into four groups, which can be summarized as follows:

1. Using wiki in education supports group work and promotes collaborative learning activities. Learners can engage in authentic and meaningful activities of collaboratively sharing, editing, drafting and redrafting academic content, and the knowledge construction process occurs through these activities.
2. Wikis are tools of collaborative education that operate under a democratic philosophy. The design of wiki can be considered as a highly democratic design tool since every user has exactly the same capabilities as any other user: even the teacher himself. Some administrative settings, however, are adjusted toward the teacher, such as inviting new users to join the wiki or restricting existing ones, according to the aims of the wiki community (Rick et al., 2002).
3. Wiki provides learners with a means for promoting group collaboration experiences, problem-solving, and critical thinking strategies.
4. Wiki has an open-editing philosophy. It provides opportunity for continual editing of the content in addition to a vast repository of the content, resources and activities.

In order to further elaborate the points discussed above, several general points are important for evaluating the using of wiki in higher education institutions. These can be outlined as follows:

1. Simply bringing a new tool to educational institutions does not change practice; the basic principles of good practice are what make learning occur (Gutierrez, 2000).

Teachers have to prepare and select the most suitable tools for the task of learning, and should design, organize and use the most appropriate activities, resources and materials for the learning situations.

2. Wiki supports group work in order to engage learners in contextualized activities, but this takes time. This setting improves the knowledge construction process in collaborative learning.
3. Teachers are required to use a variety of tools that support their different educational settings (e.g. using different web 2.0 tools), rather than just one or two tools. Each situation in the classroom has a suitable tool that can improve it with educational and pedagogical support.
4. A democratic and open-authoring philosophy does not necessarily lead to the destruction or copying of others' work, but can be an innovative way of conducting a great collaborative product. Asynchronous text-based software enriches the exchange of experience and prior knowledge, which can then be used to build new cognitive structures.
5. Teachers have to clarify the guidelines of the course evaluation criteria so that co-authorship will not be a problem for learners (Fountain, 2005).

In the study of Elyahya (2009) using social networking wiki, the results reported that wiki can support students' group work and interaction by facilitating collaborative work, since wikis are being used to promote group-based learning (Judd et al., 2010). The level of communication between teacher and learner can also be monitored, as wiki scores and wiki activity scales can compute the average number of comments per wiki page for each group. Learners who reported more timely feedback from the teacher, and who actively participated in course discussions, were those who were provided with the ability to access their teacher anytime and anywhere (Thurmond et al., 2002). Regarding the lack of real face-to-face interactions, learners may not feel the teacher's presence through online learning environments. Engstrom and Jewett (2005) reported that in a project involving 11 teachers and 400 learners, the learners accomplished high scores in posting information, but there was low level of sharing information or exchanging ideas.

In two studies of using a wiki course conducted by Ebner et al. (2008), it was found that even when participation is relatively high, none of the 287 learners created new pages or edited the existing ones. Additionally, passive participation through accessing existing wiki pages was only moderate. The reason of this lack of participation is directly related to a lack of motivation, which was found in 30% of learners in the first study and 42% in the second

one. Ebner et al. stated that the “use of wiki in educational settings is much more complicated, and it needs more time to develop a kind of “give-and-take generation”. A similar finding was reported by Solvie (2008), who examined the effectiveness of the wiki as an instruction and learning tool. The study hoped that the continual construction and negotiation of the text, through the writing and re-reading of the wiki document, would serve as a scaffold for pre-service teachers. The group interactions and collaborative writing within the wiki helped learners to focus on knowledge in that field. The study results indicated that twelve of seventeen learners emphasized that the wiki provides a space for effective collaborative work. In addition, a study by Coutinho and Bottentuit (2007) aimed to introduce and develop collaborative skills using a wiki platform. The results indicated that from the learners who filled in the electronic questionnaire, with average age 31, (42.9 %) were female and (57.1%) were male, most of them (93%) had a professional occupation (most were high school teachers), 71.4% had heard about wiki before, but only two had previous experience with a collaborative activity using this technological tool.

On the other hand, a study of Ryan (2007) reported different results. The study aimed to measure the effect of social networking on achievement with and sense perception of collaboration. Ryan found that social networking created no significant differences in achievement, although there was a significant difference in the sense perception towards the collaboration work. Similar conclusions emerged from a study by Vise (2007), which investigated the influence of text-based asynchronous platforms (namely wikis and blogs) on learners’ performance. The study sample of 41 students was divided into two groups; the first was 18 learners who studied with collaborative learning strategies via wiki, and the second was 23 learners who studied with collaborative learning strategies via blogs. The main study tools were pre- and post-test and an attitudes questionnaire. The results indicated that there are no significant differences in the achievement in the post-test after adjusting the variables, and there were also no significant differences in the attitudes towards language learning between the two groups.

Similar experiences are reported by Chou and Chen (2008) in their study. The study used qualitative research methodologies for data collections and then employed the content analysis approach, and the survey questions consisted of two parts of scale questions and one open ended question in order to elicit opinions regarding the advantages and challenges of wiki use. Fifty-five learners participated in information technology for a two-weeks programming language course. All the learners received notifications of the upcoming activity two weeks before the study. This study expected that wiki in the classroom would not only

support learning with an opportunity to examine the current instructional strategies, but would also allow the teachers to recreate a modified learning activity.

Some other literature has emphasized other aspects of future research into wiki in education, including the negotiation of online and offline space, the performance and negotiation of identity in social software communities, and the development of multi literacies and engagement in multimodal design (Grant, 2006). In Schroeder's (2009) study, the author discusses how three faculty members at Boise State University used wikis, with the result that successful use of wikis by collaborative groups requires participants to be able to share knowledge, invite critique, present multiple viewpoints, and attempt to change others' ideas. All professors reported that initially learners were uncomfortable with the unstructured, open nature of the wiki and with editing other students' work. They felt that participants' limited experience with self-directed work in an online setting required more specific directions from the teacher, and the literature suggests that this is a common problem in wiki use. Teachers need to provide freedom while also supporting learner-exploration (Lund & Smordal, 2006). All three professors reported that it was difficult and sometimes impossible to get learners to modify or make changes to other learners' work; even when they informed the learners that these changes could be restored by the "History" feature of the wiki. One of the three professors discovered, however, that when she would try to shift discussions from the wiki to the 'Blackboard' there would be less interaction among the learners. This faculty member also indicated that while wikis encourage learner freedom, the teacher direction is also critical. For wiki to be successful in the classroom, it should to be structured and promoted in ways that will encourage and maintain learner interaction and collaboration. Despite these points, the public nature of the wiki, the increased interaction among learners, and the authentic nature of the course activities all contributed to learners doing their best work.

Even in traditional environments, there are many challenges to introducing collaborative, knowledge-sharing strategies (Bruns & Humphreys, 2005; Parker & Chao, 2007). As when wiki is used, bringing collaborative strategies to traditional environments requires a shift in pedagogical perspectives and theoretical frameworks towards learner-centered learning settings (Beldarrain, 2006). As outlined above, the features and functions of wikis make them inherently structured for learner-centered and learner-directed content. In their study on a media wiki, Augar et al. (2004a) found that for learners for whom this was their first experience of learning in an online environment, 50% found the experience unsatisfactory. The researchers argue that the main reason for learners' dissatisfaction was the

lack of interaction with peers and teacher. Supporting this, only 42% of students indicated that all group members participated in the discussions.

A similar experience is reported by Coyle (2007), where the study's results reported that the most commonly mentioned disadvantages of wiki collaboration was that it was harder and less efficient to communicate and share ideas about the wiki project. The participants also stated that the wiki was not such a familiar way of working as face-to-face environments. The study's collaboration surveys indicated significantly lower rates of wiki collaboration compared to face-to-face collaboration, but there was no major difference in the effectiveness of the different methods of collaboration. The study therefore indicated that while wiki is an effective collaboration method, face-to-face collaboration is preferred by learners because it is familiar as well as efficient. Collaboration via wiki allows learners to work in their own space, and it is easy to see the other group members' work. In addition there was not a significant difference in learners' experiences of learning and community between the collaborative learning with wiki versus face-to-face.

Wiki as a web 2.0 technology fosters a collaborative learning environment. It has many characteristics that support group work, with a set of potentials and features, functions and buttons, content management aspects, file sharing and collaborative writing features which allow users to draft and redraft, edit, share and modify their work. When using wiki in educational situations, wiki has a lot of potential to foster collaborative learning, such as providing clear instructions about online courses, topics and resources. It promotes the learning outcome and supports the learners and achieved satisfaction of learners' work. Using wiki, educators can reinforce their learners. It allows teacher to monitor the learners' activities and can give him/her documented information about the learners' contributions through the wiki course. With its simple structure, wiki can be considered an attractive and thus effective learning environment. Users do not want to learn more about programming skills or codes or other prerequisites before using wiki. It is very easy and simple to use where anybody can change anything through the wiki course. It supports the creation of simple websites, projects developments with the group work, and supports the feeling of community and group authoring. Also it provides a unique function to facilitate the tracking of learners' work.

Just bringing the tool to learning situation does not change the practice, but the basic principles of good practice are what make learning occur (Gutierrez, 2000). The use of wiki in education encounters also with some challenges such as:

By supporting the group work, wiki is challenged with formulating authentic and meaningful activities. The democratic philosophy of wiki makes the teacher act as a normal

node of the wiki community like the other learners, thus we should pay more attention to the relation between the teacher and the learner through wiki learning community, the interaction among learners and between them and the teacher, the way to emerge the self-directed learning strategies even through the group work, problem solving, critical thinking and the lifelong learning through life-span.

2.7.1.5. Wiki and the role of teacher

Teachers can provide learners with the desired support of their learning and create an interactive learning environment "to promote group cohesiveness and build up a virtual learning community." In addition, they can courage a collaborative building of knowledge, and create meaningful activities to engage learners in group learning (Wang, 2007). Therefore, wiki encourages, facilitates and supports the learners' collaboration, the sharing of opinions, and developing active online communities (Wang et al., 2005). While one may act as a leader in posting such an activity to the wiki, the others become leaders through additional posting as well as through editing the treated topic or text. In other words, one participant is not uniquely responsible for posting and another for editing; they are all together responsible for both editing and posting. To enable learners within collaborative or constructed activities requires the teacher to retain some degree of control over those activities (Lamb, 2004). Regarding this shift, the teachers' role moved from being the source of knowledge in the traditional classrooms to act as facilitator or monitor of the learning process that include multiple elements and interactions such as contribution, participation, using learners prior learning experiences, materials and communication with the peers in an academic content (Gutierrez, 2000). Thus, teachers should pay attention to the impact that web-based technology and computer-mediated instructional environment have while designing their web-based courses (Hillman et al., 1994).

In their review of using wiki for collaborative learning, Judd et al. (2010) suggest that "Two heads are better than one." It is a saying often repeated (Lund & Smørdal, 2006), and can be used as a starting point towards collaborative work, such as the extreme use of wiki in social public spaces and in commercial situations, as well as in education especially in the collaborative situations. All of these forms of interactions support the claim stated above, using a wiki requires a shift in pedagogical perspectives and theoretical frameworks, with learning and the shift from teacher-centered to learner- centred (Beldarrain, 2006). However,

there are challenges to using collaborative, knowledge-sharing strategies in traditional environments that still operate in traditional paradigms (Bruns & Humphreys, 2005; Parker & Chao, 2007) as well as using them in online learning setting.

Along with these potential benefits afforded by wikis, through wiki learning learners would be engaged in a social network during the collaborative reading and writing process. In addition, the wiki could possibly assist teachers in recognizing how diversity of thoughts and issues of power affect content development. For example the high level features of one of the wiki providers' web site so-called PbWiki can affect teaching in the following manner:

- *The history* function*:* wiki allows teachers to identify users to the page, as well as timestamps for each page version to garner valuable information about the learning process, e.g. by observing who is active and when, how many are active, (Lund & Smørdal, 2006), the collaborative nature of the edits, the rate of new topics compared to the improvement of the existing ones.
- *Invite more people:* wiki allows teachers to invite more participants to share their wiki workspace.
- PbWiki has a *Control access to this page* function*:* the teachers can control accessing such a page to do an intending situation.
- *Share the wiki:* only the administrator or the teacher who is responsible with publishing the workspace for sharing.
- *Backup the wiki workspace:* the teacher can make copies of data to reuse it in other classes or even to restore the original one in the event of loss of data.
- *Setting wiki workspace security:* the teacher is responsible for setting the wiki security.
- *Allow or ban the notifications and RSS*: teachers can allow or prevent email notifications and RSS feeds.
- *Add comment:* the teacher as well as the learner can send a comment to the other peers or reply to existing one.

The teacher acts as a leader in designing and posting activities in wiki, and learners become leaders through sharing the wiki content, deleting, and adding additional posts as well as editing the wiki text. Both the teacher and learner can work together on wiki in an asynchronous or synchronous way (Schaffert et al., 2006) and such close group work may generate learners' reflective learning and enrich their experiences beyond the content (Chen et al., 2005). Teachers often used wikis to support learners' learning, through managing their activities, determining learning goals and group work collaboration, such as collaborative

writing assignments, glossaries, manuals, textbooks, discussion and review, projects, reflection, presentations, formal and informal assessment and all other resources and activities of an academic content (Ben-Zvi, 2007; O'Shea et al., 2007; Zeinstejer, 2008). When the teacher wants to use wiki in education there are some strategies that should be taken into account such as teachers who have to determine a clear criteria of the use of wiki in education and learning processes and learners' learning assessment, the topics of the wiki community, the participations information, a time plan for participation process, dividing the learners into subgroups and finally involving the discussion between the teacher and the learners to assess the progress in the wiki topics (Bruns & Humphrey, 2005).

All the above leads us to report that e-learning encountered with a lot of challenges and can hardly emerged in traditional educational settings. Regarding the rapid change in this society, a new learning culture can also hardly be developed through this kind of traditional settings. New digital media far away educational activities enrich with pedagogy do not lead to a new learning culture. A new learning culture corresponding to the requirements of the knowledge society and has to be acquired in adequate pedagogical settings. Therefore we have to look for adequate settings of learning and instruction and for adequate approaches to emerge, utilize and investigate the potential advantages of using e-learning through new approaches of educational settings (Giest, 2010, pp. 373, 369). This study will be underpinned by the results of literature and it is an attempt to investigate the influence of using different interaction levels in social networking software technologies on the learners' achievement and satisfaction, through learning the basic skills of a learning management system. E-learning using powerful tools and the problem that media is not enough to create new learning culture, new learning and teaching, but educational settings are needed in order to exploit the potential of digital media e.g. wiki. As an attempt to broaden the research on the teacher–learner interaction, the frequency and methods of teacher–learner interactions are examined in a very specific rather than general manner. The study does not focus on a single communication function, but rather on all communication functions types used in wiki online social networking software. In addition, the teacher–learner interactions were classified by the content of the wiki course as analyzed by the content analysis tool, the contents of messages sent by the teacher and the wiki small group members, the quality of individuals' final course product, the learners' responses on the achievement test, attitudes scales, satisfaction scale, and finally a classroom community scale.

The importance of this research is made clear by the preceding overview of existing studies into the interaction between teacher and learner, especially in e-learning, in light of the

scarcity of research in this direction as well as the use of collaborative learning strategies in support this interaction by using social networking social software.

2.8. Questions and Hypotheses

The purpose of the study is: to find out how to foster self-directed learning in collaborative learning-teaching settings using social software in higher education in order to accomplish better understanding of the influence of improving learners' performance and satisfaction. To recognize the main aspects of interactive-based software approaches that service online, group work, problem solving, contextualized, authentic learning situations. Through this study, the researcher seeks to accomplish a better understanding of the influence of interactive online software on learners and teachers in higher education, in order to improve learners' performance and satisfaction, to recognize the main aspects of interactive-based software approaches that service online, group work, problem solving, contextualized, authentic learning situations, and to determine the advantages/disadvantages that promote/hinder the teacher–learner interaction through social networking software, with the aim of achieving better understanding of interactive learning between teacher and learners and among peers.

This study aims to examine the influence of using different interaction levels on learners' achievement and satisfaction in social networking software using some standardized and semi standardized instruments. Structured interview is representative of the quality of learners' interaction. Independent variable (level of teacher-learner interaction) is examined. In the context of models for self-directed learning (see figure 6), the level of teacher-learner interaction has proven important. In addition, the achievement and satisfaction of learners can be detected. Ultimately should be displayed, showing the impact of the use of self-directed and collaborative learning strategies on learning.

2.8.1. Research Questions

The main question guiding this research is:

What is the influence of using different interaction levels on learners' achievement and satisfaction in social networking software?

The main question can be branched into the following sub questions:

The first question of this study refers to the learners' performance after the sessions of self-directed and collaborative setting sessions.

1. *Did the use of different levels of teacher-learner interaction influence the students' performance on Moodle course through social networking software wiki?*

The literature on teacher-learner interaction has been linked to a lot of variables such as teacher's presence, timely feedback, face-to-face encounters, performance, and learners value the interaction with their teachers. When learners interact with the teacher, the most frequent variable is sending prompt feedback (Thurmond & Wambach, 2004). Learners become active participants in social communities and construct their knowledge and meaning as it relates to those communities (Smith & Hardaker, 2000; Moore, 1996; Hannon & Adkins, 2002). The researches' findings demonstrate that teacher–learner interactions promote and improve learning outcome and are important factors in academic achievement (Barkley et al., 2005; Rhode, 2009; Anderson, 2003; Jiang & Ting 2000; Faux & Black-Hughes, 2000; Aase, 2000). These considerations lead to further questions. They refer to the predictors of learning outcome.

The second question relates to the relationship between learning interaction and learners' quality of their final Moodle course after finishing the wiki sessions.

2. *Are there any differences in the quality of the learners' final product after wiki-based collaboration between different levels of teacher–learner interaction?*

Interaction means dividing the work or solving subtasks individually and combining the results into a final product (Scanlon, 2000, p. 464). Assuming that the two levels of interactions using the same learning strategy (collaborative learning) skills are valid, then the data should correspond. Those students who emerge a high level of interaction, with immediate feedback, deep processing and, their learning was monitored, tracked, reinforced by the teacher should also report in the scale. The study tries to investigate the differences between learners' final courses (the course that the learners are required to build it at the end of the study). External reports will be integrated by experts on the learners' final product rather than the researcher.

3. *Did the use of different levels of teacher-learner interaction influence the students' satisfaction through social networking software wiki?*

According to those presented in section 2.6.1. studies, the most frequent factors which directly influenced learners' satisfaction is believed that the immediate feedback, timely comments may enhance learners' satisfaction. While the lack of interaction, may cause negative response from the learners. Many of the investigations under section 2.7.1 of the

relationship between learning interaction and learners' satisfaction are based on satisfaction analysis. Corresponding is hypothesized that arise in answering the positive statements of satisfaction scale items to reflect the main aspects of satisfaction among individuals, depending on the strength of interaction between them and the teacher. More interacted students with the self-directed strategy in classrooms enjoyed the interaction among them and between them and the teacher (Mok & Cheng, 2002).

4. *What are the conditions that benefit or hinder collaboration for learners when using the wiki interaction setting?*

Emerging social networking software in educational institutions is encountered with a lot of challenges. The idea of physical and temporal distance between the teacher and learners is the most important challenge in online learning environments. In addition, learners do not directly interfere with the work of other learners. They do not want other people to add to or change their work, or to interfere in their own work. Learners are unsure as to whether or not to publish their work on a public domain, and do not want their work to be subject to evaluation, scrutiny and judgment. This may lead to frustration and heighten the feeling of isolation by learners who are engaged through social networking software (Bruns & Humphreys, 2005).
In-depth investigations suggest that these frustrations are caused under the condition of low level of teacher-learner interaction (Thurmond et al., 2002).

5. *What are the features of the learner's motivation, attitudes and prior knowledge towards the context of Moodle course after the teacher–learner interaction (with its two levels) setting using wiki?*

Following the reasoning to the first and the third questions, it is assumed that the operationalization of the learning interaction it is essential for the predictive power of learners' prior knowledge, motivation and attitudes. It would be wrong to deal with learning from a limited perspective instead of a wide perspective that takes in individual satisfaction, differences, attitudes and motivation, all of which they should involved in the designing and implementing of learning activities. The main principle of constructivism is the shift from the idea of transferring knowledge to constructing new knowledge through collaboratively using the learners' prior knowledge. Learners should construct their knowledge rather than being passive recipients of the learning messages or accepting those given by the teacher whose learning style may differ than theirs. Motivation is essential factor in the learning, since highly motivated learners achieve much better success in learning situations (Slavin et al.

2003). Situational interest is somewhat related to motivation, and academic achievement is positively affected by learners' situational interest (Hidi & Renninger, 2006). Learner-centered learning is one of the most contemporary approaches and models of learning to promote learners self-directed attitudes while at the same time discouraging their dependency upon the teacher through their learning setting (Milheim, 1993).

A new learning culture must correspond to the requirements of the knowledge society and has to be acquired in adequate pedagogical settings. Therefore we have to look for adequate settings of learning and instruction and for adequate approaches to emerge, utilize and investigate the potential advantages of using e-learning through new approaches of educational settings (Giest, 2010, pp. 373, 369). This study will be underpinned by the results of literature, and is an attempt to investigate the influence of using different levels of interaction in social networking software technologies on the learners' achievement and satisfaction, through learning the basic skills of a learning management system. E-learning using powerful tool, with the problem being that media alone is not enough to create a new learning culture, new learning and teaching, but educational settings are first needed in order to exploit the potential of digital media e.g. wiki. As an attempt to broaden the research on the teacher–learner interaction, the frequency and methods of teacher–learner interactions are examined in a very specific rather than general manner. The study does not focus on a single communication function, but rather on all communication functions types used in wiki online social networking software. In addition, the teacher–learner interactions were classified by the content of the wiki course as analyzed by the content analysis tool, the contents of messages sent by the teacher and the wiki small group members, the quality of individuals' final course product, the learners' responses on the achievement test, attitudes scales, satisfaction scale, and finally a classroom community scale.

A second interest final product as an outcome of learning is the experience of self-self-directed learning. In particular, the results of (Hargreaves, 2003) and (Candy, 2004) (see Section 2.4.7.1) could clarify that self-directed learning with support of teacher-learner interaction foster learning outcome. It is hypothesized that the use of self-directed learning strategies with the experience of teacher-learner interaction will improve it. It must be assumed that, because these features affect teaching and learning situations (self-directed learning and learning interaction) through knowledge society, teaching and learning situations can conduct better outcome.

3. Research Methodology

In a group of quantitative and qualitative analysis methods, the self-directed learning of participants was investigated. The aspects of self-directed learning were collected by questionnaire, both quantitatively and qualitatively through an interview. The aim of this study was, first, to find out a form of interaction between teacher and learner can support learning outcome using social networking social software (Wiki) riches with possibilities of interactivity features that ICT applications provide. Secondly, to investigate the influence of self-directed learning in collaborative learning environment ensuring learning outcome via new digital media. Through this study, the researcher seeks to develop a classical quantitative 2×2 pretest-postest control group design with multiple choice test, questionnaire, and interview based experimental measurements for users of collaborative wiki. In order to prove this hypothesis, we conducted a classroom experiment (intervention study in pre/post-test and with the intervention and control groups). Each group consisted of seven participants. The independent variable was high/low level teacher-learner interaction and the dependent variables were the learners' performance and satisfaction. We developed a wiki course (with the aim to learn how to construct a moodle course). Several standardized and non standardized instruments with the goal orientations were used. The instruments were the wiki itself, a satisfaction interview, a satisfaction survey, and a pre and post-test, an attitudinal survey towards teacher-learner interaction, motivation survey, and classroom community scale. Because of the limited sample of the study we used additional qualitative analysis in order to act as an inquiry into the reasoning behind participants' behavior through their responses on the wiki course.

This chapter included a description of the experimental design, study variables were identified, and methods of experimental adjustment through threats to internal and external validity have been identified and the community sample, describing the study with the tools to identify factors effecting the instruments' validity and reliability, followed by a detailed description of the procedures applied in the study pre and post phases and measurements for each of the control and training groups, with clarify the statistical treatments.

3.1. Research design

The researcher should understand the common research design methods for experiments in order to select the best alternative research design (Schäfermeyer & Hurd, 1998, p. 511). To test the hypotheses of the study and answer its questions, and as is pointed out in literature and the characteristics of the wiki environment, and advices received from experts in the field, the experimental method has been applied. The study adopted the experimental design of two groups (experimental and control) with pre and post-test (see table 1).

Pre-test-Post-test Control Group Design

Experimental:	**R**	**O1**	**X**	**O2**
Control**:**	**R**	**O1**		**O2**

Table 1: The experimental design.

In this case, learners are randomly assigned to either the experimental group or the control group. To determine that a treatment (X) which refers to the high-level teacher-learner interaction had an effect, the pre-test measurements (O1) will be similar, while the post-test measurements (O2) will be different for the experimental and control groups. Schäfermeyer and Hurd (1998, p. 511) reported that this design has a potential problem with the lack of generalizability. Consider either a quality-of-life study or satisfaction survey, where pre-tests have been applied. Post-test results may be affected by the fact that the subjects have been sensitized from the pre-test and they may now start to take more notice of the quality of services that they received or aspects they may have ignored previously. This effect is known as an "interaction of testing and X" - a threat to external validity.

Campbell and Stanley (1973) highlighted the random selection of the subject as the most important factor to overcome the threats to validity. Because of the nature of the current study's instruments, both quantitative and qualitative methods have been used. Through the qualitative method an electronic content analysis tool has been emerged to analyze the learners' contributions, and because of the wiki course is an online course, there were no restrictions in the randomly distribution of learners into two groups because the attendance process was electronically addressed. Thus the researcher had the chance to random distribute learners without being restricted to learners in advance.

The study aimed to prove that the teacher-learner interaction affects the learners' achievement and satisfaction through networking social software. The balance between the

two groups has been adjusted before the experiment through randomly selecting the two groups' members, where the pre-test (see Appendix 8.3) instrument has been applied prior to the experiment to achieve equality of the two groups. Upon completion of the experiment the effects of independent variable on the learners' achievement and satisfaction have been measured through using mixture of quantitative and qualitative analysis methods.

3.2. Variables

Regarding the research question that guided this study, namely "what is the influence of high level teacher-learner interaction on both learners' achievement and satisfaction in social networking software?" there were two dependent variables for this research. The first dependent variable was the students' achievement. This variable was assessed by a post-test that contained 30 multiple choice items related to the content aims. The items of the test were related to the cognitive aims with regards to the content structure and the production of Moodle courses features. The participants were required to choose one selection from four alternative responses, with only one answer being the correct answer, and one correct key was created by the researcher (see Appendix 8.3). The results of the test were processed using SPSS software.

The second dependent variable was the satisfaction of learners. This variable was assessed by a mixture of quantitative and qualitative methods such as interview questions containing items regarding the ease of the wiki course through the interactive process among learners and between them and the teacher. This instrument encouraged the learners to report the main advantages and disadvantages of teacher-learner interaction through the wiki course. Finally, if the learners were challenged or encountered any barriers that hindered the interaction through the wiki course, and which features of this kind of interaction they would want to deal with in the future (see appendix 8.6).

The second instrument was an attitudinal survey towards satisfaction concerning the interaction through the wiki course; it was contained items with regards to the learners' feelings towards teacher-learner interaction, interactive learning, peer interaction, social interaction situations advantages/disadvantages. The results were also processed in SPSS software (see Appendix 8.8).

The independent variable in this research was teacher-learner interaction with its two sub-levels. It was assessed with the instruments below:

A content analysis tool, final product scale, classroom community scale, pre-test, which was the same as the post-test and was assessed in the same way (see Appendix 8.3).

3.3. Experiment adjustment

The study variables have been adjusted through some procedures to adjust the factor effecting validity (Campbell & Stanley, 1973) with what is called "Internal validity." This means for any range in the independent variable, the reason is the dependent variable. The procedures below have been followed to achieve this internal validity:

Prior to the study, three preparatory activities will be engaged in. The first activity was the wiki tool PbWiki which presented the wiki course with several web pages concerning the learning activity goals. Second, a detailed activity description and a wiki instruction package will be formulated to guide the learners learning. The last one, the study sample were notified with individualized e-mail, which invited participants to participate and provided the learners with the methods that they can use to access the wiki course without a complicated registration processes. Factors affect the internal validity are as follows:

1. History: The length of the implementation of the study may affect its results through the presence of other factors affecting the results rather than the independent variable. This did not hinder the study as it was carried out between 3 and 5 weeks.
2. Maturation: This also did not hinder the study because it was carried out in short time using two groups.
3. Instruments: The validity and reliability of the study instruments as stated above were verified.
4. Selection bias: To avoid this, the two groups' members were randomly selected.
5. Experimental Mortality: This factor did not hinder the study because the experimental period was so short and the study sample attended an organized learning program.
6. Experimenter bias: The researcher was a member of the community and tried to avoid having any effect on the experiment. A checklist based on non-discrimination between learners was therefore used in order to avoid any impact on the learners' attitudes and behaviors.
7. Response bias: This problem has been avoided by using the content analysis tool by two coders on the learners' participation.
8. Prior Experience: The study sample was selected randomly, and the balance between the two groups has been achieved by using the pre-test.

The procedures below have been followed to achieve the external validity. Although the study sample was small, some procedures have been done to globalize the study results as follows:

1. Interaction effect of testing: All the study instruments were analyzed by the researcher and some other experts. The learners did not deal with these analyzing processes.
2. The interaction effects of selection biases and experimental variable: The learners were distributed randomly into two groups.
3. Reactive effects of experimental arrangements: the learners were participating with wiki or Moodle platforms; they met each other and the researcher a few times during the experiment.
4. Multiple treatments interface: there are no multiple-treatments in the experiment, only one treatment applied to the training group as independent variable and the control group was not subject to this treatment.
5. Variance Error: Variation error may cause a judgment to be made about the significant differences, which may not be a result of the experiment, but the result of dispersion of data. To avoid this problem procedures below have been followed:
    a. Measurement tool: The content analysis tool has been used in the qualitative analysis, after examining its characteristics and its ease of use rather than other tools where the state of arts refers to. This helped the researcher to gain reliability. Also the experimental design distinguished the processes of treatments, where the high level teacher-learner interaction which used as an independent variable, while the control group used low level teacher-learner interaction, in addition, the randomly selection of sample members to control the internal variables, to reduce its effect on the research results.

3.4. Data collection methodology

3.4.1. Participants

Potsdam is a metropolitan university, located in the Brandenburg state capital part of Germany. Enrolment continues to grow, with over 20,000 students, with over 2,000 of these being exchange students, and the largest number of students enrolled in the Faculty of Philosophy. The education faculty and teacher preparation, a department of Potsdam University, provides technology support, hardware support, and equipment services for faculty and staff. The university also supports Moodle, open source learning management system (LMS) and a wiki networking software both used by a majority of faculty members to host online courses and support face-to-face and of course the blended settings. Additionally, the university offers many tools and features to facilitate the teaching of both online and face-

to-face courses, such as teacher training and preparing programs and announcements, communications for students (email, discussion forums, file sharing), grade books, and online quizzes, etc. The study took place during the winter semester 2010 at Potsdam University in the Department of Teacher Training. The study was carried out among two separate groups with a total of 14 students. Participants were enrolled in this non-requisite course "How to use Moodle" on learning, three of them were female and eleven were male. For a few of them, this was their first online course on how to use wiki.

There is a difference between the theory and practice. Scientific research requires submitting another person as course teacher instead of the researcher. But in fact it is so difficult to find a person who does not have any personal duties to assign him as course teacher. This person should also monitor the participants' work, join the course for long time, send learners feedback, respond their questions regard the content, accomplish the aim and design of course. These things are quite different to be done. In this case, the researcher was both the course teacher and course developer. This researcher had roughly ten years teaching experience as well as online teaching. Having offered the course multiple times, materials for each unit were already prepared. The main development tasks were updating the content and materials (i.e., syllabus, readings, text-based lectures, assignments, etc.) and verifying that web links were current and active. All 14 participants enrolled in the course agreed to participate in the study wiki course. Participants were assigned randomly into two groups; each group had seven members, because the total participants' number was even. Interaction-based research and reports about current trends and the wiki technology tool were used through this study; also the course interactive activities should result in sharing of information between the course teacher and the learners.

Because the researcher limited skills in German language, he cannot establish and manage a course in German and he was not able to conduct his empirical study on the basics of German language. He invited a lot of groups of students to join the course, but most of them were not interested to join the course even who will be English teachers.

Do not expect online learners to do something you ask them to do without promising to give them some credit for doing it. The researcher with support of his supervisor ensured that the course gave the students credit-hours in cooperation with "Studiumplus" management at Potsdam University. The course was worth three credits hours, a matching number when considering the course content and the expected duration. The researcher printed announcements informing the learners that there is a course which will support them with

three credit hours and placed the bulletins it high-traffic areas of students that are studying English and / or are likely to end up teachers in the future.

The researcher cannot do the empirical investigation in his country (Egypt) because the course was built through social networking software (Wiki) and most of the work will be online. The infrastructure in Egypt cannot support this setting. Most of the Egyptian students also do not have personal computer at home and the internet services are so limited. All these things caused unexpected problem in finding an adequate sample of interested persons (who will be English teachers) those students rejected to participate the course after being informed that it will be held in English. This explained the poor number of sample in my empirical study.

Although the sample number is insufficient to generalize and address the results, the researcher used a lot of methods, tools and different statistical approaches (both qualitative and quantitative analyses).

3.5. Research Model

The Song and Hill's model (2007) was adopted as the base of the research model for understanding self-directed learning in an online context. It pays attention to the prior knowledge as a node of knowledge interaction also the treatment to the individual differences where it considered a very important factor to the classification of individuals before their engagement in learning process, the relation between the self-directed learners and the peer interaction which consider the main idea of this research and the important that the model concentrates to the feedback and motivation because of their role in learning.

According to the research model, the learner was responsible for his or her own learning (has been encouraged to and the main focus of the research will be on using the course resources, motivating the learners and the learner prior knowledge as a cognitive structure to the new one), generally organized his own work and learner had to gain these attributes in learning initiative. Learners learned new ways to learn and also new information, they participated in social discussion with peers and the teacher, generated learning ideas or possible solutions by identifying available information related to the course content. Learners also used wiki technology and software as a tool to reach the course goals, to access and show the information, develop understanding of the course concepts through experiences.

3.6. Instruments

This section deals with the construction of social networking software called a wiki community and will deal also with the measurement tools. It describes the instruments that were used in this research. These instruments included the wiki software itself, a satisfaction interview and survey, a pre- and post-test, attitudes survey towards the teacher-learner interaction, interview, classroom community scale, and content analysis tool. Each instrument will later be matched to such a research question more closely related to it, and the data obtained from these instruments will also be explained.

3.7.The technology wiki has been used in the study

Wiki is basically a social media which supports reading / writing web opportunity, where its users have the availability to write, add, edit, revise and post materials by clicking simple buttons, the so-called "edit" and "save" buttons. There are many wiki software packages available for free through the internet. The wiki space was chosen because it is simple to use and as it includes features that allow comparison of previous versions, discussion pages, and user authentication, with the additional important features that it is free and that settings could be managed so once you invited your learners, they can edit your content. These features are very important as teachers usually want the learners to take ownership of their wikis without public interference, and they want to be sure that the content that will be produced only by their students without outside help. “It is also important to the teachers that they can track who will make which edits and comments and so identify the authors of any abusive or offensive posts and take appropriate action” (Grant, 2006).

There are also a lot of opportunities that are restricted to only the full version of the wiki which give the teachers more facilities via wiki. The researcher was able to overcome all these problems (Carter, 2009). There are two possible ways to create a course wiki. The first, signing up with an external wiki host, is extremely easy but presents some limitations on use. The second, setting up a wiki on your own or your institution’s server, requires more initial work but offers benefits in flexibility and functionality. The easiest way to start a wiki is to use one of the many wiki hosting services on the web. Using this way you will save a lot of time in setting up your wiki and you will just make signing up, naming your wiki, and adding content. Your site could be run in few minutes and ready for students in a few hours (while you are building your course).

In contrast there are few downsides to using an external wiki host. Free sites have bandwidth and storage limits, and the address of your wiki will not be an institutions (.edu)

extension and will not be identifiable as a school address. In addition, your ability to include add-ons may be limited. Free sites usually require use of such wiki engine and pay sites offer support for only a limited number of wiki engine types (Carter, 2009). A commercial wiki service was used to host the wiki course, so called PbWiki. PbWiki served as technological backbone to collect knowledge in area of structural concrete, the current wiki software that has been used in the study was asynchronous text-based technology Pbworks wiki provider, the world's largest provider of hosted collaboration solutions for business and education, supported a free wiki program by a community of developers and users. PbWiki has a lot of advantages; Schroeder (2009) summarized them in the following matter:

- PbWiki is an advertisement-free site suitable for teachers to engage students.
- Allows VIEW and EDIT source code.
- Provides some additional theme templates to choose from.
- Supports click and view editor.
- Supports file upload feature.
- Allows the availability to print pages in Pdf format.

The author reported a downside characterized as "Right hand box should default to sidebar navigation view when opening site." The PbWiki was well-suited to the intended course features, for instance, regarding hosting features it has no limit in storage and bandwidth quota, and regarding social features supports e-mail notifications and comments, while it allows teachers access control using access keys. It also provides statistics of recent visitors, in addition to providing support for embedded videos, flash and image editing, simple and complex tables, and PbWiki supports the wiki page with page history features and unlimited page revisions. All of these features and a lot of advantages regarding social, syntax, usability, statistics, media and files, output, links, and common features were clearly noted after comparing a huge number of wikis via the wiki matrix website.

An interesting and very helpful list of wikis is available through a website called WikiMatrix (http://www.wikimatrix.org/). Wikimatrix.org has a side by side comparison feature and a quiz to help you choose the right wiki. This WikiMatrix gives users the opportunity to deliver their product and services offer directly to people searching for a wiki solution. These matrixes can help wiki new developers to understand the dynamics behind the successful adoption and operation of a wiki, which could easily be applied to wikis used for education settings. PbWiki supports interface editing and provided optional e-mail alerts and/or RSS feeds, the study focuses on the e-mail regardless RSS alerts of the students' activity. The wiki software used in this investigation was private and available only to

students enrolled in the course by the teacher, supported two distinct learning activities in one subject (Moodle learning management system) over the duration of one semester. The first activity carried out at the beginning of the wiki course was used to introduce and familiarize learners with the wiki itself and its interface and functionality. The second activity was related to the content of the course and it was divided into four units. The wiki homepage was included an introduction to the activity and sidebar with links to a series of wiki pages refer to the introductory (that was not the focus of this investigation) and main topics of the course content on which the wiki group members could develop their knowledge.

We spent the several days before the warm-up activity planning the course schema, collecting the content, producing the course pictures, videos and other resources, building the course itself, and validating it by professionals in the field by the AG eLEARNiNG group members to hear their opinions on the course design, content, time, appropriateness for the learners, and the interaction process. Finally, we pre-applied to the course as a pilot study using a different computer to examine the stability of the course resources appearance via variety of computer operating systems...etc. To ensure that the wiki course works smoothly, a pilot study was conducted with two students, both studying PhD. in Berlin and Brandenburg (two districts in Germany). Although neither student had used a wiki community before, both two students were able to create and edit articles in PbWiki within 30 minutes, using only the scaffolding pages of the wiki community.

3.8. Study procedures

The experimental part is divided into three parts, pre procedures, experimental procedures and post procedures to both of the two groups, these parts can be summarized as follows:

Pre procedures:

1.1. Finishing the management procedures to apply the experiment, such as the permission of my professor, the permission of the sample…etc.

1.2. Identifying the independent variable, the features and the level of teacher-learner interaction through collaborative learning activities in the wiki course.

1.3. Designing the experiment, building the wiki course and determining the study instruments.

1.4. Applying the pilot study of the course, to achieve the validity of the research instruments.

1.5. Selecting the research sample and dividing them randomly into two groups.

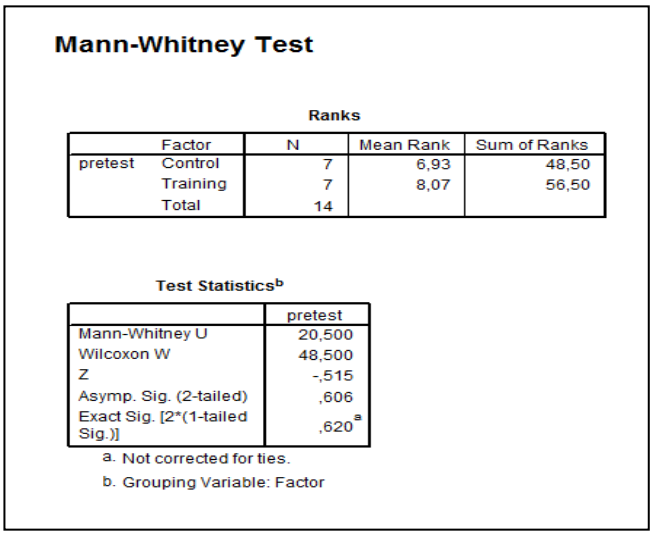
1.6. The research sample consisted of (14) participants and each group had (7) participants, one of whom was identified as a group leader.

1.7. Learners were engaged in a unit of the wiki course entitled, 'How to use wiki' to familiarize themselves with working through wiki before starting the experiment.

1.8. Ensuring balance in the two groups:

1.8.1. Random selection of the group members: through using the participants' list and then dividing the list into two lists, one of them is the experimental group and the other one is the control group.

1.8.2. Balancing in prior knowledge of the two groups: to achieve this procedure, a pre-test has been applied to the members of the two groups. Mann-Whitney test has applied, to find the significant differences between the averages of the two groups in prior knowledge (see table 2).



Mann-Whitney Test

Ranks

	Factor	N	Mean Rank	Sum of Ranks
pretest	Control	7	6,93	48,50
	Training	7	8,07	56,50
	Total	14		

Test Statistics[b]

	pretest
Mann-Whitney U	20,500
Wilcoxon W	48,500
Z	-,515
Asymp. Sig. (2-tailed)	,606
Exact Sig. [2*(1-tailed Sig.)]	,620[a]

a. Not corrected for ties.

b. Grouping Variable: Factor

Table 2: Significant differences in pre-test between the two groups.

As shown in the table above, there is no significant difference between the two groups in prior knowledge before starting the experiment.

2. Experimental procedures**:** the experiment was carried out as follows:

2.1. The two groups used the same content, and performed the same tasks as far as the content which consists of four units each unit consists of number of activities and assignments, each activity has a certain time be accomplished.

2.2. Each group has been asked to collaboratively complete a task as follows:

2.2.1. Each participant can post his/her ideas.

2.2.2. Each one can visit his/her wiki course and insert his/her ideas and comments.

2.2.3. He/she can revisit the wiki and read the posts of the other participants, share, edit, delete and add his/her contributions.

2.2.4. Posts, comments and answers have been added to reinforce the learners' interaction.

2.3. Participants were allowed to use all available resources included: Slide sharing, YouTube files, text sharing, external websites (almost 300 web sites), documents, information banks, animations and hypermedia applications.

2.4. Participants were allowed to add new ideas or modify existing ones and save all their contributions.

2.5. Each group' performance is overseen by the group leader of this group. The group leader is in very important position, he can:

2.5.1. Delete or modify any post or comment if he/she found that it is not suitable or reuses an old version of the text.

2.5.2. Determine the tasks' timetable.

2.5.3. Determine the title of each topic with each member in his group.

2.5.4. Encourages the learners' participations in the same work group and ask his colleagues to concentrate in answers or posts and promote interaction among participants and between them and the teacher.

2.5.5. Tutor the group's performance and the researcher tutors all the groups' performance follows-up the tasks of teaching process, clarifies any ambiguous parts received from members of the group and explains, answers any questions, provide the students with feedback, conducts reports and daily assessment, and supports them with the feedback.

2.6. Experimental group: high level teacher-learner interaction has emerged as the independent variable as addressed before and collaborative learning strategies have been used as teaching method.

2.6.1. All participants are allowed to ask the teacher directly what they want to ask.

2.6.2. Participants were requested through the guidelines page to review all the announcements as they have been formulated by the teacher.

2.6.3. Participants are requested to take into account the assignments deadlines.

2.7. Control group: traditional use of e-learning emerged. Collaborative learners are required to build their own course in Moodle learning management system to examine the final product of the learners and collaborative learning strategies have been used as teaching method.

3. Post procedures: the post procedures were as follows:

3.1.1. Upon completion of the experiment, post-procedures were carried out by applying all the study's instruments on both of the two groups as follows: All the

posts and contributions of both groups through the wiki course have been analyzed.

3.1.2. All the insertions of the two groups will be analyzed with the content analysis for all the students using Moodle in learning.

3.1.3. Analyzing the statistical results of the experiment.

The study was carried out over a three week period during the winter semester of 2010. Research data was collected through a series of instruments taken by all of the students before and after they completed the entire course assignments via pre and post-test, final product scale, satisfaction survey, satisfaction interview, content analysis tool, classroom community scale, survey scale, and teacher- learner interaction scale. All the study instruments were applied after completion of the course assignments, except for the achievement test which was applied pre and post engaging the students in the assignments. Each of the study's instruments was taken by the participants individually, with a deadline to respond to each one. A list with the names of the participants and group members was sent to the learners via e-mail.

The researcher then sent invitations to each participant so that he/she could join the wiki course group. Learners who are registered as users have access to a whole range of functionalities, such as: reading / writing, editing / saving, uploading resources, giving and receiving feedback on assignments developed by colleagues and rating learner's products (Nikolov, 2011, p. 53). The latter, the researcher, in coordination with a faculty member of Construction Administration/ Classroom assignment "Bauverwaltung / Lehrraumvergabe" at Potsdam University, booked a room in which to meet with the students. Similarly, prior to starting the first unit of the course, the researcher finished the university procedures by providing access to the sample to Moodle platform of Potsdam University, where each student has another username and password to log on Moodle.

Beginning the course with a good hook activity sets us up for a better chance of success, so the study course began with a non-measured activity unit. In this unit we wanted to highlight most of the features of the wiki and its uses, try to conclude the uses of wiki especially in educational situations. The itinerary of this unit was to (a) give participants the opportunity to the ease accessibility of course via the username and password, (b) recognize the main elements of the wiki main page, (c) learn how to use wiki functions and (d) how to use the wiki edit tool bar, (e) navigate the main features of the wiki in the VIEW/ EDIT mode, (f) insert a plug in into the wiki page, and finally (g) to use the warm-up activity make the participants more familiar with the wiki software, and identify the wiki technical challenges that may face the first wiki users and allow them to express their questions.

At the beginning of the wiki course, the teacher held an introduction to PbWiki for approximately 60 minutes, explaining its potential opportunities and functions. Additionally, an achievement test was distributed to gather information such as, prior knowledge about structural concrete and the content.

All participants involved in the warm-up activity accessed and used two wiki courses under the condition of the same structure, design, resources, assignments and the same content. Each group was asked to collaboratively create wiki based contributions on the subject Moodle learning management system. The participants were required to add their posts in the warm-up activity on an interesting ceremony related to their interest, and all of them started adding their edits to this wiki page. Through the warm-up activity, all the participants were requested to add their ideas about this ceremony. Warm-up activity captivated learners and draws them into the wiki course.

During the warm-up activity, participants were encouraged to report any difficulties and ask any questions they had about the challenges that they might face through the first wiki use. Subsequently, participants reported some difficulties in accessing and using the wiki. Minor problems were reported by the participants, such as being unable to access their wiki group due to some technical issues. In the same direction there were some technical and pedagogical problems that challenged both the learners and the researcher through the course, which are expanded upon below.

In the first day of the experiment, a problem arose with images not appearing on the wiki page; this issue was highlighted by both groups. The researcher solved the appearance of the initial skills. Later on in the day, all the problems with the pictures were solved. There was also a problem in the “Let’s Practice” link which shifted the application into Moodle platform, and the researcher resolved this problem. As the participants were not in Potsdam University, the activation of the access to Moodle platform was delayed in allowing learners to log-in to Moodle and start the assignments. This problem existed until the third day of the experiment. One participant from the control group had a problem with his personal computer and he spent one day fixing the technological problems, as the majority of the work was done at home.

On the second day, there was a problem in the hyperlinks in the wiki page which was solved. All of the participants complained because of the amount of the e-mails they received from the teacher in the beginning, and attempts were made to reduce this problem. The researcher used another strategy to send the assignment and editing the technical problems by disabling the notifications (that send e-mail with each edit) while making any modification

and then re-enabling it again to achieve the interaction among learners and between teacher and learners.

Other problems in the course included:

- Until the second day of the experiment, most of the learners did not pay any attention towards answering others' e-mails. They thought that they have to do as passive nodes, such as what happen in the face-to-face settings, and they were not participating in the completion of useful phrases.
- Determining a fixed day for face-to-face meetings was very difficult thing to discuss the problems that arose, to answer the participants' questions and to inform participants to interact because they did not have enough time; the researcher began having online synchronous discussion through Skype to confront the problem of face-to-face meetings with the learners.
- One participant of the control group created a second registration to the Moodle platform, and was provided with his username and password the next day by the responsible person from the university.
- On the fifth day of the experiment, the unit 'what is Moodle' was finished. Participants were challenged with some problems and complaints; one of these problems was the duration of time spent on the writing skills, and that thinking about the answers requires a lot of time.
- Some learners complained that the assignments were boring and duplicated and required more time to be completed.
- Both the participants and the researcher himself have been challenged with the number of e-mails that have been sent to the groups' members. When any member edited, shared, or sent new post or even if he/modified the font formatting to the text that has been written before, the wiki community sent an e-mail to all the course members. As a result the researcher was unable to respond to all of them on time or answer their questions. That may be the reason for a lot of delay through the content analysis process of the course content and learners' posts. It is recommended to assign more than one teacher to the same course. To control this problem a suggestion was made to elect a group leader to control the group work. The election was entitled, "An Election invitation to group leader". Until the end of the day, nobody demonstrates the readiness of the group's nomination. The reason for this is that the announcement was on the wiki front page and the participants used to deal with the front page as a non-edited page, because participants were alerted by the

teacher at the beginning of the course not to add any comments or edits to this page (the participants made a lot of edits at the beginning of the experiment on the front page and this procedures caused such a confusion for them), so that the participants were alerted through the mail to select their nomination for both groups.

- After becoming more familiar with working Moodle, participants preferred to work through Moodle platform rather than working in wiki. They used to post forums' topics through Moodle; they were informed in the meeting sessions to contribute to the wiki.
- The Moodle course of a participant of the control group has been blocked; the learner started building new one after it was published by the responsible person in the university.
- Most of the control group members used Moodle's Forum ("Nachrichtenforum") to add their courses' data, they have been informed that the forum was to discuss their ideas and they have to add their data in their course area.
- Some learners added 'Enrollment key' to their courses, they were asked to make this 'Enrollment key' to all the group members the same or they can delete it.
- At the end of the course, the participants were deleted from being teachers in the Moodle course to prevent them from logging on again to the course after the experiment's deadline.
- Most of the participants changed their courses names according to the assignments, the researcher distinguished between them and matched each course with the person who is the owner of it.
- Some participants in the training group added some persons to their courses as 'students', as required in the assignments, they assigned roles to some students from Potsdam University and the researcher deleted it but saved these roles with the names of each participant in each course (see figure 7).

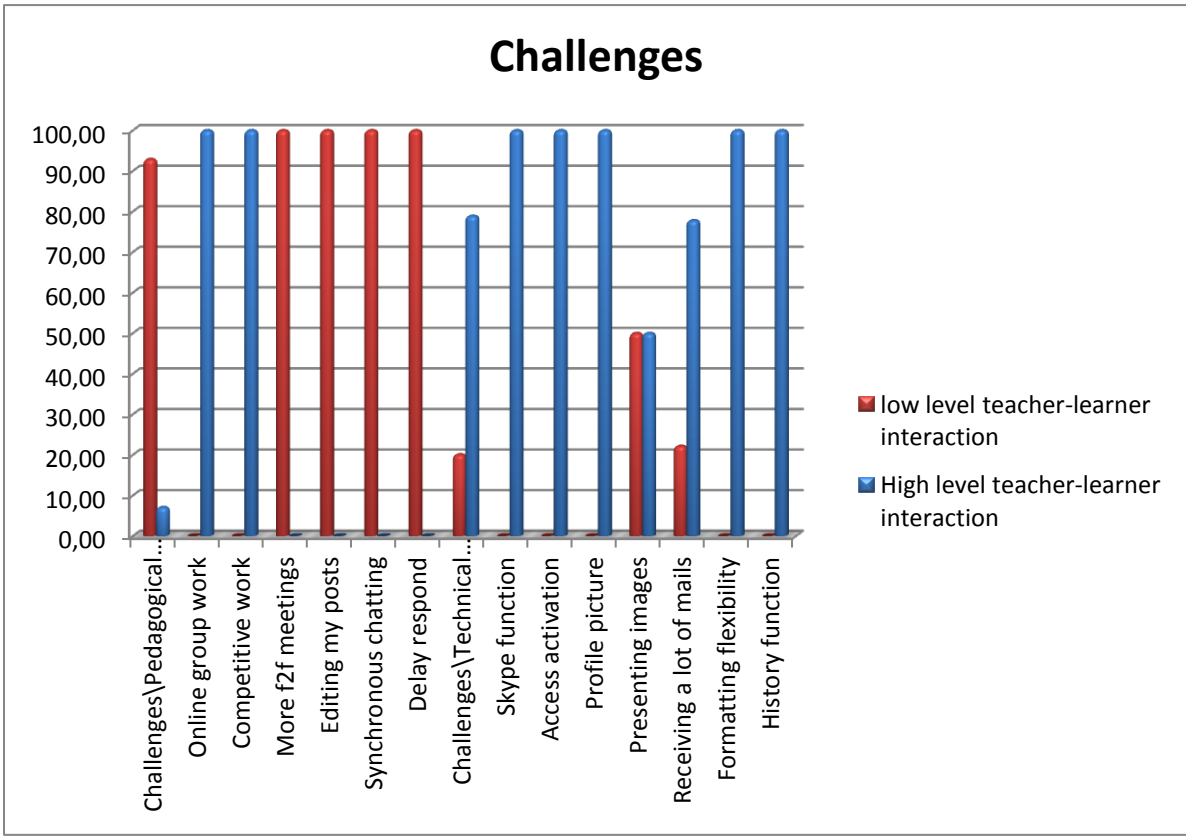


Figure 7: The challenges that encountered the participants.

In each group, there was one member designated as a group leader who was in charge of controlling his / her group members' work, tutoring them towards the main goal of each topic. In addition, they were to supervise the application of the assignments in the group course. He / she would encourage each member of the group to post their contributions on time, as a result of the students' complications that has been stated earlier. Due to the continuing students' errors caused as a result of all the participants never having used a wiki before and requiring some instructions and practice using the wiki before they could start course activities, the researcher handed out details of the wiki tasks and specific written instructions were provided (both verbally and through flow of printed notes in meetings and via e-mails) for the leaders of each group as well as for each participant at the beginning of the tasks. Written instructions were also sent through e-mail for students who did not attend the meeting that day (see Appendixes 8.12, 8.13 and 8.14). Wiki etiquette was incorporated in the wiki course. For example, the PbWiki teacher included three simple statements to the learners on a page so- called "Wiki Guidelines:"

1. Be polite!
2. Be nice!
3. Be democratic! (Your participation is critical to the success of the group work). Participants in each group can edit, share, add or modify the content of wiki course in

this group. In order to be invited to each group, the participants were alerted with an e-mail containing an invitation and a link. Participants had to follow and join the wiki group with a default level of editing the wiki page with limited responsibility as a "Writer", so that participants were able to access their wiki group using a username and password.

From November 1 to 21, participants of both groups were given a series of specific instructions about the current activity, what they have to do during this period, what was involved, support and advice before and during the task, parts of the content syllabus were provided to the participants in PDF downloads via the wiki course. Constant reminders were sent by the researcher through comment function of the tool being used or even through e-mail. Learners not only received the knowledge and practiced exercises from the courseware produced by the teacher, but were also able to explore and search for information through the internet. The course content included a lot of hyperlinks that allow them to search for information. Also after each unit there were four face-to-face meetings to talk with the participants about their progress with the previous activity, to keep the group informed of their work and also to solve and facilitate any questions, difficulties or challenges that may experience the students through their group work.

So after all participants accessed their respective wiki course using their accounts, the researcher provided specific details of the tasks and due dates (see Appendix 8.12), Participants posted their edits, comments, questions, applied the course assignment in their own time where the researcher administrate the wiki course to the two group almost 24 hours a day, and participants navigated the wiki course from everywhere and anywhere using their own personal computers or from the university computer labs. Learners were working together in two small groups with close "problem scaffolding by the teacher" (Oliver, 2002) to reach a certain goal of the course goals.

The following items were done as important factors for continuous improvement in teaching the course according to Arsham (2002): Throughout the course, information (objectives / content / assessment) was clearly given. Learners were able to locate and use suggested resources and sometimes add or upload their resources. Various components of the unit were clearly linked to one another where the course was consists of the main skills of how to use Moodle divided into four units in the following manner:

Unit 1: What is Moodle: dealt with the idea of what Moodle is by making the learners familiar with 'Moodle', define: 'Moodle' is an acronym to what and what does it mean? Identify the term 'Moodle' to its applications in a real life situation, the way to login Moodle,

recognize the main page elements of Moodle platform and the structure of it, its contents and functions, how the learners can edit their profile and how they can add blocks to the main page of their Moodle courses.

Unit 2: Administration block: dealt with the ideas of the importance and use of the Turn editing on / off function, preparing the learner to be able to adjust the course settings, set the suitable course format to the educational aims and course organization, assign different roles in Moodle, how to backup a course, restore a course from a backup copy, import a course data and how to add questions to the course.

Unit 3: Resources: dealt with the ideas of add a book to Moodle course and insert a label into the course.

Unit 4: Activities: teaches participants how to add assignments to the course; adjust the advanced uploading of files activity, add online text activity to Moodle course, add a Chat activity, Choice, Database, Feedback, Forum, Glossary, and Wiki activities to Moodle course. Activities, resources and assignments in the course enhanced learners' range of knowledge and skills in the content area covered where each skill or topic has the suitable resources and assignments that stimulate learners to exchange their knowledge. The researcher presented the course materials and content clearly at the level that makes the learners could understand. He tried to appear enthusiastic about the material being presented and used strategies and techniques that stimulated learners' interest in the content being covered through assisting their learning by being available for discussion/questioning/clarification through 24 hours per a day. The researcher was well prepared with his ten years online learning environments' experience, as a node in the group, providing messages containing the relevant knowledge of the covered content. through posting organized and more related types of assignment set to the treated topic, seemed from his point of view appropriate to the course aims and educational goals and validated by an expert in AG eLEARNiNG group to check if they are easy, clear, suitable to the topic, have enough time to be finished, not frequented or boring, thus provides a good channel of interaction and communication between the teacher and the learners. Written comments on material returned from the learners about the assignments were helpful, informative, and returned in a reasonable time. This was addressed in the learners' complaints of the problems that challenged them. The researcher supports the learning community with enough feedback in which used as a means to measure the effect of online learning and teaching. The researcher displayed good skills in methods of communication, particularly through the interaction with the training group that which the dependent variable of a high level of teacher-learner interaction.

3.9. Aspects of teacher-learner interaction through the course

Some features were adopted through the course to address the high level of teacher-learner interaction, as distinguished in the highlight of Diggins (2004, p. 56) between a number of key themes related to what is currently being taught regarding communication in social work in the following manner. Using communication skills instead of interviewing and interview' dominance in the social learning situations, this has been applied in the course through encouraging learners to identify particular contributory or 'sub' skills, including reading, questioning (in particular asking open questions) and non-verbal communication). The common pedagogical application of wiki supports writing using the opportunities of wiki. Wiki stimulates writing where "Fun" and "wiki" are often associated. These aspects were addressed in the course. In this scene, the teacher used such a wiki which provides low cost but effective, communicative and collaborative tool, promotes close reading, revision and tracking of basic work and also supports in easily way writing for wider range of audience, allows users to draft and redraft each other's text online, and to share that text among a community of participants. Pay more attention to the communication skills training, through increasing the user involvement, with users coming in to deliver teaching and also being involved with assessment; increased assessment by observation as well as written assessment. Group and collaborative learning situations followed by exercises and feedback foster learning. The teacher should be closed to his learners by the electronic means, teacher took into account the idea of interlinking with the individual through the learning situation by mutual notifications by teacher or questions from the learner side also make the aims and course expectations are accessible by the students, the course information, topics and the deadlines of each topic also encouraging them to participate the course and modifying their colleagues and or teachers' work.

The researcher clarifies and negotiates the purpose of the ambiguous boundaries of learners' involvement. He was notified of all the learners' questions and whenever possible sent them immediate feedback, listened actively to others, engaged appropriately with the life experiences of wiki users, critically understood their viewpoints and overcame personal prejudices. The course provides the capability of 'working with the others and the community concept, 'social context of social work' and 'adapting skills to users' situations' were included in the course. On the other side, the researcher encouraged the self awareness through the learners' learning by allowing them to use their prior cognitive structure in addition of the new ideas by the other peers, shared information in the treated course to build

the new cognitive structure by the participants themselves, then they can post it to their colleagues to use it to build the new one and so on.

A wiki community platform was used to allow the participants to share their ideas and consider the adaptation of users' skills to certain situations as key. Additionally, it also allowed support of working with difference and diversity. All of these opportunities allowed him to engage the learners to involve their course with their everyday life. Follow and develop an argument and evaluate the viewpoints and evidence of others, through the learning situation. Via wiki, learners were asked to share their course' content and to build the final form of the content (reflective essay about the content), also the course included the evaluation of the final Glossary of the terms that had been stated in the course. The course contained many functions which facilitated the interaction between learners themselves and also between them and the researcher. From another side, the course was contained a clear instructions, symbols, font types, images that may allow the learners to accomplish their group work in the highlight of researcher' facilitation.

After each topic, the researcher presented a report about the previous topic containing the main points that were discussed, and all of them was posted by mail or directly through the wiki posts, also all participants were informed by statistical report about each member participations via the wiki group work through adding the function of 'Number of visitors' counter in the front page of the wiki course. This may improve the learners' work in the next topics. In the same regard, the researcher effectively prepared for teaching situations and led online sessions in a productive way, he communicated effectively by confronting the barriers resulting from individual differences.

Another aspect of high level teacher-learner interaction through the course was that learners can be strongly motivated through communication with the learners and be sure concerning the treated content and the feedback features. In addition was the cohesion among learners and between them and the researcher and to what extent the learners were comfortably interact with their peers in online learning environments and they were collaboratively work together to conduct such a content (Kussmaul et al., 2006).

The methodology and tools that were used in the course facilitated the learning process (e.g. adapting the collaborative strategies with support from the teacher, reinforcing the learners to do the assignments, tutoring the learners' learning and providing them immediate feedback and motivating them). The researcher taught learners to think in self-directed learning strategy and then share their knowledge with their peers in the learning community. To some extent, learners acted not only as the receiver of the knowledge but also

generated their own meaning, knowledge and absorbing the course materials such as videos, pictures, texts, hyperlinks, chat sessions, Pdf files etc. The researcher demonstrated confidence in his knowledge, and was well informed on technical and professional advances and his role as a teacher.

Learners must have a variety of possibilities and therefore the availability to choose. The researcher tried to formulate more flexible assignments and the learners had to respond these assignments. The researcher noticed that there are some skills, or assignments of which motivated learners answered them, despite being much harder and challenged assignments. Teaching and learning processes and their product must have a social and personal value for the learner to improve the learning outcome. The researcher challenged a lot of these problems in the initial construction of the course, but after reviewing the course by an expert and supported the course with his advices about the structure, design, content, resources and materials, the adequate time that suitable to accomplish the assignments, before starting the course the researcher has the ability to build the course' materials and tasks within the teaching framework and the assignment structure.

Regarding the problem-based learning as a constructivist and collaborative learning environments, the course started with an authentic problem that is relevant for the future practice of the course content. Learners met each other twice a week during the duration of the course where they were working together in small groups consisting of seven participants. In the first meeting, learners start with activating their prior knowledge about the given task. The problem was then analyzed, possible explanations are generated and learning issues are formulated. After these first steps, learners individually studied the learning issues and search for relevant information related to the course content. During the second meeting learners discuss and synthesize their findings, which should lead to a deeper understanding of the problem (Kamp et al., 2012, p. 2).

Interaction occurred through the interaction among peers and between them and the teacher to allow the group members to enhance their knowledge to achieve the desired task of each topic of the academic content. Learning through the course was based upon problem–based learning structure and real-life features, where participants participated through activities like posting ideas, sharing data, conducting glossaries, terms, asking and or replying questions, add comments that encouraged reasoning and exploration, there were no chance to develop short-answer, true/false, or multiple-choice questions in the course (Abdullah, 1998). The course was also conducted in highlight of "Inquiry based learning" which leads to a deeper understanding of learning by providing learners with skills and attitudes that allow

them to make decisions while constructing their new knowledge. They exchange their prior knowledge together, the person with a lower skill set tries to ask questions or post comments to the group members and the teacher to find answers; through this process they generate their new knowledge and reflect on their meaning in this topic of skill which can then later be used as prior knowledge to the next situations (Dillenbourg, 1999).

The training group participants were encouraged to post on the dates assigned, so that they contributed towards a valuable written work regarding the course content. Prompt feedback was directly sent whenever possible to the training group members 24 hours a day. The ability to post comments and messages all day may lead to students' belief that the teacher will instantly send respond at any time and they already highly supported (Davidson-Shivers & Rasmussen, 2006; Mandernach et al., 2007). Learners, especially those who are new in social networking software, want to contact teachers and they do not have clear expectation about when the teacher is available to answer their questions. In this course the researcher was available approximately all day to respond immediately whenever possible and support the two groups, especially the training group, with answers to all their questions regarding the content (Fox, 2007).

Regarding its nature as reading / writing the web, wiki participants may encounter possible problems when using wikis, including inappropriate posting of content and unintentional deletions. Wiki does not support participants' monitoring by recording the dates and number of postings that has been made by participants. Moreover it has a valuable function does the same role called "History" function to get a documented information about the participants' postings (see Figures 15, 16). Despite all the obstacles caused by this activation, the monitor option of the wiki was activated to allow the researcher to receive an e-mail notification every time a student made a change to the wiki page (you change the frequency of notifications being sent to the group members). The development of a set of guidelines also helped clarify the requirements on how the students can navigate the course. They encourage learners to be active, friendly and to be considerate of others while contributing the wiki course (see the guidelines are depicted in figure 22).

At the end of each task assignment, the wiki course pages included assignments that learners should complete. Assignments were divided into two types; the first was entitled "assignments" and was related to the cognitive part of the content such as "Write a brief description about the assigning roles in Moodle (the concept and the importance) then add it to the Glossaries". The second one was entitled "Practice Homework assignments!!" related to the practical part of the content and learners are requested to apply them in Moodle

platform such as “Add almost 10 students to your course.” and “Add another teacher to your course”. There were 144 assignments in the wiki course distributed between 62 assignments and 82 practice homework assignments through 80 wiki pages represent the total number of the wiki course (see figure 19).

Research tools have been built according to scientific research bases and regular steps as we shall see in details. On November 21, data collection instruments were conducted in post. The final product scale and content analysis tool were administered by two persons other the researcher. At the end of the course, learners were acquired to respond a flow of instruments post-test, questionnaire and survey. All the study instruments were distributed asking for the general use of social networking software, additionally, semi-standardized interviews were conducted with all of the study students. The scales have very good reliability values so they can be used in good trust (see Appendix 8.29).

To show the relation between the study instruments and their purpose in the study (see table 3).

Instrument	Purpose
The achievement test	RQ1- Did the use of different levels of teacher-learner interaction influence the students’ performance on Moodle course through social networking software wiki?, RQ5.
Product Scale	RQ2- Are there any differences in the quality of the learners’ final product after wiki-based collaboration in different levels of teacher–learner interaction?
Satisfaction Survey	RQ3- Did the use of different levels of teacher-learner interaction influence the students’ satisfaction regard a Moodle course through social networking software wiki?
Satisfaction Interview	RQ3-
Content analysis tool for online collaborative learning	RQ3 & RQ4- What are the conditions that benefit or hinder collaboration do learners when using wiki interaction assignments? The process of knowledge construction during group interaction would happen via its five phases.
Wiki activity scores	RQ4
Motivation survey (Survey questions)	RQ5- What are the features of the learner’s motivation, attitudes, and prior knowledge towards the context of Moodle course after teacher-learner interaction (with its

	two levels) assignments using wiki?
Teacher learner attitudes scale	RQ5- To assess learners attitudes towards teacher learner interaction situation
Classroom Community Scale	RQ4- To assess the learning and community aspects of the online course.

Table 3: The relationship between the study instruments and their purposes.

Prior to any collection of data, the first instrument of the study was the achievement test (pre-test) took place; participants are requested to complete the instrument taken before the wiki course, they completed the pre-test questions. To verify the validity of the test, it was presented to the professionals of the field. Regarding their modifications, the researcher presented the tool in its final form (see Appendix 8.3). To verify the reliability of the tool, Cronbach alpha test was calculated and the value of the tool reliability of the pre-test was (0.309) which meets the study's requirements and the post-test scored (0.773) (see table 4).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,773	30

Table 4: The reliability of the post-test using Cronbach alpha test.

The second instrument was a 20-item satisfaction attitudinal survey towards learners' satisfaction. Each item is accompanied by a 5-point Likert scale, ranging from strongly agree to strongly disagree. The satisfaction questionnaire statements were written in the form of positive and negative statements. Ten statements represent the positive aspects of the scale; these statements were numbers (3, 4, 8, 9, 10, 11, 12, 13, 14, and 19) and the other ten statements (1, 2, 5, 6, 7, 15, 16, 17, 18, and 20) were negative (Appendix 8.8). Before applying the statistical treatments, the positive statements have the values (5, 4, 3, 2, and 1) to the ranges (strongly agree, agree, neutral, disagree, and strongly disagree) respectively. On contrast, the negative statements have the values (1, 2, 3, 4, and 5) to the same sequence of the ranges. This questionnaire was developed by the researcher and validated by the professionals in the field, and in order to verify the reliability of the questionnaire, the Cronbach alpha test was calculated and the value of the tool reliability of the satisfaction survey was (0.934) which meets the study's requirements (see Appendix 8.29) to report the learners' satisfaction, containing items with regards to the learner's feelings towards teacher-learner interaction, interactive learning, peer interaction, social interaction situations advantages/disadvantages. The researcher conducted the satisfaction scale with highlight of

Wang Yi-Shun's model for measuring e-learner satisfaction (2003), which dealt with e-learner satisfaction in highlight of four aspects: learner interface, learning community, content, personalization, where the items number 1, 3, 4, 5, 6, 11, 12, and 18, belong to the aspects of learning community, while the content aspects of satisfaction was covered through the items number 2, 15, and 20 and finally the items 7, 8, 9, 10, 13, 14, 17, and 19 covered the personalisation aspect. The results were also processed in SPSS software (see Appendix 8.8).

The third instrument was the satisfaction interview which contained items regarding the ease of the wiki course through the interactive process among learners and between them and the teacher, also the interview encouraged the learners to report the main advantages and disadvantages of teacher learner interaction through the wiki course, finally if the learners challenged or experienced any barriers hinder the interaction through the wiki course and requiring the most features of this kind of interaction they want to deal with in the future. The interview validated by the professionals in the field (see appendix 8.6).

To measure connectedness and learning, the 20-item classroom community scale (CCS) developed by Rovai (2002) was used. This instrument consisted of 20 self-report items such as *feel encouraged asking questions and feeling reluctant to speak openly.* Each item is accompanied by a 5-point Likert scale, ranging from strongly agree to strongly disagree. The scale includes items that are positive characteristics and those that are negative characteristics of classroom community. The CCS was also divided into two subscales, connectedness and learning. The connectedness subscale is calculated by adding the weights of the odd-numbered items; those were (1, 3, 5, 7, 9, 11, 13, 15, 17 and 19). The learning subscale is calculated by adding the weights of the even-numbered items; those were (2, 4, 6, 8, 10, 12, 14, 16, 18 and 20).

Before applying the statistical treatments, the positive statements have the values (5, 4, 3, 2, and 1) to the ranges (strongly agree, agree, neutral, disagree, and strongly disagree) respectively. On contrast, the negative statements have the values (1, 2, 3, 4, and 5) to the same sequence of ranges. The participants checked the place on the scale that best reflects their feelings about the item where:

- Connectedness: represents learners' feeling where "students' care about each other, connected with the others, a spirit of community, and this course was like a family and its members depended on me, feel isolating, trusting others and rely on them".
- Learning: represents learners' feelings regarding "encouraging asking questions, receiving timely feedback, help and ample opportunities to learn, meeting the

educational needs and finally promoting the desire to learn" (Rovai and Jordan, 2004).

The classroom community scale statements were written in the form of positive and negative statements. Ten statements represent the positive aspects of the scale; these statements were numbers (1, 2, 3, 6, 7, 11, 13, 15, 16, and 19) and the other ten statements (4, 5, 8, 9, 10, 12, 14, 17, 18, and 20) were negative (Appendix 8.19).

In order to verify classroom community scale' reliability, the Cronbach alpha test was calculated and the value of the tool reliability of the classroom community scale was (0.936) which meets the study's requirements (see Appendix 8.29).

The fifth instrument was 20 items on teacher-learner interaction scale to serve as an attitudinal survey towards this kind of interaction through the wiki course. It was created in order to assess the learners' attitudes towards teacher-learner interaction and validated by the professionals in the field. In order to verify the reliability of the tool, the Cronbach alpha test was calculated and the value of the tool reliability of the teacher-learner interaction scale was (0.955) which meets the study's requirements (see Appendix 8.29). The teacher-learner interaction scale was used based on the work of Rees et al. (2002), the communication skills attitude scale (CSAS) used to collect information regarding student attitudes about communication skills training. The CSAS consists of 26 items dealt with the ideas of qualified teacher has good communication skills with his/her learners, the importance of communication skills in developing knowledge of teaching, respect the others' viewpoints, considering communication as an interesting, useful and something fun, communication skills facilitates team working skills, supports the ability to communicate with others, to what extent communication skills can be trusted as an information resource, respecting the other's rights, and the ability to communicate is a lifelong skill.

The teacher-learner interaction scale statements were written in the form of positive and negative statements. Twelve statements represent the positive aspects of the scale; these statements were numbers (1, 2, 4, 6, 8, 11, 14, 15, 16, 17, 18, and 20) and the remaining eight statements (3, 5, 7, 9, 10, 12, 13, and 19) were negative (Appendix 8.9). Each item is accompanied by a 5-point Likert scale, ranging from strongly agree to strongly disagree. Before applying the statistical treatments, the positive statements had the values (5, 4, 3, 2, and 1) in the ranges strongly agree, agree, neutral, disagree, and strongly disagree, respectively. In contrast, the negative statements have the values (1, 2, 3, 4, and 5) to the same sequence of the ranges. Participants also completed a demographic questionnaire.

It has been refined to a 20-item list of statements containing items regarding social communication, individual differences, teacher-learner interaction, interactive learning disadvantages, guiding and facilitating learning, participating in situations similar to real life, clear course expectations, deadlines and ease of accessibility and finally managing the wiki course (see Appendix 8.9).

The sixth instrument was a content analysis tool using Maxqda software included the main and sub levels of Gunawardena et al. (1997) in order to analyze content for online collaborative learning environments facilitated by online courses. Content analysis is a method of analysing written, verbal or visual communication messages (Cole, 1988). To verify the reliability of the tool, a comparison was applied among several tools of content analysis such as Gunawardena, et al. 1997; Fahy et al. (2001), and Anderson (1997). The Gunawardena, et al. (1997) tool is the easiest tool in the analysis unit and the most linked tool to the current study variables, where the analysis unit is a completed post. For example, when one participant posts his/her contribution to the wiki course, this contribution is considered an analysis unit. While in the Henri's tool (1992), it focuses on the meanings, which threatens the reliability of the tool and the unit of analysis of Fahy et al. (2001) tool is the sentence. In addition to focus the participation analysis on the cognitive classification and this does not consider the aim of the current study.

Content analysis was used for making replicable and valid inferences from data to their context, with the purpose of providing knowledge, new insights, a representation of facts and a practical guide to action (Krippendorff, 1980). In order to attain a condensed and broad description of the phenomenon and the outcome of the analysis was in categories describing the phenomenon (Elo & Kyngäs, 2007) .This instrument is included into the qualitative analysis process through the Maxqda software after finishing coding its sub categories. Learners' contributions are coded into category if a part or all of it matched the description, regardless of whether it was positive or negative. All participants' contributions were independently coded by someone other than the researcher (see figure 8).

The purpose of the study is to develop a theory regards how to support self-directed learning through multi-author and content management tool. It is recommended that the term 'category be used when describing the analysis process, we use the term 'category' because this is mostly used in literature. This method is as easy or as difficult as the researcher determines it to be (Neundorf, 2002).

The study used a mix of two approaches of content analysis (in an inductive or deductive way). This is determined regard the purpose of the study. Studies use the inductive

approach when there is not enough prior knowledge about the phenomenon and the categories are derived from the data (Lauri & Kyngäs, 2005). In this approach data moves from the specific to the general, thus the analyzer accumulate the similar aspects into general one (Chinn & Kramer 1999). When the structure of analysis is operationalized on the basis of prior knowledge, then the Deductive is recommended (Kyngäs & Vanhanen, 1999). It is based on an earlier theory or model and therefore in contrast with the other approach it moves from the general to the specific (Burns & Grove 2005).

The content analysis process was conducted through three phases: preparation, organizing and reporting. The preparation phase starts with selecting the unit of analysis which can be a word or a theme. A unit of analysis may consist of more than one sentence and contain several meanings. Analyzers should take into account that may make the analysis process difficult. On the other hand, if the analysis unit was too narrow, (one word), may result in fragmentation (Graneheim & Lundman 2004). Regarding this research question, the unit of analysis was a word, sentence, portion words, and the number of participants in discussion, participant posts and contribution on the wiki course or the time used for discussion. In addition the content analysis units were the participants' comments; participation, edits and sharing through the wiki, into a series of categories (Polit & Beck, 2004) (see Appendixes 8.4, 8.40 & 8.41).

In many of today's empirical studies, computers are used as tools for content presentation and data acquisition. The qualitative data analysis process in this study has been applied through digital software called 'MAXQDA'. MAXQDA makes it easy to import and organize various types of documents, including text documents, PDF files, and images. The study limitations were only regarding the text documents, participant's posts through the wiki course, their comments and the text material gained e.g. by interviews. Additionally, because methodological aspects of qualitative data analysis (QDA) software are scarcely discussed (Kuckartz, 2006). Several features of MAXQDA 10's software have been explained in order to allow the reader to become more familiar with the program's various analytical tools.

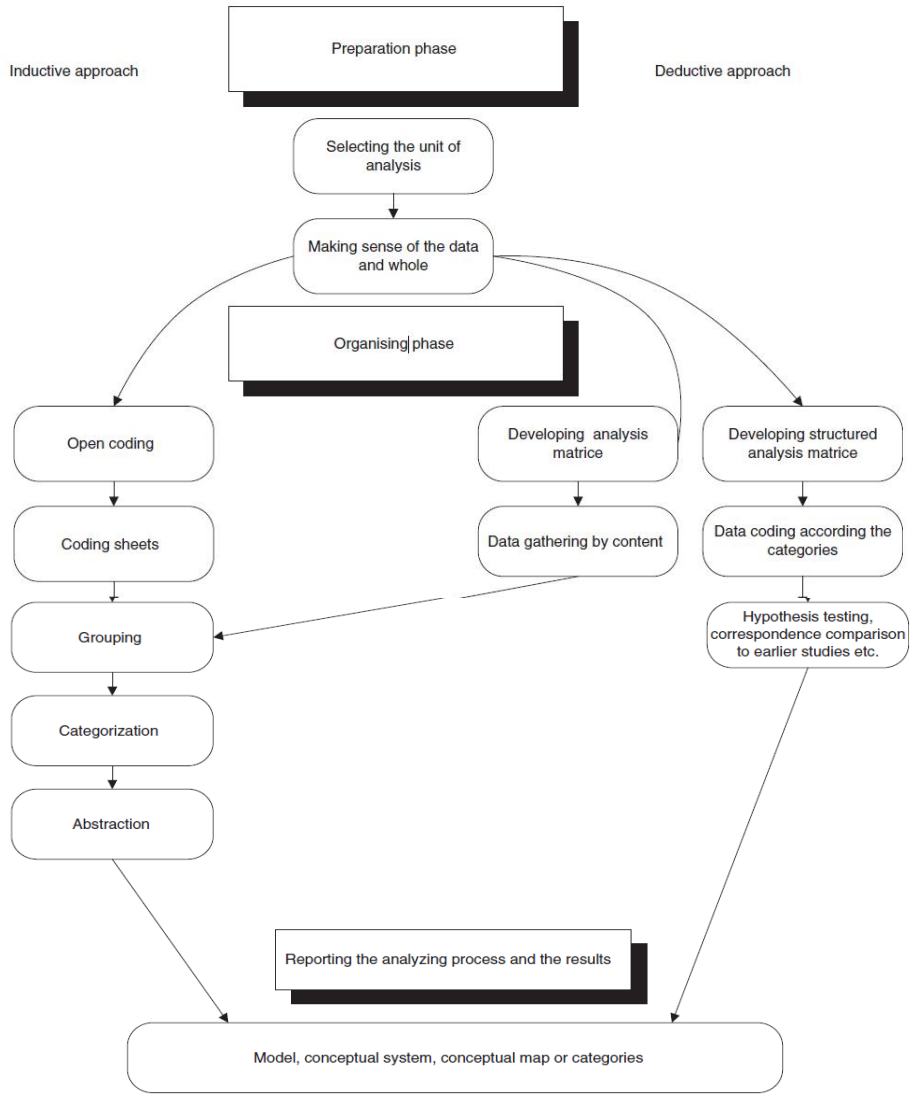


Figure 8: Preparation, organizing and resulting phases in the content analysis process (Elo & Kyngäs, 2007)

Inductive content analysis approach includes open coding, creating categories and abstraction. Open coding means that notes are written in the text while reading it. Categories are generated at this stage. Through generating categories, a general description of the research topic (Abstraction) was formulated (Elo & Kyngäs, 2007) (see figure 8). Similar subcategories are grouped together as categories and categories are grouped as main categories. Deductive content analysis is recommended when the researcher wants to retest existing data in a new context, test categories, concepts, models or hypotheses (Marshall & Rossman 1995). Then develop a categorization matrix and to code the data according to the categories, Hypothesis testing, correspondence comparison to earlier studies etc. and finally reporting the analyzing process and the results (see figure 8).

The analysis process started with the main codes (Categories) and other codes has been formulated during the analysis process. The codes of the analysis process were as follows:

They were distributed in the next main codes: (1) level of teacher-learner interaction that included high and low levels. (2) Person number ranging from 1 to 14. (3) Online interaction included: sharing / comparing of information, the discovery and exploration of dissonance or inconsistency among ideas, concepts, or statements, negotiation of meaning/co-construction of knowledge, testing and modification of proposed synthesis or co-construction and agreement statement(s) / applications of newly-constructed Meaning. (4) Interaction included: by teacher or by learner. (5) Reaction included: yes / no and if yes, the reaction was from the teacher or the learner. (6) Reaction type. (7) Timing. (8) Attitudes towards content-learner interaction, teacher-learner interaction, and learner-learner interaction. (9) Motivation. (10) Satisfaction which included satisfied or not satisfied. (11) Challenges which included pedagogical and technical challenges (see appendixes 40 & 41).

The seventhes instrument was the 30-item final product scale instrument developed by the researcher and validated by the professionals in the field. The final product scale was consisted of 30 self-report items such as general information, learning activities, learning resources (see appendix 8.5). It aimed to use criteria list to examine the Moodle courses of the sample's final products. It has been refined to a 30-item list of statements to which the expert evaluated the participants Moodle courses via Yes / No scale, where yes means that this criterion is accomplished in this course and No means it was not. This instrument was applied and administered by a person other than the researcher from the AG eLEARNiNG group in order to be sure of the final product scale regulations. In order to verify the reliability of the tool, the Cronbach alpha test was calculated and the value of the tool reliability of the final product scale was (0.883) which meets the study's requirements (see Appendix 8.29).

The pre and post-test (see Appendix 8.3) measured the learners' learning achievement with regards to the course content (How to use Moodle). The test has been prepared to assess learners' prior knowledge of the concepts and variables that are relevant in the learning environment and the second part of the test was a generic knowledge test, the generic knowledge test was divided into three sections. The first section was designed to assess the students' knowledge about Moodle; the second section measured the ability to work with two of Moodle responsibilities (learner and teacher) and the third section of the test examined the learners' performance in the areas of planning and conducting course concerning Moodle.

- Achievement test preparation:

The achievement test was constructed in highlight of the behavioral objectives expected of learners (see Appendix 8.2). In light of the scientific content of the wiki course, relying on one type of objective tests, multiple-choice questions were formulated where the question

statement was formulated, and four alternatives answers were suggested. The learner is requested to choose only one answer between them.

The following steps were followed in building the achievement test:

1. Defining the test goal.
2. Planning the test.
3. Designing a test specifications' table.
4. Building the test included the following elements: -
    a. Determining the test type.
    b. Determining the statements type.
    c. Formulating the test statements.
    d. Writing the test statements.
    e. Adjust the test.

The following steps illustrate the achievement test setting process in details:

1. Defining the test goal:

The test aims to measure the knowledge achievement of the study sample and test them by applying the test pre- and post and statistically processing the results to measure the extent of the change they have. The limitation of the test illustrated that the preparation of the test measures the first three levels of the cognitive aims (76%) who were remember, comprehension and application, depending on Bloom's Taxonomy of the cognitive objectives (1956) (see Appendix 8.2).

2. Planning the test:

The planning process to the test included the following steps:

a. Determine the aspects of the test: the test was limited to two fundamental aspects:
    I. Content aspect: includes the scientific content of course which was titled with "How to use Moodle".
    II. Cognitive level aspect: the majority of cognitive levels were in the test (76%) includes the first three levels of cognitive level (remember - comprehension - application), and the others levels were distributed 10% analyzing, 10% creating and 4% evaluating, all of them were the levels measured by the test.
b. The cognitive aspects measured by the test:

The test measures the cognitive aspects of wiki course content of which includes five themes:

I. Wiki: it was the only unmeasured unit in the course, to help learners to learn about how to use potential wiki features.
II. Moodle: to help the learner to understand what Moodle is, how to log in to Moodle, how to edit your profile in Moodle and how to add blocks to your course.
III. Administration block: to help the learner to know how to turn editing on/off, how to edit course settings, assign roles, make backup to the course, and add question to the course area.
IV. Resources: to help the learner to know how to add and adjust e books in Moodle and how to insert a label with a picture to the course.
V. Activities: to help learners to know how to add and adjust chat activity, choice, database, feedback, forum and glossary activities in the course area.

3. Designing a test specifications' table:

The purpose of a specification table is to make sure that the test measures a representative sample of wiki course objectives and cognitive aspects' of the content that it wants to measure, and it shows the relative importance of each aspect and objective. Therefore, it determines the number of the test statements that will be allocated to each aspect and each objective of the wiki course objectives.

The preparation of the test specifications table includes the following steps:

a. Determining the relative importance of wiki content.
b. Determining the relative importance of objectives.
c. Matching between the content and objectives table.

We can address the previous steps of setting up a test specifications table in certain detail as follows:

a. Determining the relative importance of wiki content:

The researcher identified the relative importance of each aspect of content by calculating the number of sub-topics that contains. Table (5) reports the relative importance of content depending on the sub-topics and its percentage with regards to each aspect.

Content topics	Unit title	Sub items	Percentage
1	What is Moodle?	16	10,81%
2	Administration Block.	45	30,40%
3	Add resource.	16	10.81%
4	Add activity.	71	47.97%

Table 5: The relative importance of the content topics.

b. Determining the relative importance of objectives:

Table (6) reports the distribution of objectives on each of wiki course topics, by selecting the number of objectives in the cognitive objective levels according to Bloom's taxonomy of cognitive objectives.

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of sub items	Percentage
Remember	8	4	1	3	16	16×100/148 = 10.81%
Understand	-	-	-	3	3	2%
Apply	4	24	15	53	96	64.86%
Analyze	4	9	-	-	13	8.78%
Create	-	8	-	10	18	12.16%
Evaluate	-	-	-	2	2	1.35%
Sum of sub items	16	45	16	71	148	-
Percentage	10,81%	30,40%	10.81%	47.97%	-	100

Table 6: The relative importance and distribution objectives on the content of each topic.

To make the table more clear, the percentages zoom row and column have been added (see table 7).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage	Percentage zoom
Remember	8	4	1	3	16	10,81%	11%
Understand	-	-	-	3	3	2%	2%
Apply	4	24	15	53	96	64,86%	65%
Analyze	4	9	-	-	13	8,78%	9%
Create	-	8	-	10	18	12,16%	12%
Evaluate	-	-	-	2	2	1,35%	1%
Sum of questions numbers	16	45	16	71	148	-	

Percentage	10,81%	30,40%	10,81%	47,97%	-		
Percentage zoom	11%	30%	11%	48%			100

Table 7: Percentages zoom.

To improve the outcome, fixed data has been deleted, and the table still shows the number of questions and the sum of questions numbers in addition the percentages (see table 8).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember					16	11%
Understand					3	2%
Apply					96	65%
Analyze					13	9%
Create					18	12%
Evaluate					2	1%
Sum of questions numbers	16	45	16	71	148	-
Percentage	11%	30%	11%	48%	-	100

Table 8: The final sum of questions numbers and percentages.

Table of specification for a test consisting of 60 questions

The previous tables show a number of (148) questions. In order to reduce the amount of questions to 60 questions, table (9) will be conducted.

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember					6,48	11%
Understand					1,21	2%
Apply					38,91	65%
Analyze					5,27	9%
Create					7,29	12%
Evaluate					0,81	1%
Sum of questions numbers	6,48	18,24	6,48	28,78	60	-
Percentage	11%	30%	11%	48%	-	100

Table 9: Reduce the number of test questions to (60) items.

Sum of questions numbers zooming

According to reducing the number of questions in table (9), percentages and the sum of questions numbers of each unit and in each cognitive level should be modified according to reducing the number of questions (see table 10).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember					6	10%
Understand					2	3,33%
Apply					39	65%
Analyze					5	8,33%
Create					7	11,66%
Evaluate					1	1,66%
Sum of questions numbers	6	18	7	29	60	-
Percentage	10%	30%	11,66%	48,33%	-	100%

Table 10: Modifying the question number zooming.

The table upon completion of the statistical process to represent the percentages in whole numbers rather than in fractions (see table 10).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember					6	10%
Understand					2	3%
Apply					39	65%
Analyze					5	8%
Create					7	12%
Evaluate					1	2%
Sum of questions numbers	6	18	7	29	60	-
Percentage	10%	30%	12%	48%	-	100%

Table 11: Number of questions and percentages.

Redistributing the number of questions in each content object and objective level as follows

In this phase the numbers of questions were re-distributed in each cognitive level and in each unit according to the new distribution of questions (see table 12).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember	3	1,5	0,37	1,12	6	10%
Understand	-	-	-	2	2	3%
Apply	1,62	9,75	6,09	21,53	39	65%
Analyze	1,53	3,46	-	-	5	8%
Create	-	3,11	-	3,88	7	12%
Evaluate	-	-	-	1	1	2%
Sum of questions numbers	6	18	7	29	60	-
Percentage	10%	30%	12%	48%	-	100%

Table 12: Redistributing the number of questions of each cognitive level and the unit.

The number of questions after modifying

The fractions of the questions have been removed to be illustrated in whole number (see table 13).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember	3	2	1	1	6	10%
Understand	-	-	-	2	2	3%
Apply	2	10	6	21	39	65%
Analyze	2	3	-	-	5	8%
Create	-	3	-	4	7	12%
Evaluate	-	-	-	1	1	2%
Sum of questions numbers	6	18	7	29	60	-
Percentage	10%	30%	12%	48%	-	100%

Table 13: Removing the fractions.

Table of specification to a test consists of 30 questions

The steps that have been made in the tables from (9 - 13) in order to make the questions to 60 questions, will be tracked to reduce the number of question to 30 questions, these steps have been done in the tables from (14 - 16).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember	3	2	1	1	3	10%
Understand	-	-	-	2	1	3.3%
Apply	2	10	6	21	19.5	63.3%
Analyze	2	3	-	-	2.5	10%
Create	-	3	-	4	3.5	10%
Evaluate	-	-	-	1	0.5	3.3%
Sum of questions numbers	3	9	3.5	14.5	30	-
Percentage	10%	30%	11.6%	48.3%	-	100%

Table 14: Reduce the number of test questions to 30 items.

Sum of questions numbers zooming

To calculate the number of statements of each cognitive level (see table 15).

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember	3	2	1	1	3	10%
Understand	-	-	-	2	1	3%
Apply	2	10	6	21	19	63%
Analyze	2	3	-	-	3	10%
Create	-	3	-	4	3	10%
Evaluate	-	-	-	1	1	4%
Sum of questions numbers	3	9	4	14	30	-
Percentage	10%	30%	12%	48%	-	100%

Table 15: Modifying the question number zooming and removing the fractions of the questions numbers.

Redistributing the number of questions in each content object and objective level as follows:

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember	1.5	1	0.5	0.5	3	10%
Understand	-	-	-	1	1	3%
Apply	0.97	4.87	2.92	10.23	19	63%
Analyze	1.2	1.8	-	-	3	10%
Create	-	1.28	-	1.71	3	10%
Evaluate	-	-	-	1	1	4%
Sum of questions numbers	3	9	4	14	30	-
Percentage	10%	30%	12%	48%	-	100%

Table 16: Redistributing the number of the questions.

The final form of specification table of the achievement test.

Content topics / objectives	What is Moodle	Administration Block	Add resource	Add activity	Number of questions	Percentage
Remember	1	1	1	-	3	10%
Understand	-	-	-	1	1	3%
Apply	1	5	3	10	19	63%
Analyze	1	2	-	-	3	10%
Create	-	1	-	2	3	10%
Evaluate	-	-	-	1	1	4%
Sum of questions numbers	3	9	4	14	30	-
Percentage	10%	30%	12%	48%	-	100%

Table 17: The final test specifications table of the achievement test.

The test in its final form (see Appendix 8.3) consisted of 30 statements; the questions were arranged from easy to difficult by the ease factor for each question. Table (17) represents the final test specifications table of the achievement test.

The relative weights of the educational objectives in content were as follows:

- Remembering level of 10%.
- Understanding level of 3%.
- Application level 63%.
- Analyze level 10%.
- Create level 10%.
- Evaluate level 4% (see table 17).

The number of questions after modifying

Determining the relative weights of each topic of the content' objectives: table (16) represents the relative weights of the objectives of each topic and objective level of the content.

c. Matching between the content and objectives table:

The achievement test was developed in its preliminary stage through the steps below:

1. Determine the number of test statements with 30 statements, covering most topics in the wiki course content.
2. Determine the number of items in each topic, where the test includes 10% measure the remembering level, 3% of the statements measure the understanding level, 63% for application, 10% for analyzing, 10% creating, 4% to measure the evaluation level.

4. Building the test.

a. Determining the type of test: The test was built to be an objective test of what the objective tests have several advantages can be summarized in the speed of response and evaluation, the stability and ease of evaluation, and the objectivity in the results of this kind of tests by avoiding the bias of the researcher.

b. Determining the type of statements: One type of objective tests was selected for the formulation of the test statements which were multiple choice questions.

c. Formulating the test statements: while formulating the test items some important elements include: clarity in formulating the question, avoiding generalizations, randomly distribution of the correct answer among the alternatives, the variety of questions range from ease to difficulty, to be sure that the question contains only one right answer, although all alternatives were attractive and interesting, so that they seemed to be correct. Also, the researcher was aware while formulating the test that the question statement does not contain information not related to the question idea.

d. Writing the test statements: The test started with the test instructions and these instructions are clear and easy to read.
e. Adjust the test: The test in its preliminary stage was conducted through showing the test by experts to express their opinions about to what extent the test instructions were cleared, the test statements' formulation was suitable to the content, the appropriateness of the test statements order also the suitability of alternatives of multiple choice questions, to what extent the test covered the scientific content of the wiki course "How to use Moodle", to what extent the test was valid to be applied. And after reviewing the test by the experts, the researcher conducted the requested edits by the experts, and thus the test became ready to apply.

The eighth instrument was an attitudinal satisfaction survey (see Appendix 8.8), which measured the learners' satisfaction towards teacher-learner interaction. A Likert-based scale questionnaire was created by and validated by professionals in the field. The survey statements included items such as attitudes toward learning interaction; wiki based learning, learners' satisfaction, perceived value of communication and interactive learning. The content validity of the tool was conducted according to the guidelines reported by some colleagues in my institute, in order to ensure that the wording of each item in the satisfaction scale was clear and suitable to the learners and if they were representative for its purpose or not?

The experts were selected according to their experience as professionals in the field and following their acceptance to participate in evaluating the research instruments, the researcher provided each expert with a packet which included the instruments (see appendix 8.1). The experts rated each item for clarity and representativeness on a four-point scale from (1-4) with (4) in the highest value. They also reported their comments, explained their ratings and which items should be modified, added, or even items that should be deleted (see Appendix 8.11).

The following figures illustrate how the researcher and the learners behaved through the wiki community. They are important factors to know more about the teaching process that was through the course.

Before beginning construction of the course, a great deal of effort was exerted in trying to build pre-wiki course as a pilot study to examine how the teaching process through it will be addressed. The missing pedagogical aspects of the course and the opportunities of the wiki community before starting the experiment. Six pre-courses or workspaces in addition to the final two communities have been built. The figure (8) represents all the workspaces, last change date to each of them, and the number of views or visits to the work space. The last two

workspaces were the experimental workspaces in which ‘Moodletg1’ belongs to the training group and the ‘Moodletg2’ belongs to the control group (see figure 9).

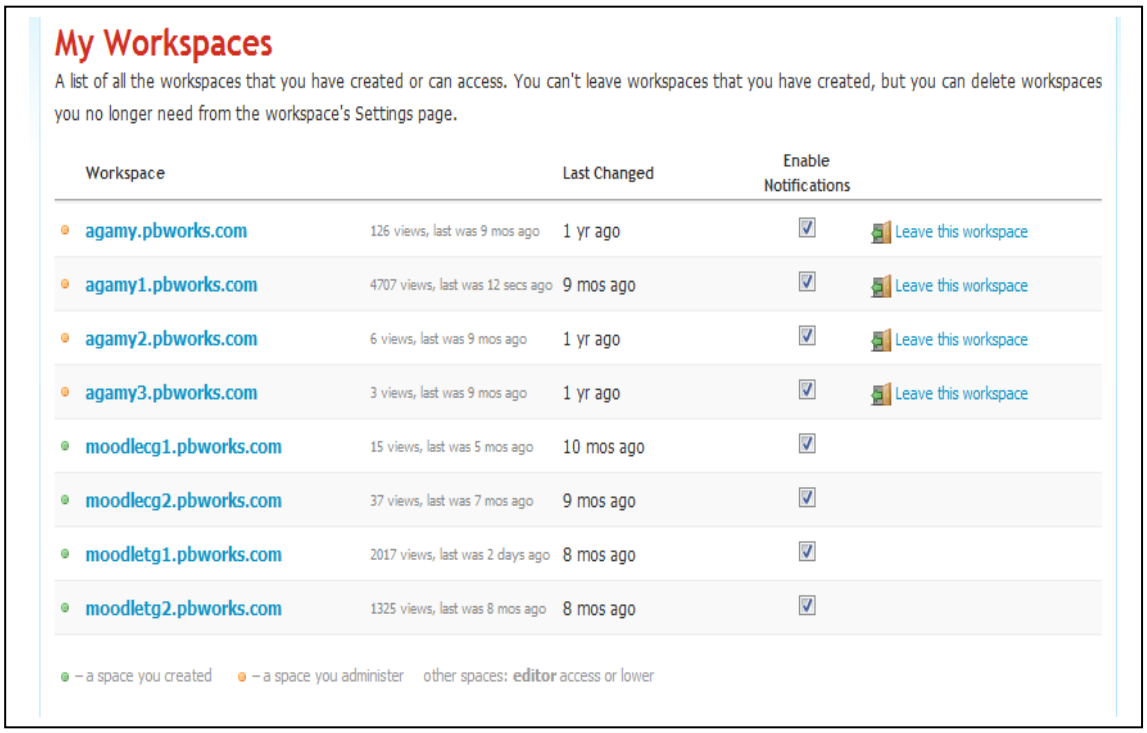


Figure 9: The researcher’s workspaces homepage.

Email notifications kept the researcher alerted when any changes were made to a wiki page, or additions, comments, or when new files were uploaded. E-mail will only be sent out if other users make changes to wiki page (see figure 10). The Figure represents the e-mails that had been posted to the two groups during the experiment where the training groups scored 293 e-mails versus 141 were scored by the control group.

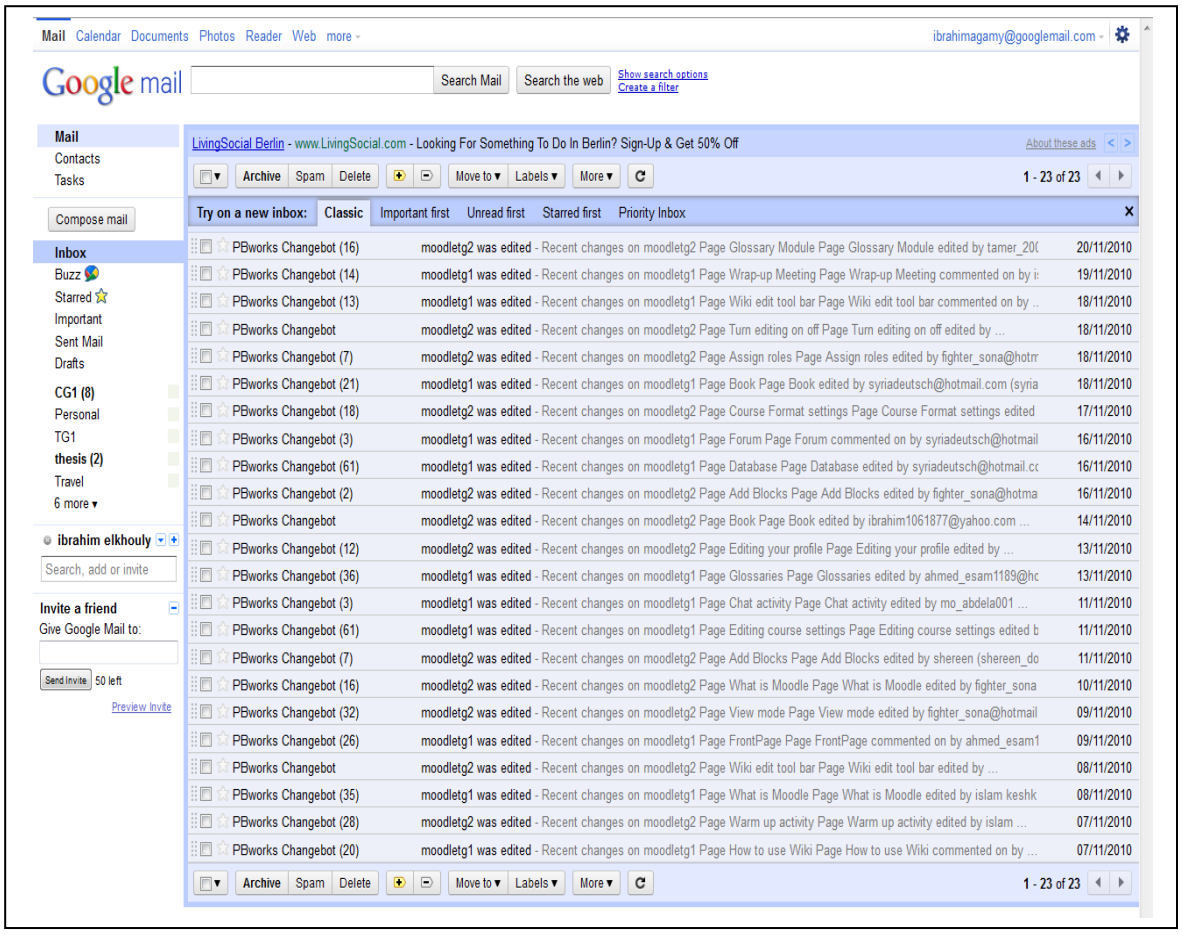


Figure 10: E-mails sent by the wiki.

All the participants were accepted to participate this we-based course. They were engaged in a non-measured unit dealing with the idea of ‘How to use Wiki’ before using the measured units to make sure that every participant had a necessary understanding of how to use wiki. The researcher worked closely with them navigating the first non measured unit, to bring their knowledge to the required level to start the course for both of two groups. This is done by the researcher, prior to starting the main course (see figure 11) which presents the warm-up activity page. In this page learners used it as a sandbox to navigate the opportunities and functions of the wiki page and apply these function in this wiki page. The contents of the ‘How to use wiki’ unit were in the ‘Sidebar’ on the right side of the wiki page.

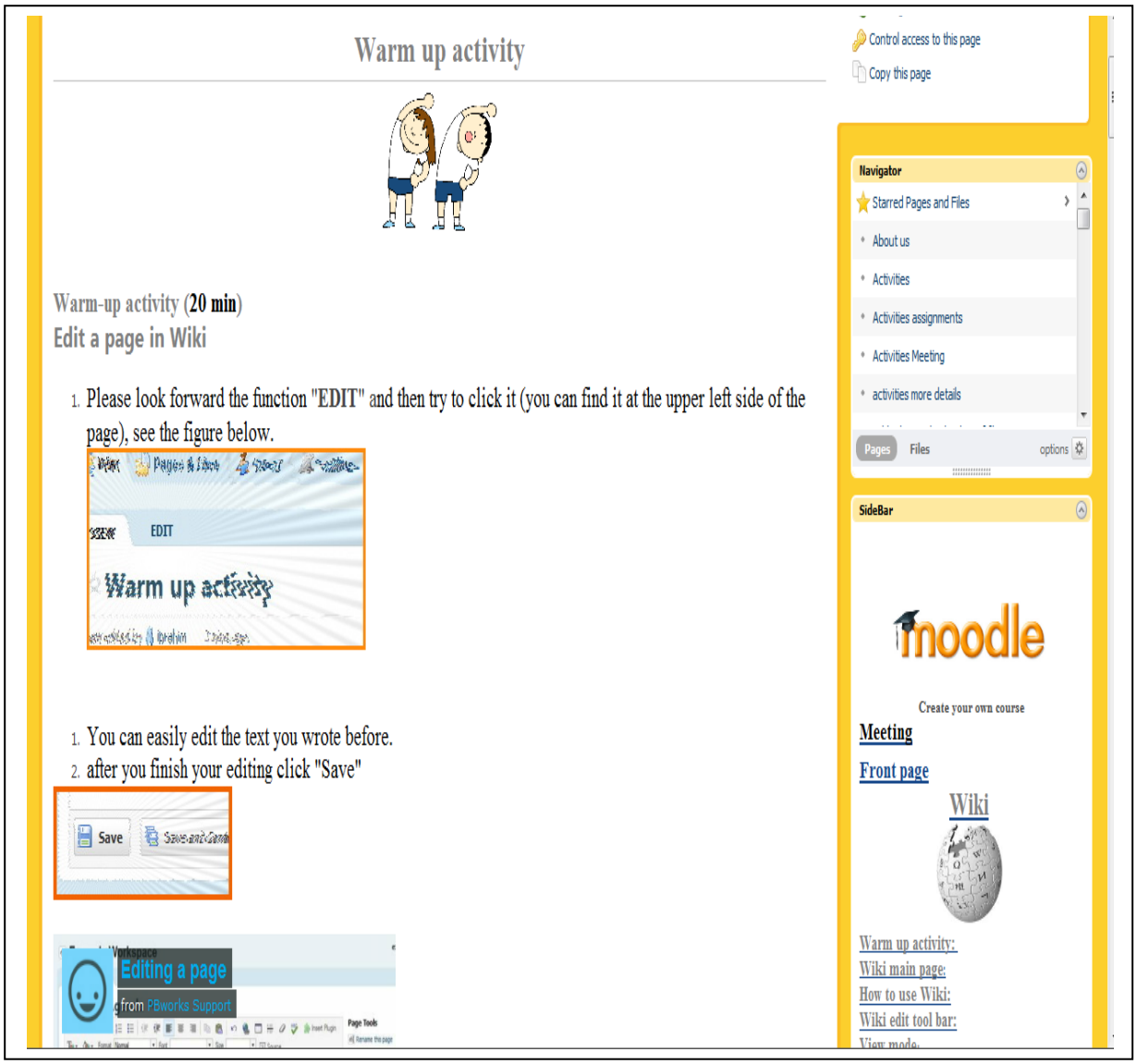


Figure 11: Warm-up activity.

The technical features of the wiki software were introduced to the participants at the beginning of their project. The learners were informed (after they finished the pages entitled "warm-up activity" and "before we start") an initial front page for both wiki groups is presented explaining the basic instructions, the meaning of the instructions the basic of how to edit, create new pages and create hyperlinks between pages. Wiki is qualified to be dynamic-frequently updated networking social software and full of lively interactions. It is easily edited by anybody at anytime and anywhere who has internet access with a minimum of programming skills. Additionally, it has easily and quickly features of adding new pages and content, where the ease of editing a wiki page makes it a more dynamic webpage (Carter, 2009). Figure (12) represents simplicity of the wiki homepage (front page) where the course description and review versions of upcoming quizzes and tests are posted on the wiki, this page also includes warnings and general hints about success in a Moodle course. Any hint of

extra information about quizzes or tests gets immediate attention. This was one way to guarantee, and try to stimulating learners to revisit the wiki.

The announcements are sent and the learners have got them; wiki can be used to announce meeting cancellations, room changes, and requests for any recent information … etc.

Figure 12: The participants' wiki course homepage (front page).

The figure below represents the front page of the wiki course with its components of the administrator responsibilities. The front page represents the course title, course description, and the aims of the course, the textbox that the content is related to it, the course requirements, and homework, group interaction features, announcements and the course policies.

One of the most important points in teacher training program and particularly in online collaborative learning environment is to know how the teacher can plan the learning activity and how such activities can be hired in wikis. The researcher did his best to understand how contextualized activities may be planned and structured. Figure (13) represents the course contents, limitations and the course requirements and also the sidebar of the wiki page which contains the main skills of the course and its sub skills.

Figure 13: The course contents.

Wiki could assist teachers in recognizing how diversity of thought and issues of power impact content development. Wiki group working involves learners to acquire skills in a social network during the collaborative reading and writing, critical thinking, and reflection process or in other words how to challenge the work of other participants. This kind of group work will improve when and how the teacher take a decisions as to correct, add to, delete, and or write over (rewrite) the work of others (Solvie, 2008). Figure (14) represents the wiki 'Edit Mode' where learners as well as teacher can write, reflect their ideas and post them to the others through the wiki page area or through the function 'Add comment' where they can send a comment to the other peers. Wiki has a simple and clear layout, and on most wiki engines it is easy to add tables, colours, bulleted, and numbered lists. This makes it easy to build an aesthetic visual layout even on a page with a lot of information (Carter, 2009) and teacher and learners can use the edit toolbar that has been presented in figure (14) to add these functions and features.

Figure 14: The wiki 'Edit' mode.

Wiki supports teacher monitoring the learners' activities through more opportunities. Figure (15) represents the content of an e-mail that had been sent by the participants, shows the process of tracking the learners' interaction process and the modifications while answering the assignments.

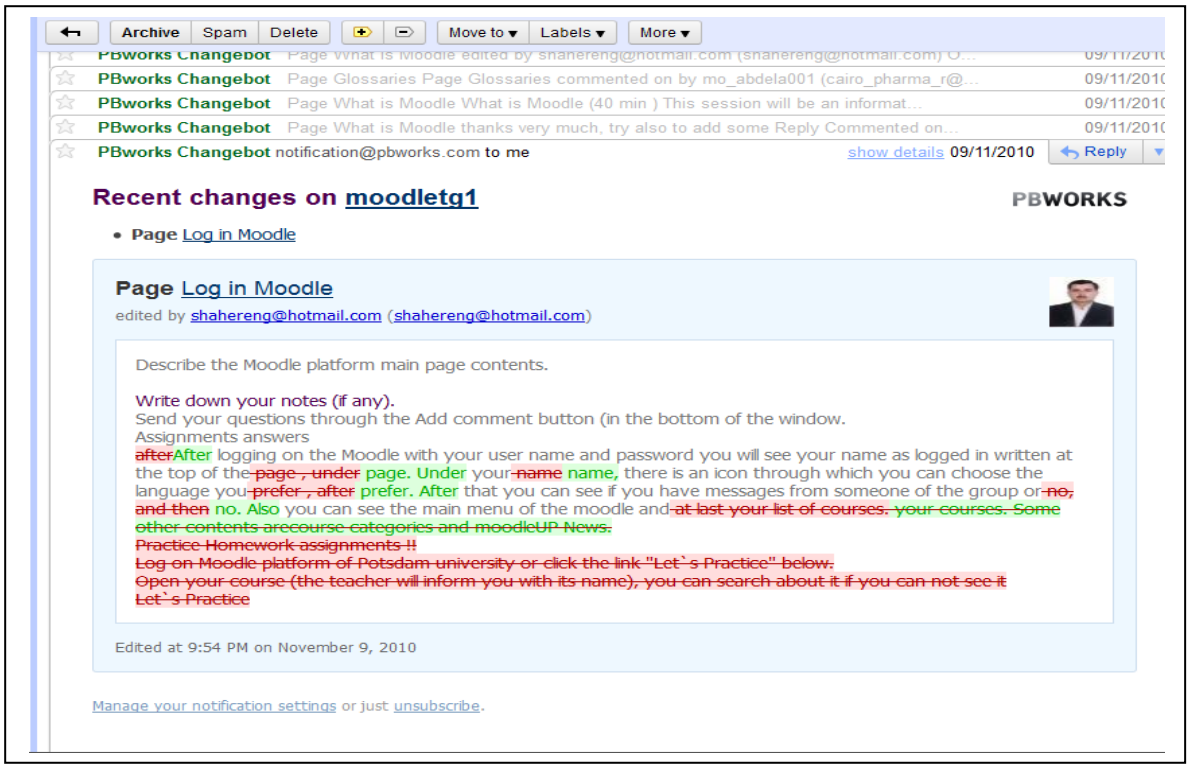


Figure 15: The monitor feature of the wiki.

It is difficult to save wiki from hacking and spamming by anonymous programs; wiki sites can be hacked and these anonymous can put links on the unprotected Wikis. But any way it is easy to correct that. Wiki supports the administrator to revert to an old version using the "Page History." Additionally, the researcher restricted the wiki course by password-protect feature to the wiki or any part of it to prevent the wiki from the infection. Figure (16) represents the 'History' feature of the wiki of the training group which consists of the name of the page that is being checking entitled "What is Moodle," the data of who created it and who is the last one edited it and when? Using this function and aspects we can get valuable information about the learning process, e.g. by observing who is active and when, how many participants are active, the collaborative nature of the edits, the rate of new topics compared to the improvement of the existing, etc. where we can use the button 'Compare' in comparing two versions of the wiki page and select the version that the teacher consider it the most related to the course aims. The same aspects in control group are presented in figure (17).

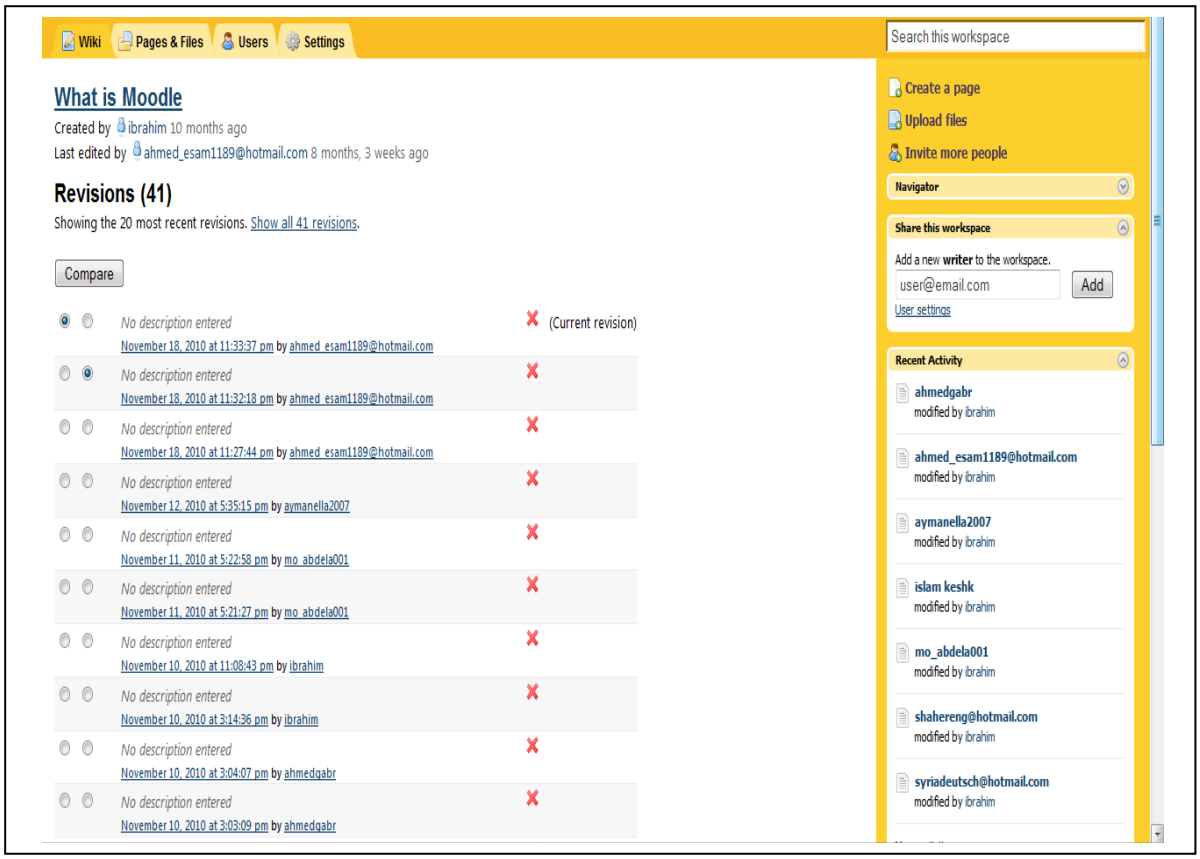


Figure 16: Sample of the 'History' feature of the wiki training group.

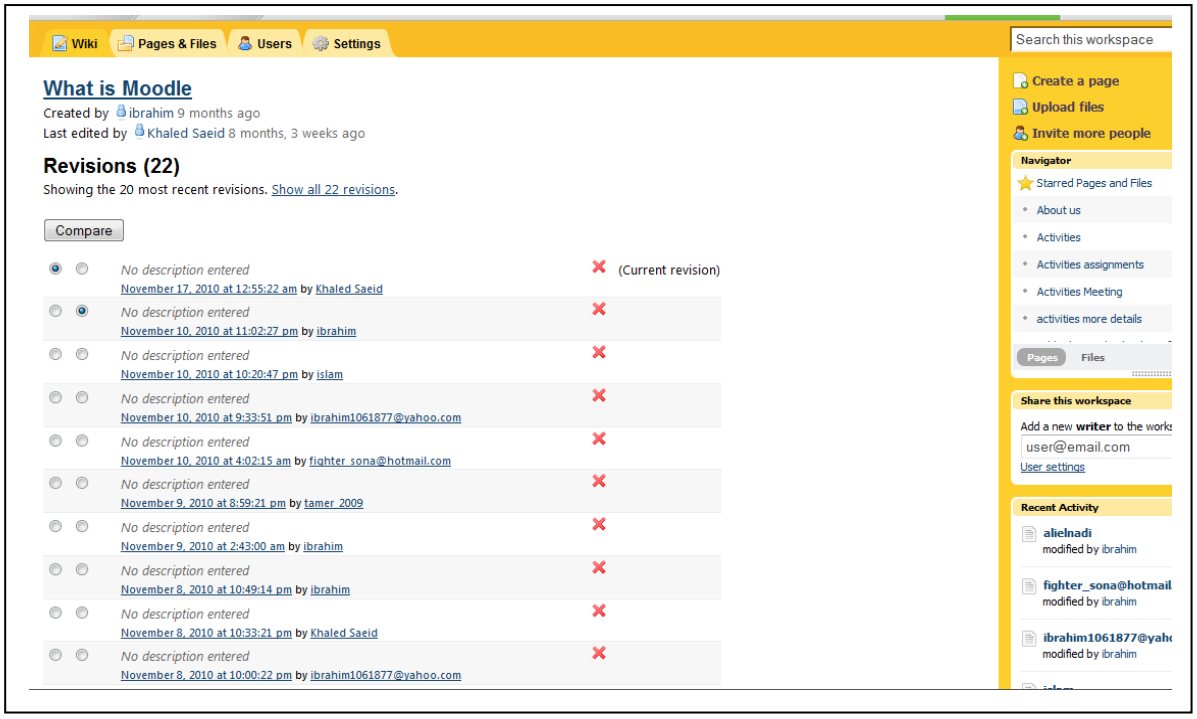


Figure 17: Sample of the 'History' feature of the wiki control group.

Learners were requested to do reading assignments and they were asked to write a summary or response to the reading. Learners also were asked to construct a course-long

summary on the wiki and to summarize the big ideas of the course. Figures (18) and (19) represent glossary pages that learners have been conducted in both two groups.

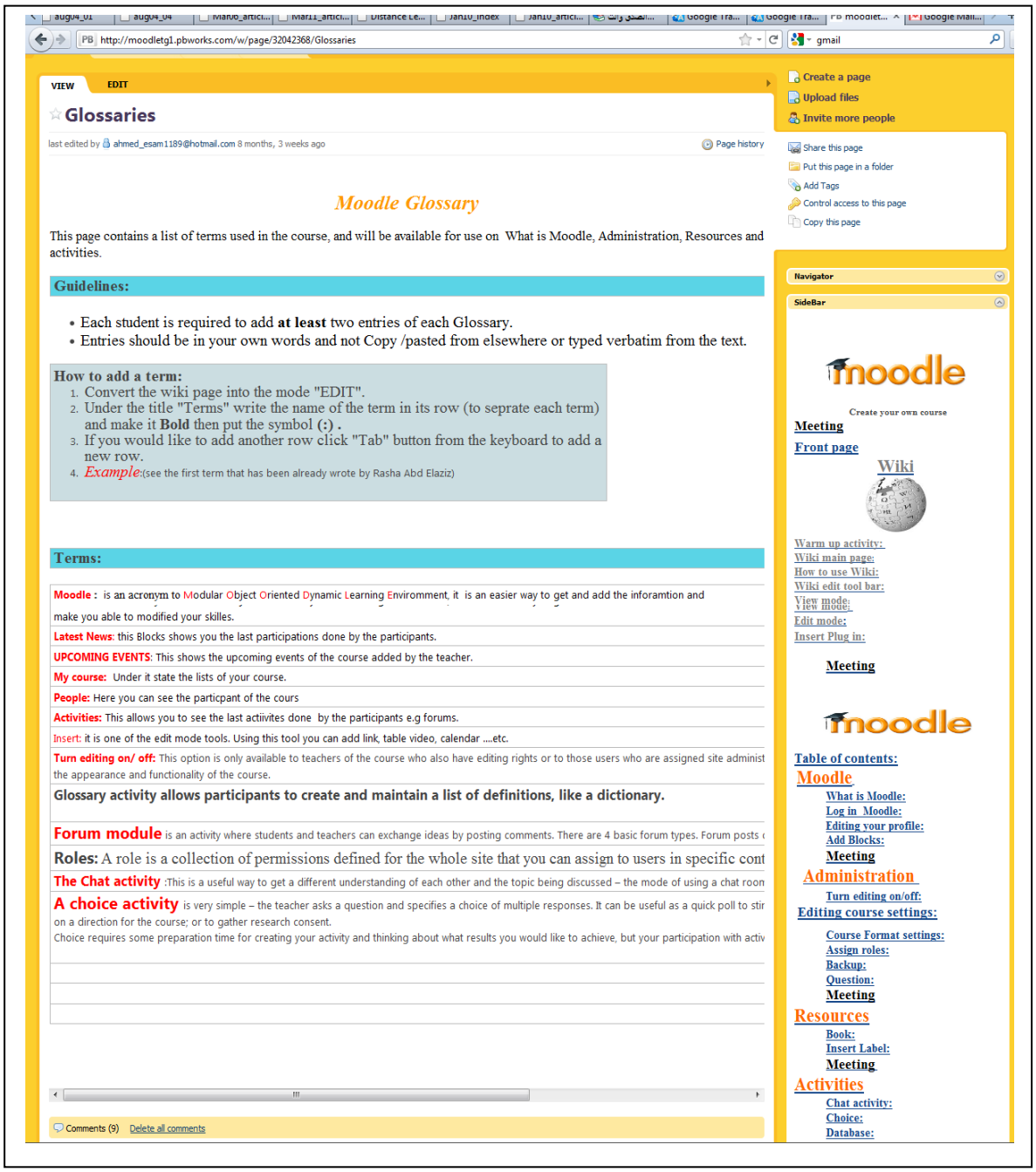


Figure 18: Glossary wiki page of the training group.

Figure 19: Glossary wiki page of the control group.

Wiki could be used with diverse opportunities for teacher-learner and also learner-leaner interaction where learners have the ability to add to and comment on the selected content directly through the course, without needing to learn typesetting commands. Participants can post homework questions and assignments to the wiki at any time; this allows them to ask more thoughtful and specific questions that arise while they are still absorbing in the content material (Carter, 2009). Figure (20) illustrates wiki page form of assignments and practice homework assignment. The researcher met with the learners in the meeting sessions four

times through the course. To assign homework, all homework assignments are posted on the wiki before starting the course. For all homework assignments the learners are allowed to answer these homework assignments in each wiki page in the text area.

When the researcher wants the learners to post homework, readings, announcements and study guides, the researcher asked the learners to post from one to two paragraphs responses to the reading for the day (about the part of the content that they already read). This promoted the researcher to be sure that the learners at least read the material and of course he was able to read their thoughts on the material.

Another aspect of planning activities in wiki courses environment is to facilitate learning by designing and enforcing certain activities. The wiki course environment should be designed under the condition of inquiry-based learning setting where a continuous process of asking, investigation, creating, discussing and reflecting. In some web-based courses using only asynchronous communication is inadequate while the presence of lack of teacher-learner interaction is existed. The courses were supported with new opportunities promote interactivity among learners and between teacher and learners. the course was supported with online chatting software built in the wiki community belongs to one of the most common commercial social networking software called ‘Skype’ to allow the teacher and learners to be more connected and online debate became available (see figure 20). Arsham (2002) reported that in web-based courses there must be a quality assurance (QA) process for all components of a web-based course and the course was supported with some of these quality assurance features such as, assignments and practice homework assignments that learners should apply them through the Moodle platform, feedback, computer-assisted learning, and formative evaluation during the learning community (see figure 19). This provides a measuring tool for these components and promotes a decision procedure for allocation of resources for creating an effective learning community.

Figure 20: A sample of assignments and practice homework assignment.

Teachers in face-to-face situations may ask the learners the question: "*How do you assign roles in Moodle course?"* On wiki the question tended to be more specific, "*Can you assign a role in Moodle to participant x as a student and to your colleague as an administration?*" This can be titled as teacher-learner interaction and wiki clearly provides additional support for this kind of interaction. The learner-learner interaction can also be remarked when the learners answer the others' questions, they can learn from the peers who are working on the same material, without the scheduling difficulty or formality of study groups, also to encourage the practice, teacher paid attention to the idea of giving learners moral reinforcement to those who take it upon themselves to help others (Carter, 2009). For example figures (21) and (22) represent parts of the teacher-learner interaction and the where the teacher reinforces the learner and the role of group leader.

Wiki pages provide a more efficient means to accomplish the usual administrative tasks involved in a course, such as receiving assignments and communicating with participants. To accomplish this aspect learners should submit reading responses. The learners were asked to post their responses to wiki pages. All of the assignments those belong one task were appeared on one page (the wiki page), so learners have an online archive of their work while in traditional courses learners send their answers separated to the teacher. Using wiki it is possible to expand virtual class work or hours into evenings or weekends.

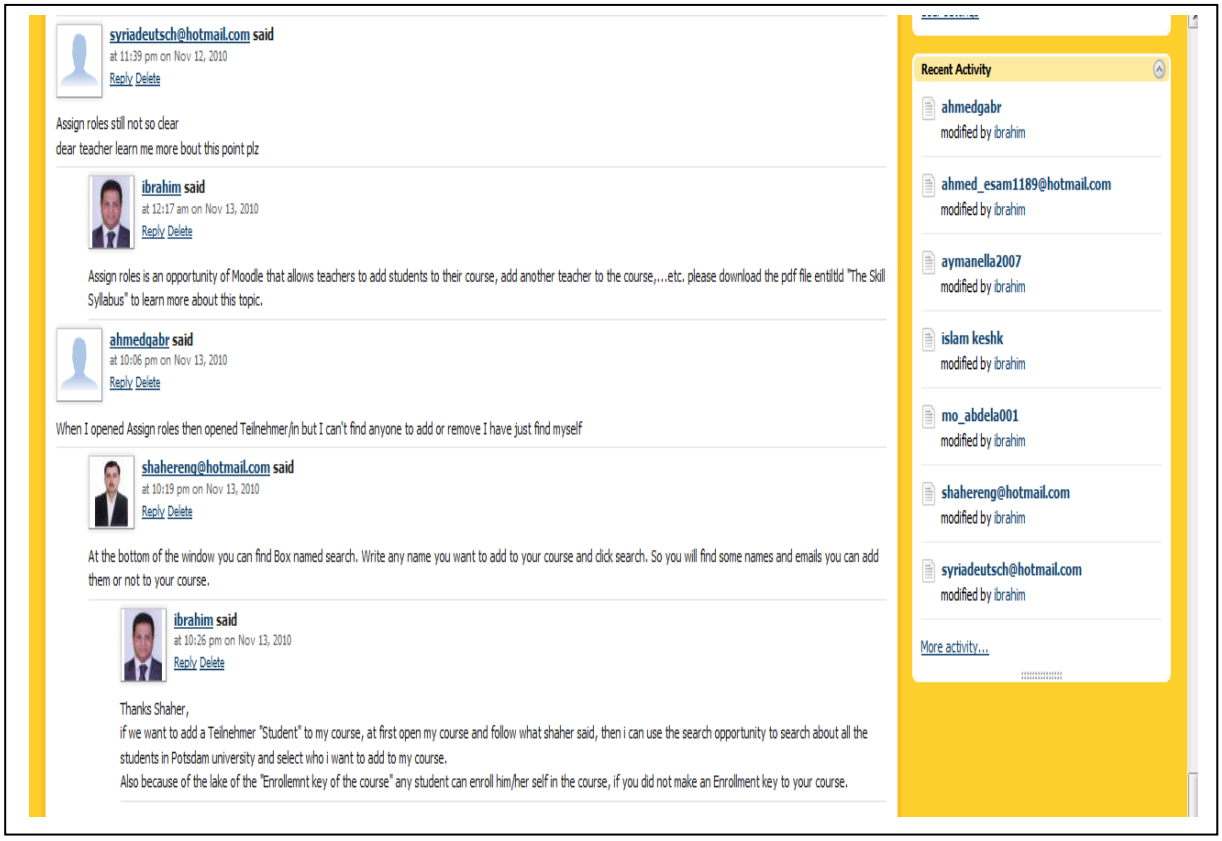


Figure 21: An example of teacher-learner interaction.

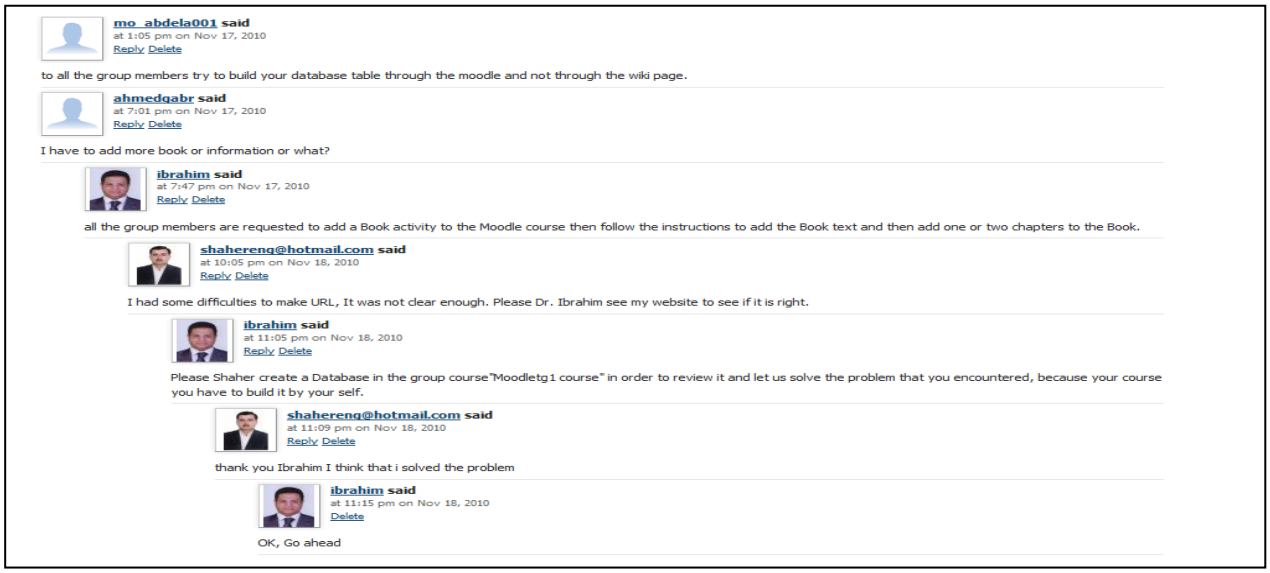


Figure 22: The interaction through the course and the group leader role.

To accomplish the course goals, the researcher realized his need to provide an easy, efficient space for learners to collaborate, communicate, and create a final, authentic product through the wiki course. Topics had only one primary author, the learners dealt with the treated topic and then they were allowed to deal with the next topics on time, then the learners shared their text, modified it and have got immediate feedback (to the training group), after

that they were able to add links, represent a new cognitive structure to conduct the new knowledge with their peers.

There are great many differences among individual students. As every learner is different, it seems the best approach through web-based learning is to give a variety of options through the course. Online learning environments can also serve as learning materials by providing videos, pictures, texts and chat, debate and discussion sessions. Understanding these differences and learners' feelings and experiences are very important aspects in improving learning outcome. Communicating with learners via e-mail may make it harder to convey feelings such as concern. The researcher adopts prompt replies to questions and immediately feedback whenever possible as shown in the qualitative analysis results at least proofed that the course was paying attention.

Through web-based teaching and especially through social networking social software, the teacher has to be available most of the hours of the day. Online learners in this knowledge society always expect instant response from the other peers through their social networking software and this became the way they live and teacher is one of these peers. Teachers should prepare themselves to spend much more (two to three times) amount of time compared with face-to-face teaching (Arsham, 2002). The researcher spent almost all day (he was available 24 hours per a day) managing the course and responding to the learners' questions, reinforces their participations, encouraging their collaborative and group work, prompting them with the suitable feedback, tutoring their learning approach and explaining the any parts of the course content that were not obvious.

The researcher used effective strategies to increase dialogue interactively. Instead of evaluating the available texts and selecting the best, the teacher paid attention by reviewing a huge volume of possibilities and recommend the best ones, thus post them to the learners. In this respect the teacher must adapt to minimize the influence of personal matters. Otherwise, dialogue about personal matters will take up the course time, and the original learning objectives will be decreased or disappear. The other problem might be that learners overtake the dialogue, and turned it into a 'monologue'.

Pages of the wiki are set in Q and A. Questions can be asked by learners and will be answered by the researcher or other learners. Wiki etiquette was another area that the researcher incorporates it in his wiki. For example, the wiki course includes simple statements on a page called "Wiki Guidelines"

1. Be polite.
2. Be nice.

3. Be democratic (Remember that your contribution is critical to the success of the group).

These guidelines align with wiki research about the importance of conventions to enable long-term success in collaborative groups (Godwin-Jones, 2003). Making wiki guidelines a requirement also ensures the teacher to gain a better collaboration from the group, where guidelines and group conventions are posted, with agreements to respect these conventions by the participants (Chawner & Lewis, 2006). Figure (23) represented the wiki guidelines.

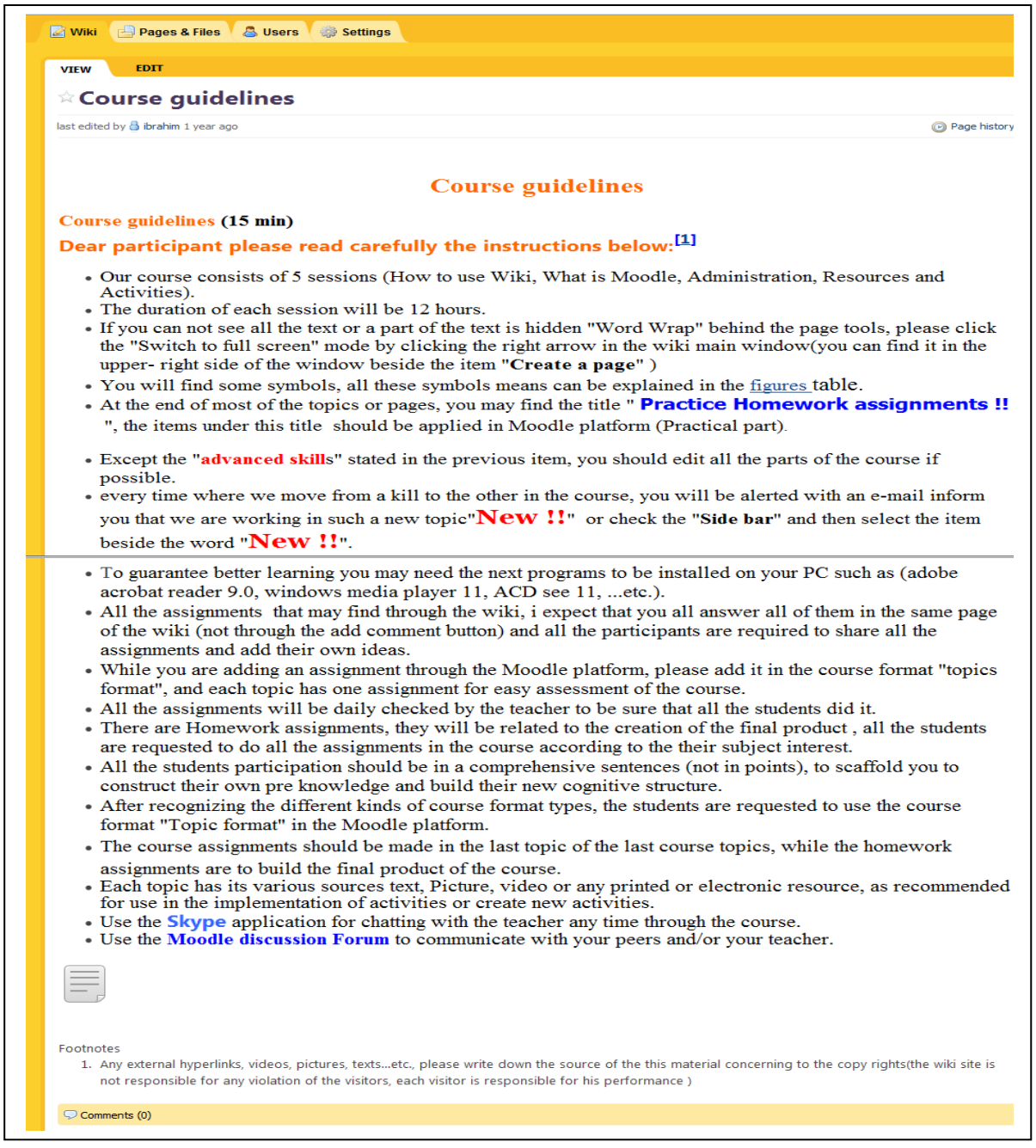


Figure 23: The wiki course guidelines.

Clarity in expectations, goals and feedback must be unambiguous; otherwise it is hard to manage the wiki course. Figure (24) represents expectations for written work and grades of the course.

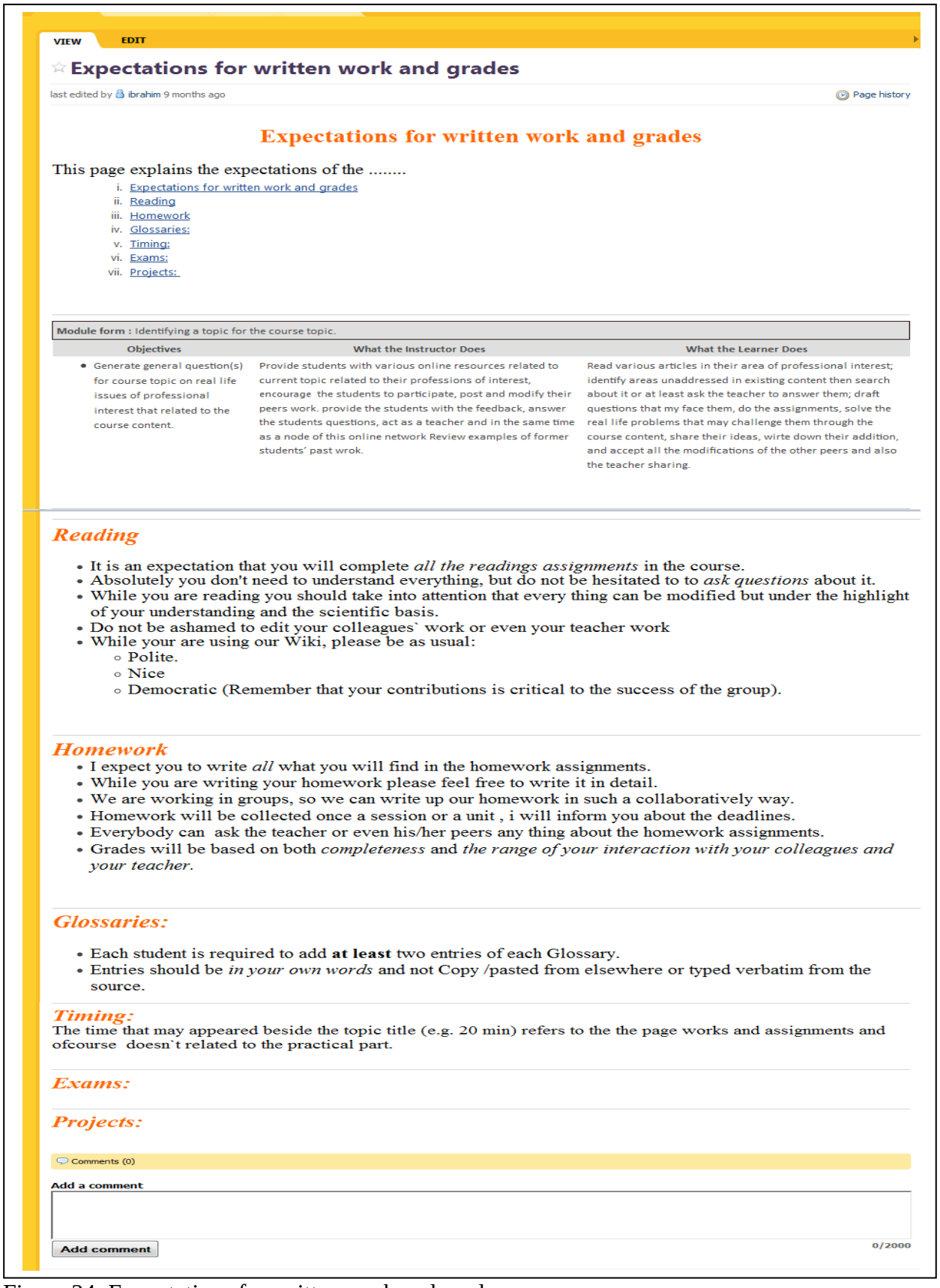


Figure 24: Expectations for written work and grades.

After finishing the experiment, all the participants were requested to build their own courses through Moodle platform. Figures (25) and (26) represent samples of the participants' courses through Moodle platform. Figure (25) represents a sample of the training group which involved the main page contents of Moodle courses, where the blocks of people shows the participants of the course, the course teacher. The activities block shows the last activities that the teacher added to the course (Notice that the researcher participated as a teacher in all of the two groups' courses, and he deleted the participants' roles as teachers after finishing the experiment to prevent anyone to edit his course after the deadline).

Administration block which dealt with the most administrative responsibilities such as turning editing on / off, assign roles…etc. in addition to other blocks of my courses, latest News, Upcoming Events, Recent activity,…etc. (see figure 25). The figure represents the characteristics of the course which has the title of the course, then the name of the course teacher, the time and a brief introduction about the course. The figure also represents the organization of the course activities and resources in which the course adapted the topics format as a course format setting with seven topics and restricted with an enrollment key. Because the course was under construction, the participant added a picture with this meaning at the right side of the course area. The course included the activities of books, chats, choices, databases and forums in addition it contains the resources books and labels. The figure (26) represents other sample of the training group final product courses.

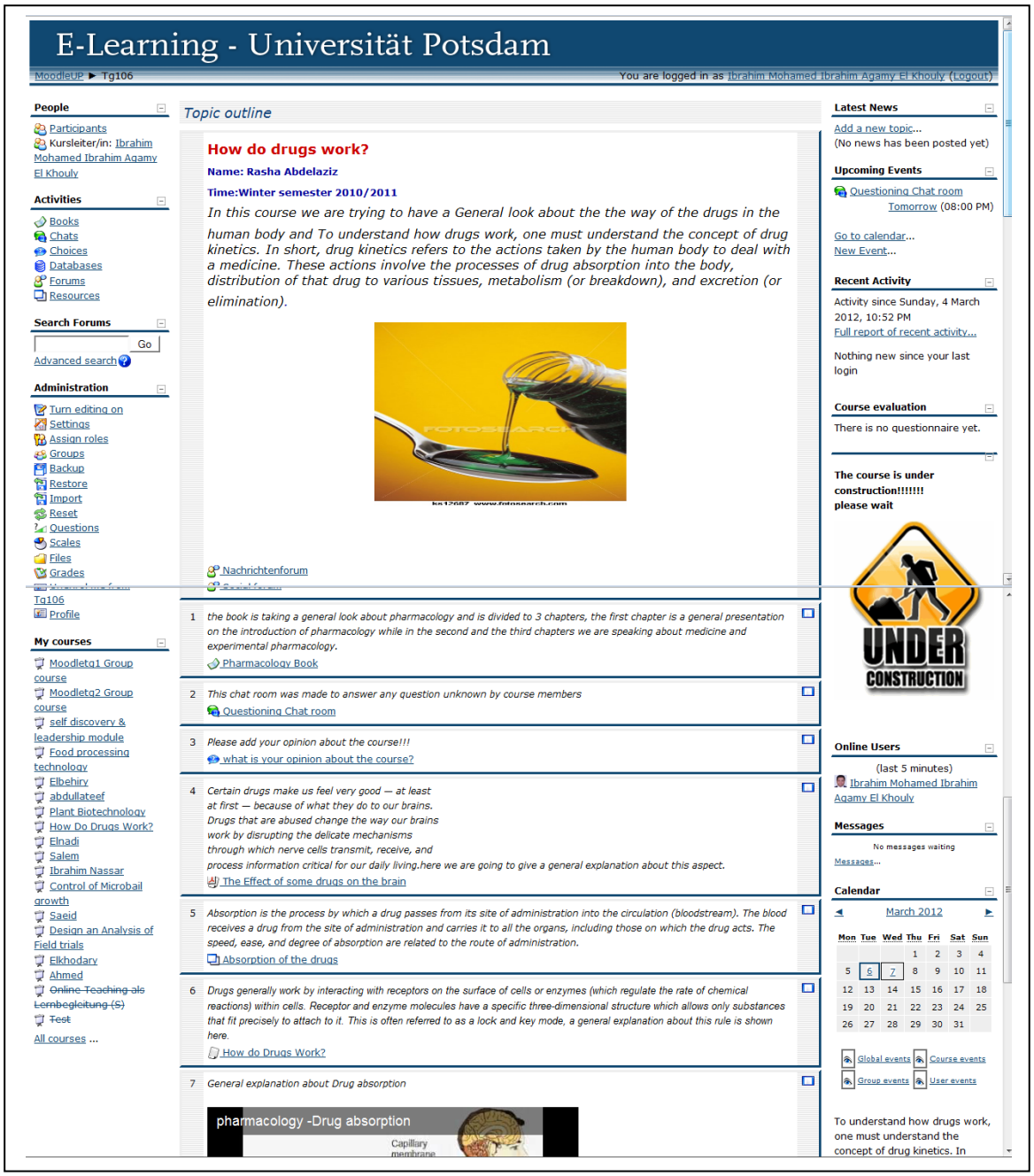


Figure 25: A sample of the final product course of one of the training group members.

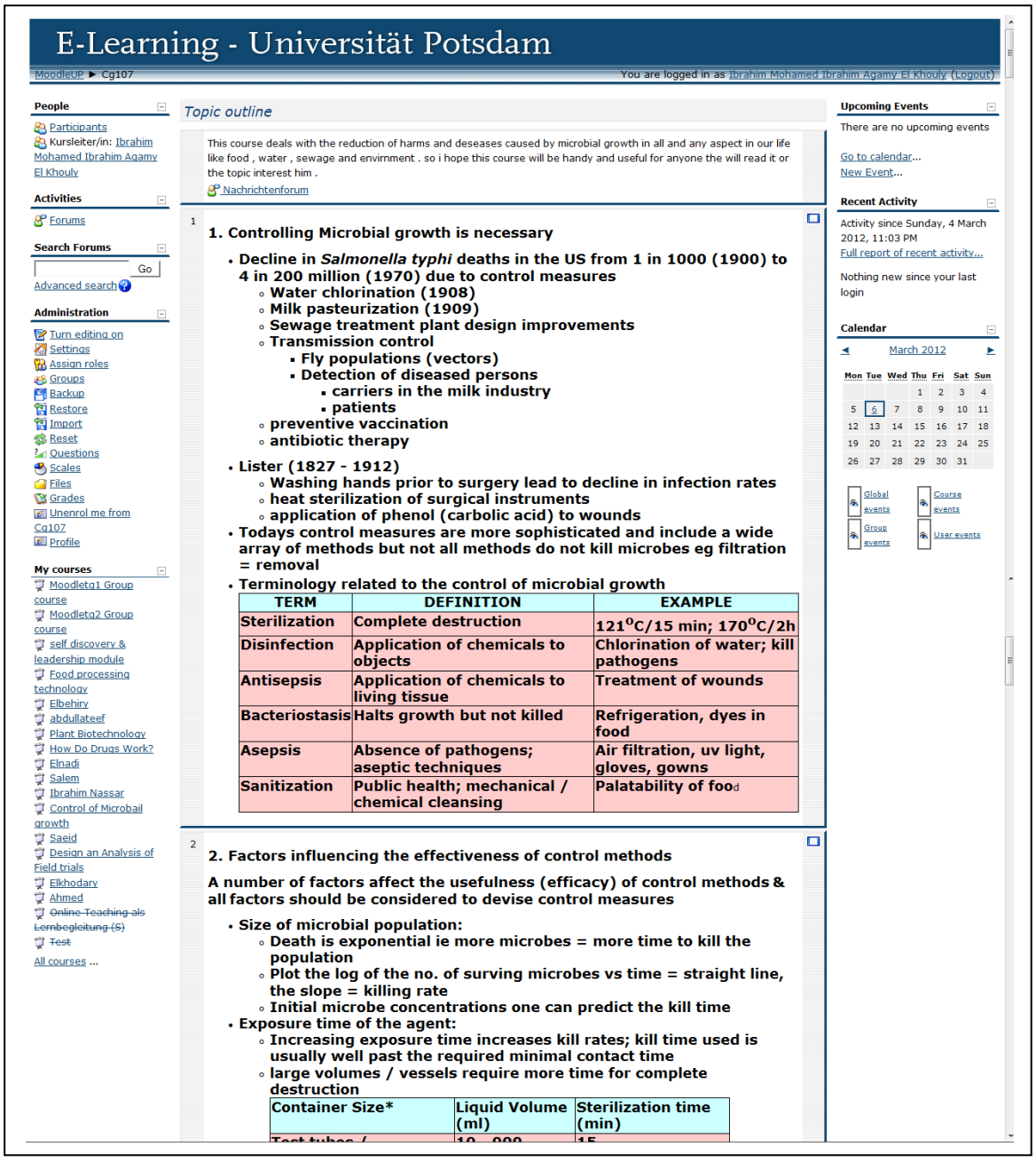


Figure 26: A sample of the final product course of one of the control group members.

3.10. Methods of Data Analysis

Data analysis through this experiment involved both qualitative and quantitative methods of analysis as follows:

The first research question was answered by comparing the two groups' means, significant differences within groups and between groups in the pre and post-test by Mann-Whitney test, one way ANOVA test results and the improvement percentages of the pre and post-test scores between the two groups and differences within groups, a statistical significance level of < 0.05 was adopted for this study. Final test scores were compared after controlling for pre-test scores. The results were used to indicate if there was a significant difference between the two groups related to the treatment. Means and significant differences of the pre and post-tests of both wiki groups compared the students' learning achievement.

The second research question was answered by comparing the means of final product scale between the two groups using Mann-Whitney test in order to describe if there were differences in the final product for students' learning under the condition of high level teacher-learner interaction situation as compared to those learning under the condition of low level teacher-learner interaction situation through the wiki course.

The third research question was answered by comparing the results qualitative analysis of learners' satisfaction interview using Maxqda software (see Appendix 8.16) and satisfaction survey by comparing the means and significant differences of the satisfaction questionnaire on Mann-Whitney test of the attitudinal questionnaire, in order to describe if there were differences in satisfaction for students learning under the condition of high level teacher-learner interaction situation as compared to those learning under the condition of low level teacher-learner interaction situation through the wiki course.

The fourth research question was answered by comparing the results of the classroom community scale through measuring the means of the scale and analyzing the wiki interaction by analyzing descriptive statistics of the participants' edits of the content, content analysis tool results through comparing the frequencies of the group of learning interaction and online interaction aspects of content analysis (see appendixes 8.37, 8.38 and 8.39) in order to describe if there were significant differences between high level teacher-learner interaction situation as compared to those learning under the condition of low level teacher-learner interaction situation through the wiki course.

The fifth research question was answered by comparing the two group's results of three tools of learner's motivation, attitudes and prior knowledge; these tools are motivation survey (interview questions), motivation scale, and attitudes towards teacher-learner

interaction scale respectively. The results were used to indicate if there was a significant difference between the two groups by comparing the means of motivation survey on Mann-Whitney test, the means of teacher-learner interaction scale. The content analysis results using Maxqda software of learner-teacher interaction aspects, a statistical significance level of < 0.05 was adopted for this study.

3.11. Limitations of the Study

Analyzing computer-mediated communication required experimental methods can be distinguished as follows:

In the sphere of comparing the computer-mediated communications versus traditional educational setting (face-to-face), variations may be made to the composition of the groups especially in small groups. It is likely to be resolved by simulation of process and the practical use of computer-mediated communication. Some other researchers conducted the field experiment method with different groups, while others compared the use of different media such as comparing computer-mediated communication versus face-to-face setting or compared different spheres of computer-mediated communication such as e-mail,…etc. in the same direction some other researchers use an intermediate method between the previous two methods. Most of the experimental procedures were faced with a lot of criticisms, where they adopted experimental groups as a base of most of these approaches in order to address a group task (Köhler, 2001).

The main limitations of the study were:

1. Since this study focused on the use of wikis, the results will be limited to this specific social networking software.
2. Since the researcher was the teacher of this wiki course at the same time, my presence and procedure might have biased the study. However, for data collection purposes other experts helped the researcher to administer the instruments.

3.12. Summary

Some variables were adopted in order to achieve the main aims of the research, as dependent and independent variables. The first dependent variable was the learner's achievement and the second one was their satisfaction. This research was carried out to investigate the influence of the teacher-learner interaction through networking social software so-called wiki. During the winter semester 2010 at Potsdam University a total of 14 learners were enrolled in an academic content. The research adopted the model of Song & Hill (2007) model as the base of the research model to explain how learners' learn through their self-directed learning

(SDL) phase and then show the learning process through the context of how it happens? The model incorporating SDL as a personal attribute and the interactive learning process between teacher and learner was highlighted as the focus of this type of interaction. This was the new dimension which was added to the model to allow the researcher to examine the influence of this aspect on the learners' achievement and satisfaction through one of the networking social software.

To achieve these aspects and to prove the influence of the independent variable, a group of instruments were used in this research, including the wiki software itself, a satisfaction survey and interview, a pre and post-test, attitudinal scale towards teacher-learner interaction, classroom community scale, and content analysis tool. The research considered the interaction among learners and between them and the teacher. Over a three-week period in the beginning of the study, the pre instruments were applied where there was only one instrument which was pre applied (the pre-test) and all the other tools were applied after finishing the experiment. The study was started with a non-measured activity on how to use the wiki itself.

The warm-up activity at the start of the activity was not measured in order to allow the participants to become more familiar with the wiki software. A group leader was selected from each group to encourage his / her group members to do the assignments and to encourage them to post their contributions. From 1st. to 21 November the learners have been engaged in the course units' assignments. After each unit there were face-to-face meetings sessions. Both groups had the same content, materials, resources, and activities. The difference between the two groups was in the interaction setting, where the control group was treated under the condition of traditional way of interaction even through the wiki, the training group was teaching under the condition of high level-teacher learner interaction in the aspects of learning that have been explained before. To measure the differences of learners' interaction with teacher through the wiki course a content analysis tool has been used to analyze the content of the wiki courses of the two groups, also a scale was adapted to measure teacher-learner interaction and has been refined into 20 items. To measure the satisfaction of learners, a 20-item satisfaction attitudinal survey was used and a satisfaction interview to report the advantages and disadvantages of teacher-learner interaction. Similarly, to measure the connectedness and learners' learning a 20-item classroom community scale developed by Rovai (2002) has been applied. To report the aspects of learners' product quality, a 30-item scale has been adjusted and to measure the learners' achievement a pre and post-test has been built by the researcher in highlight of the scientific base.

Through this chapter the researcher supported the findings with figures illustrating the work through wiki, the participants' wiki course homepage, the course content, e-mails sent by the wiki, the "History" feature of the wiki of both of two groups, glossary, and the assignments.

It concluded with a distribution of statistical tools explaining the answer to each of the research questions, where research question number one was answered by comparing the two groups' Mann-Whitney test and Wilcoxon test as non-parametric tools, and the improvement percentages of the pre and post-tests between the two groups on one way ANOVA results and differences between and within groups. Research question two was answered by comparing the means of the final scale results of Mann- Whitney test to the final product scale. To answer research question three, the results of satisfaction interview have been analyzed by comparing the qualitative analysis of learners' satisfaction interview using Maxqda software. In comparing the results of the content analysis tool and the classroom community scale research question four has been answered and finally the last question of the research was answered through comparing the two group's results of the learner's motivation scale, the means of the teacher-learner interaction scale and the content analysis results using Maxqda software results of learners' interaction aspects and prior knowledge using the pre-test results.

4. Results and analysis of data

Interaction among learners and between both them and the teacher is becoming increasingly important as an efficient factor, particularly in learning situations. The internet applications, such as web 2.0 technologies and its applications such as social networking software support these types of interaction among people with a lot of facilities never previously possible. This study was conducted to illustrate the deep understanding of the potential facilities of one of these new trends of social networking software known as wiki towards effective learning situations to find greater clarity when making a decision about engaging these kinds of tools in learning situations. Specifically, this study examines differences, benefits and difficulties of interaction between the learner and the teacher through online wiki software.

4.1. The context and the participants

In this study, interaction is the core of the wiki course assignments. The content being studied was "How to use Moodle" through collaborative networking social software based wiki. Participants of the study were assigned randomly into one of two groups, which were observed over the course of the winter semester at the Faculty of Education. The majority of the participants were in-service teachers in higher education institutions who were pursuing their PhD degrees. Both two groups used wiki as powerful networking social software, for online collaboration and included synchronous or asynchronous discussion as participation requirement for grade. Slightly more than one-fourth of the participants had previous experience using the wiki tool. Figure 27 summarizes the basic demographic information about the group's members.

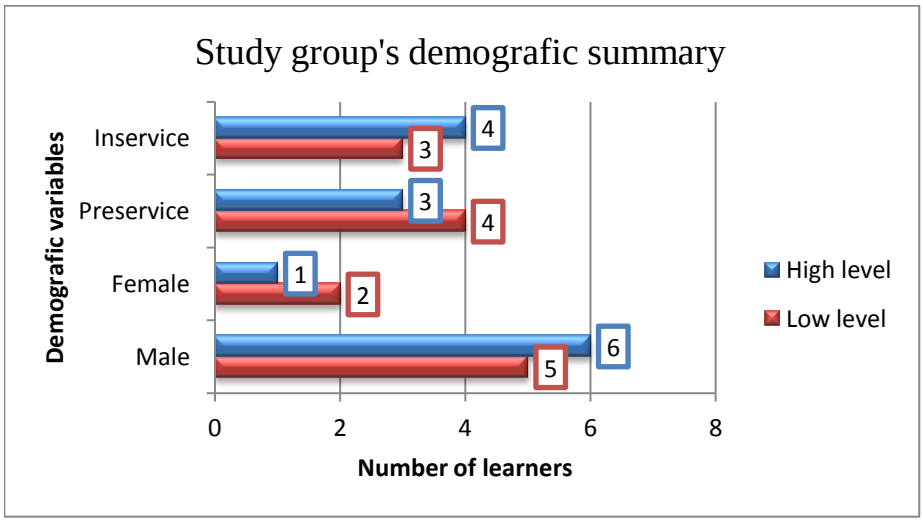


Figure 27: Study members' demographic summary.

In terms of gender, one-fourth of the study's 14 participants were female and 3/4 of them were male. As noted above, participants were assigned randomly to one of two groups. Each group was composed of seven members; low level setting group included two females and five males. Four of the participants were pre-service and three were in-service, two of all four preservice were in their third term of their higher education and would be graduating at the end of the next semester. The other two participants were graduated and the in-service participants were PhD students they are teaching in their faculties as assistant lectures.

High level setting group had seven members and was more even in gender, with one female and six males. There were three pre-service participants in the group and four were in-service, one of the three preservice was graduated and the other two were in their third term of their higher education and planned to graduate at the end of the next term, while the four in-service students were three of them were PhD. students and one was a lecture.

The course content includes several skills depending on the aim of the course, but the experiment course was focused on the basic skills of Moodle, where it consisted of four units. Before the study, participants have been asked if they were familiar of wiki or not. Most of them had never heard about wiki and did not understand how it worked, and a small number of them heard about Wikipedia before and previously used it. In the following part the study results will be explained with some details through exploring the results of each instrument of the study and determining whether the research hypothesis or the 'Null' hypothesis will be accepted or rejected.

4.2. The research hypothesis for the first research question was

The use of different levels of teacher-learner interaction influenced the students' performance on Moodle course through social networking software wiki.

To examine the first hypothesis, the Mann-Whitney test was calculated depending on the pre and post-tests results. Before and after finishing the course, the achievement test was taken by every member of the study included 30 items related to the content of the course. The results of the two groups in the pre-test were analyzed using Mann-Whitney test results of the achievement test for these items (see Appendix 8.21).

Of the 30 items of the pre-test in the achievement section of the experiment, the test of Mann-Whitney results indicated that there is no statistically significant difference at a (0.05) level of probability between the two groups before applying the independent variable (see figure 27). The two groups scored no significant differences in the pre-test where the results of Mann-Whitney scored (0.653) which represent a level higher than the significant level

which was determined as acceptable of the significant differences, which was (0.05). While in the post-test there were significant differences between the two groups which scored (0.021) (see table 18)

Statistik für Test[b]

	test_pre	test_post
Mann-Whitney-U	21,000	6,500
Wilcoxon-W	49,000	34,500
Z	-,450	-2,315
Asymptotische Signifikanz (2-seitig)	,653	,021
Exakte Signifikanz [2*(1-seitig Sig.)]	,710[a]	,017[a]

a. Nicht für Bindungen korrigiert.

b. Gruppenvariable: CG_IG

Table 18: Mann-Whitney test results in pre and post-test for the two groups.

The results of the pre-test refer that the two groups were homogeneous in their backgrounds of the study content, and that meets the study's requirements.

Appendix (8.21) represents the achievement test degrees for both of the two groups before starting the experiment. The total means of the training group results was (11) and the control group total means scored (10.29) in the pre-test (see figure 28).

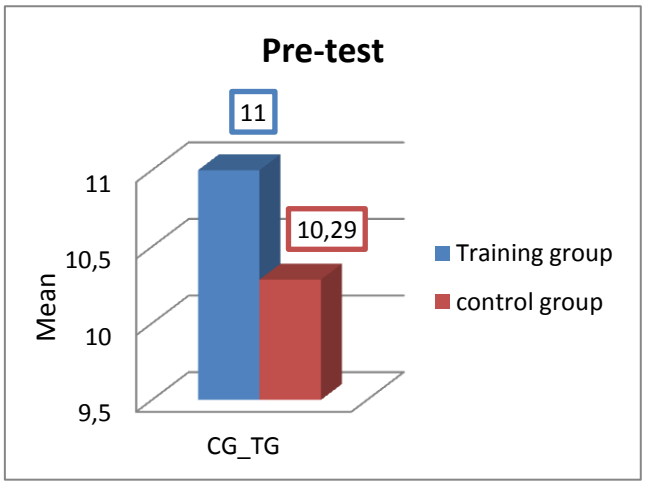


Figure 28: The total means of the control and training groups in the pre-test.

The two groups achieved significant differences between their own results in pre- and post-test where both of the two groups achieved significant difference (0.018) (see table 19). This refers that the two groups achieved a progress or improvement in their learning that appears in

the existence of significant differences between their performance on both of the pre and post-test.

Statistik für Test[b]

CG_IG		test_post - test_pre
control	Z	-2,371[a]
	Asymptotische Signifikanz (2-seitig)	,018
training	Z	-2,371[a]
	Asymptotische Signifikanz (2-seitig)	,018

a. Basiert auf negativen Rängen.

b. Wilcoxon-Test

Table 19: Significant differences within groups.

After finishing the experiment, the post-test was applied on all the study members of both groups. The result of the post-test using non parametric test (Mann-Whitney) has addressed through Appendix (8.22). There are significant differences between the two groups in the post-test with (0.021) level of significance and this level of significance is enough to accomplish the research hypothesis which adopted the probability level with (0.05) (see table (18). Also the total means of the training group was (21.57) and the control group total means scored (15.43) in the post-test (see figure 29).

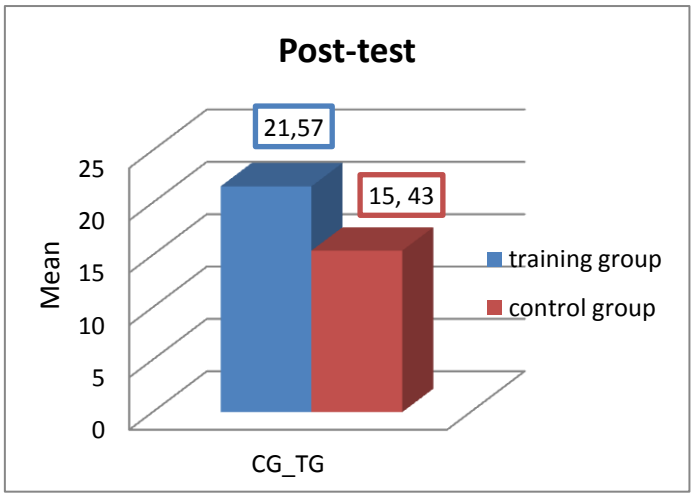


Figure 29: The total means of the control and training groups in the post-test.

There are statistically significant differences at a .05 level of probability between the two groups upon completion of the experiment. Moreover, if the improvement had been noticed, reported that the average of improvement between the pre-test and the post-test concerning low level setting, it will be approximately (5.14), where the control group scored (10.29) in

the pre-test and (15.43) in the post-test (see figure 30 & Appendix 8.22). If this result was compared by the average of improvements to high level setting towards the same test which scored approximately (11); the difference between the two averages may be the double towards the high level setting group (see figure 30 and Appendix 8.23 of improvements and percentages).

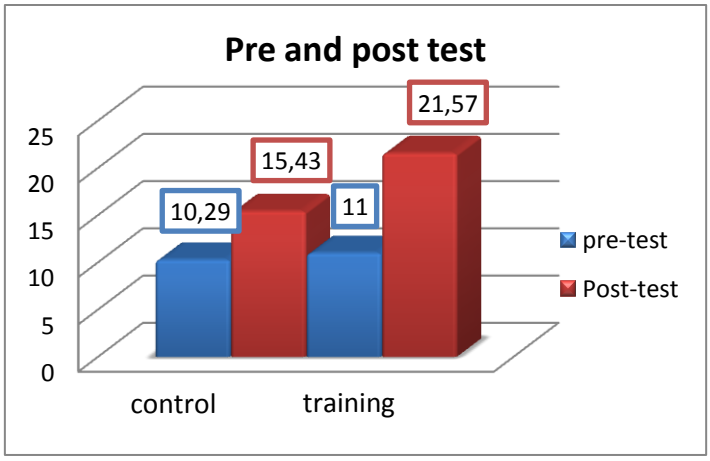


Figure 30: The improvements of the two groups in the pre and post-test.

Guiding with improvement of the two groups (see Appendix 8.23), it can be explained by tracking the improvement of each learner in both of two groups in the pre and post-test. If we notice the first row (through the control group) we can see that the learner has improved in his/her learning with 50% and the other were (200, 30.80, 20, 83.30, 18.20, and 37.35 %), while the training group scored high improvement between their results on the pre and post-test where the first learner scored 53.80% and the others in the same group scored (41.70, 166.70, 90, 285.70, 53.30 and 108.30 %) respectively.

Appendix (8.24) represents accumulative data about the pre and post-test and the improvement in learners through exploring the differences between the results in pre and post, and also the percentages of this improvement.

The one way ANOVA test was applied to show the differences within groups. Appendixes (8.25 & 8.26) addressed these differences and the results of the test one way ANOVA illustrates the differences between groups, within groups for the pre-test and post-test, improvement and the improvement percentages. The results of the test one way ANOVA reported that there were significant differences in the post-test and in the improvement of the two groups.

From the above, it is clear that there are significant differences in the achievement test's total means between the two groups for the training group at the level of significance (0.05). This leads to the rejection of the 'Null hypothesis' and the acceptance of the hypothesis, which

confirms the existence of statistically significant differences in cognitive achievement between the two groups and this leads to '*The use of different levels of teacher-learner interaction influenced the students' performance on Moodle course through social networking software wiki'.*

4.3. The research hypothesis for the second research question was

There are significant differences in the quality of the learners' final product after wiki-based collaboration between different levels of teacher–learner interaction.

To examine the second hypothesis, the Mann-Whitney test was calculated depending on the final product scale results. After finishing the group assignments, all the participants are requested to build their own courses through Moodle platform, regarding to a list of 25 items are the criteria of online courseware, an expert used the criteria list to be sure if these criteria are accomplished or not. The results of the Mann-Whitney test represents that there were significant differences in the final product scale of the participants courses for the training group with a significant level (0.002) (see table 20). Appendix (8.27) represents means, standard deviation and standard error of the criteria total for these items.

Statistik für Test[b]

	product
Mann-Whitney-U	,000
Wilcoxon-W	28,000
Z	-3,141
Asymptotische Signifikanz (2-seitig)	,002
Exakte Signifikanz [2*(1-seitig Sig.)]	,001[a]

a. Nicht für Bindungen korrigiert.

b. Gruppenvariable: CG_IG

Table 20: Mann-Whitney test results of the final product scale between the two groups.

There are statistically significant differences at a (0.01) level of probability between the two groups in the degrees of the final product scale after finishing the experiment. The mean of the final product scale results between the training group and the control group represents that, the control group scored (7.71), while the mean of the training group using the same criteria scored approximately (17.86); the difference between the two means may be the double towards the high level setting group (see figure 31 & Appendix 8.5).

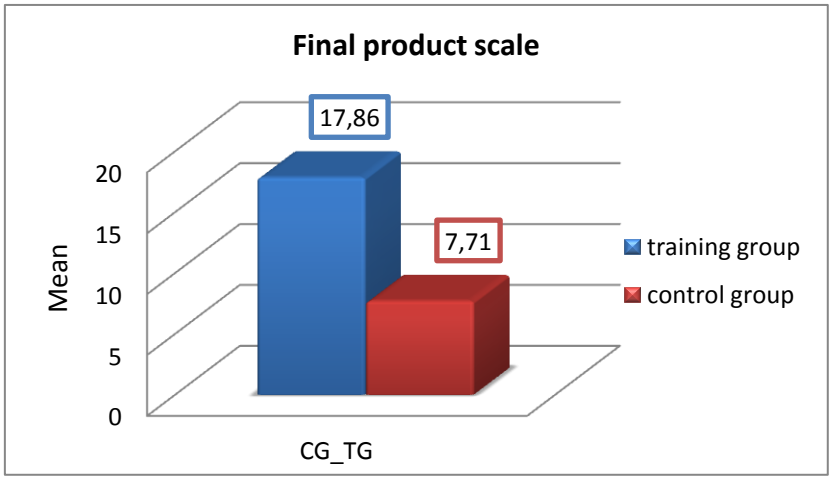


Figure 31: The means of the final product scale results for the two groups.

From the above, it is clear that there are significant differences in the final product scale's total means between the two groups for the training group at the level of significance (0.01). This leads to the rejection of 'Null hypothesis' and the acceptance of the hypothesis, which confirms the existence of statistically significant differences in final product scale between the two groups and this leads to '*There are significant differences in the quality of the learners' final product after wiki-based collaboration between different levels of teacher–learner interaction'.*

4.4. The research hypothesis for the third research question was

The use of different levels of teacher-learner interaction influenced the students' satisfaction through social networking software wiki.

To examine the third hypothesis several statistical tests were calculated in order to examine the learner's satisfaction, these tests were applied on such scales included: the qualitative analysis of the learner's satisfaction interview using MaxQDA software, and satisfaction survey scale. The results of qualitative analysis of MaxQDA software was calculated on the learner's satisfaction results as follows.

4.4.1. Qualitative analysis of the learner's satisfaction interview

The results of content analysis tool through Maxqda software regarding the aspects of learner's satisfaction represent that all the aspects of dissatisfaction were scored by the control group where 100% of dissatisfaction aspects as a result of low interaction between the teacher and learner, the existence of disadvantages of the networking social software environment or as a result of encountering some barriers through their learning, participants of the control group scored 100% of these aspects. In contrast, the training group scored high satisfaction

regarding the course expectations with 100% of the two groups' responses and scored (62.50%) versus (37.50%) to the control group regarding the benefits of wiki networking social software environment respectively. The results of the content analysis tool also represent that as far as the two groups' satisfaction on the teacher-learner interaction, the training group scored (87.5%) versus (12.5%) scored by the control group in the same aspect. While the results of the two groups on learners' satisfaction aspects regarding the existence of useful functions, and the easy use of the wiki social networking software were as follows (69.3%, 58.30%) scored by the training group versus (30.8%, 41,7%) scored by the control group respectively. The results represent the same response of the two groups regarding the learner's satisfaction because of the simple structure of the wiki social networking software, where both of them shared the same ratio (50%). The training group scored 100% of the learners' satisfaction regarding the aspect of social networking software supports the learners openly to express their own ideas (see figure 32 & appendix (8.37))

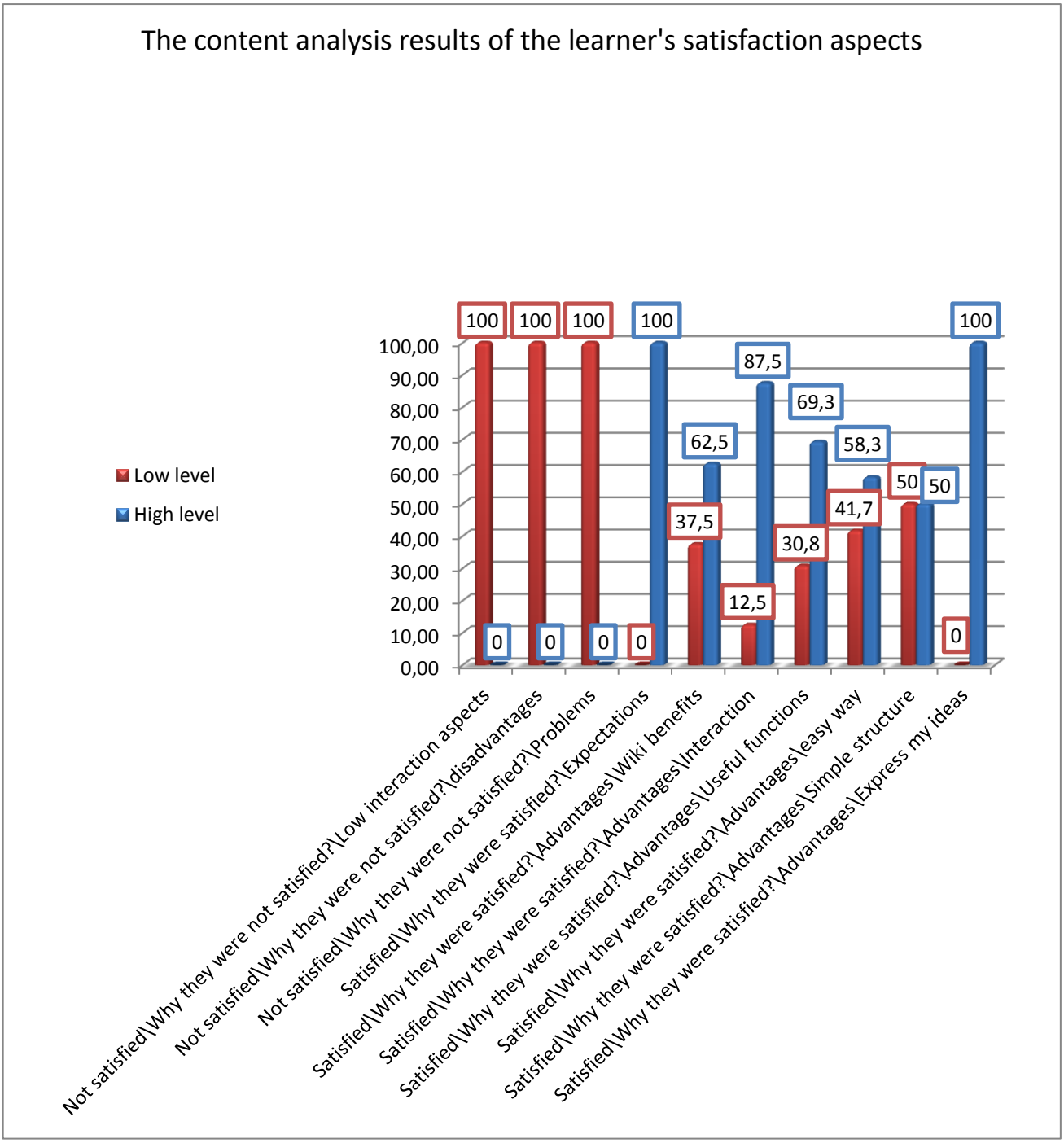


Figure 32: The content analysis results of the learners' satisfaction aspects.

The satisfaction interview instrument has been conducted to report the learner's satisfaction towards teacher-learner interaction. The interview consisted of five questions as following:

4.4.1.1. The first interview question

Reflecting on your Satisfaction, How easy was the wiki to use for interaction between you, your colleagues and the teacher? Describe any problems you might encounter in the wiki course.

As a part of the final interview, through open-ended questions participants were asked for their experience with the ease of wiki use for interaction in both the high level and low level teacher-learner interaction and participants confirmed the survey responses with the principle of reflecting on their Satisfaction, Several respondents described the relative ease of wiki and also any problems might encounter the participants in the wiki course. This description by one of the participants summarizes points made by others in the study:

> *The interaction using wiki was relatively easy, as it gives some tools that collaboratively help you. As an example, you have Edit / Save tool, add comments and plug-ins, all of these tools make the interaction between the members much easier, concerning the problem that I have met. Really I cannot remember any problem that really faced me during the course (Participant 14).*

Another participant stated:

> *Well, I think wiki was very useful at any rate and easy, and the interaction was also very good. Regarding to the problems, well I can say that: the Edit button was not easy to be used especially if you want to edit or change an idea or to add some ideas or to wrote something, then you have to click the button (the Edit button). I mean to go out of the main page and then to use the scroll bar and search where I want to edit something, it takes a little time and make some difficulties (Participant 12).*

Also:

> *I think wiki is a very easy site to handle and work with, as all the instruments and activities is explained and there is not anything complicated or coded in the using of the site wiki (Participant 3).*

Similarly, there was general consensus among learners and the majority of them agreed that wiki facilitates interaction among them and between them and their teacher. With what has previously been stated serves as evidence to to predict that it will be generally agreement and the same satisfaction aspects among learners towards the interaction through wiki courses.

4.4.1.2. The second interview question

In their responses to interview questions asked at the end of the study, participants were asked about their experience with collaboration in both the high level and low level teacher-learner interaction and with the principle disadvantages of teacher-learner interaction in collaborative learning environment via wiki through each type of interaction. Tables 20 to 25 contain all of the interview responses by study participants to the questions asking them to express the principle advantages and disadvantages of each of the two methods of interaction through wiki. Tables (20, 21) report the responses about advantages to of teacher-learner interaction in collaborative learning environment in both low and high level setting via wiki.

Table 21: Interview responses: Advantages in low level teacher-learner interaction via wiki.

Reflecting on your satisfaction, what were the main benefits of teacher-learner interaction in collaborative learning environment via wiki?
The learners' responses were as follows: *Exploring our viewpoints and each one can change the others' viewpoints.* *I interacted with the teacher through the wiki by two ways, through comment option. And the second was through the wiki itself by writing and answering directly what opinions* *I can write what I want and my teacher can review it, in the same time I can also ask any questions using add comment.* *It helped me to understand the topics and the program items.*

Where the group members engaged in only one group of wiki, there were several common themes about the benefits of low level teacher-learner interaction in collaborative learning environment via wiki in the participant's responses, including:

- *Any edit or comment that I did, was send directly to my colleagues and teacher and I will get response, and replies from them.*

A closer view to participants' responses represents general aspects of teacher-learner interaction whatever in high level or in low level. In the two cases there was a presence to the teacher role. Participants' responses focus on the benefits of wiki support teacher-learner

interaction settings through stating: interaction through comments or wiki editing area, the ability to write to the teacher and edit a text or send a comment.

The following items illustrate the responses of the training group members on the same question (see table 22).

Table 22: Interview responses: Advantages in high level teacher-learner interaction via wiki.

Reflecting on your satisfaction, what were the main benefits of teacher-learner interaction in collaborative learning environment via wiki?
The learners' responses were as follows: *This kind of interaction makes the interaction between the members of the group much easier and more co-operative.* *We were able to share our opinions, the opportunity to write on the main page point of view that you see and this point of view also could be changed.* *We have found speedily responses and immediate feedback from the teacher and students.* *Sending our ideas to all in the wiki and receive their ideas and comments, also online chatting through 'Skype' is very nice thing.* *An effective method and fast way to get a contact with the teacher and with the colleagues, and to express your idea by discussing them with the others.* *Edit button is very useful not only to add our own ideas, but also to save them, also the forum property is also very useful to share the others what you want to share.* *Using the page history which allows the teacher to choose any form done to the page by the others and it could be changed to the right form.*

There were also several common themes about the benefits of high level teacher- learner interaction in collaborative learning environment via wiki in the participant's responses, including:

- *The ability to add comments or questions by using add comment, moreover not only replying easily to the comments, but also make online chatting through skype.*
- *The main advantages in the wiki that support:*
    - *Make online chatting.*
    - *Make edit and save, and all the group members will receive an e-mail with this change.*
- *Getting feedback from the wiki members about our ideas.*
- *Getting the ability to reply to a certain person if you want.*

In their responses to the interview questions asked at the end of the study, participants confirmed the interview responses about their satisfaction of collaboration in the two different groups. Several respondents described the relative advantages of the wiki to use for interaction between the participant, his / her colleagues and the teacher, describing any problems they might encounter in the wiki course. This description by one of the participants includes and summarizes points also made by others in the study in the high level setting:

> *Actually there are many benefits of using this kind of interaction, as an example adding comments, by this tool you have the ability to add any comment you need to explain your opinion, also using reply button gives you the ability to reply to a certain person if you want, you can also have 'Edit' and 'Save', button which gives you the opportunity to write on the main page the point of view that you see and this point of view also could be changed by the administrator by using the page history which allow him to choose any form done to the page by the others. This kind of interaction makes the interaction between the members of the group much easier and more co- operative (Participant 14).*

Another participant stated:

> *I think there are a lot of benefits in wiki. I can summarise some of them like the ability to add comments, and these comments will be sent to the others, so you can get feedback from them about your idea or so, also Edit button is very useful to add my own ideas and not only to add them but also to save them.*
>
> *Other benefits for example Skype to make chat with the others, they are online. The forum property is also very useful to share the others what you want to share or what you want about special ideas or general ideas.*

4.4.1.3. The third interview question

Tables 23 and 24 show the responses of each group about disadvantages of both low and high level teacher-learner interaction in collaborative learning environment via wiki. There were several common themes in low level setting participants' responses, including:

- *There were no chat sessions or synchronous discussion to interact more with the teacher and to work with my colleagues in my group and exchange knowledge.*
- *The interaction between us and the teacher was weak; there were delays in teacher responses.*

The description by one of the participants includes and summarizes points also made by the others in the study:

> *To be honest I thought the interaction between me and the teacher should have been more as there was no chat sessions or online chatting to interact more with the teacher and to work with my colleagues in my group and exchange knowledge (participant 3).*

Another participant stated:

> *There was no teacher interaction in collaborative learning environment via wiki. I was waiting for more supports and provide from the teacher (Participant 2).*

Regarding the high level teacher-learner interaction members' responses to the interview questions included these disadvantages have common themes, including:

- *The most things that hindered the interaction: we felt with some confusion from receiving huge number of e-mails in the day, this disturbed us and we cannot read all of them!!!!*
- *The disadvantage was not serious.*

The description by one of the participants includes and summarizes points also made by the others in the study:

> *The disadvantage was not very serious but the main was the amount of e-mails that the users received, really it was very panic, and time by time I stopped reading them, also during the writing, there was no flexibility in the font formatting, the page history also disturbed me, because any time anyone could*

change my editing to the page to the last one before, that was not good (Participant 14).

As a result to the question of disadvantages of teacher-learner interaction both two groups' responses were as follows:

Table 23: Interview responses: Disadvantages of low level teacher-learner interaction via wiki.

Reflecting on your satisfaction, what were the main disadvantages of teacher-learner interaction in collaborative learning environment via wiki?
The learners' responses were in the following manner: *There was no teacher interaction in collaborative learning environment via wiki.* *I was waiting for more supports and provide from the teacher.* *To be honest I thought the interaction between me and the teacher should have more.* *Changing of my opinions by the others with wrong data. (From my point of view).* *I cannot contact my colleagues and teacher using an online chat program, for example (yahoo messenger) I think that this may help us to learn better.* *The most problem was the absence of online chatting and delayed response.*

The responses of the training group on the same question were (see table 24).

Table 24: Interview responses: Disadvantages of high level teacher-learner interaction via wiki.

Reflecting on your satisfaction, what were the main disadvantages of teacher-learner interaction in collaborative learning environment via wiki?
The learners' responses were: *I did not face any problems during the interaction between the teacher and me.*

I did not have a lot time to read all the mails from the wiki group members. When anybody edited and saved the wiki, I got a new mail. On the other side, the mails contain the new data that changed.

During the writing, there was no flexibility in the font formatting; the page history also disturbed me, because any time anyone could change my editing to the page to the last one before, which was not very good.

4.4.1.4. The fourth interview question

Tables (25) and (26) report the participants' responses about what the participant would like to see more of in teacher-learner interaction. As with the responses about the teacher-learner interaction, there were several common themes in participants' responses about what would the participant like to see more in teacher-learner interaction regarding to the low level setting group, included:

- *More interaction ways with me and my colleagues and my teacher.*

And regarding to high level setting group, included:

- *I am satisfied with this course.*
- *Before I attend to this course, I did not have any idea about wiki, so it was for me enough what I saw in wiki and it was more than I expected.*

The question that has been asked to the learners to address their demands in their interaction with their teacher was as follows:

Table 25: interview responses: low level setting

Reflecting on your satisfaction, what would you like to see more in teacher-learner interaction? (Please state the problems that you might encounter).
The learners' responses were: *Interaction online discussion because, sometimes I have questions and I need immediate answers.* *Effectively teacher interaction with me. I hope to find online chatting with teacher and students every time.*

I want to see more interaction between me and the teacher. As I mentioned before like chat sessions and online chat to be immediate replies to my comments and questions and there will be a direct feedback between me and the teacher and also with the colleagues in my group.

I was expect to make more meetings or telephone calls at least once a day to gave me answers and explanations, but there were only one meeting after each unit.

For me face-to-face programs are much better than the e-learning programs because the interactions using face-to-face programs are much easier and quicker, so if we added this kind of programs to the e-learning programs, it would be much better.

More interaction ways with me and my colleagues and with my teacher.

More online chatting and more interactions.

Whereas the responses of the high level teacher-learner interaction group on the same question were:

Table 26: Interview response of the high level setting

Reflecting on your satisfaction, what would you like to see more in teacher-learner interaction? (Please state the problems that you might encounter).
The learners' responses were:
I think the course covered a lot of my desired and my goals about the collaborative e-learning system.
None
I would like to see competitive group works, in other words two groups do all their bests to success and to get better learning. I think this will support the interaction between group members.

One participant discussed what he/she would like to see more in teacher-learner interaction by the group that had worked under the high level teacher-learner interaction:

> *Actually, my expectations from the teacher was very good, because he was closed to the participants, any one has a question or has something that not clear, the teacher reaction or the teacher response by e-mail or by mobile phone and phone also, especially for me, sometimes I had some questions or so and after couple of minutes get the answer (Participant 13).*

Another participant stated:

> *Actually, my imagination about the online learning programs was just receiving and sending e-mails with the scientific content, after I attended this course I found it completely different. The interactions and co-operations between the members made the course more attractive and differ than that I have imagined. Actually I do not have any problems. I do not see any problems that could be counted (Participant 14).*

4.4.1.5. The fifth interview question

In the final interview, participants confirmed the themes below about barriers or challenges that they had been experienced using wiki to interact with the other peers or teachers. In addition, respondents specified and explained how they dealt with these barriers using wiki in the low level teacher learner interaction setting group in the following points:

- *I faced some barriers like the low interaction and communication between me and the teacher and the other colleagues as there was no direct feedback between each other, Second, if anyone in my group or my teacher edited or changed in the wiki I received a huge amount of mails which is very difficult to read and respond to them and to their questions and comments (Participant 3).*
- *As I said before, there was no enough interaction with the teacher, so I was not obtain answers directly or to make calls or meetings at least once a day (Participant 4).*
- *The interaction between me and my teacher was not so good. I hope in the next time if I attend any other e-learning programs, I could find more interaction (Participant 5).*
- *As I said before, I faced the problem of lack of online chatting to use it to be more connected with my colleagues and teacher (Participant 6).*
- *Yes, I hope if there is more online interaction and face-to-face meetings (Participant 7).*

While the response of the other setting of high level-teacher interaction confirmed the themes below about barriers or challenges that had been experienced using wiki to interact with the other peers or teachers as follows:

- *…No but as I mentioned from before, that the main problem with using wiki was several mails in the day.*
- *No, I did not have any barriers or challenges (participants 1, 9, 10, 11 and 14).*
- *Ok, one of the barriers, I can describe as following when somebody works in a skill, and I am working in another skill then, it is a little difficult to go back or to jump to the other skill and read about it. Of course at first and to share idea or to edit or to correct, add some information, that of course take a lot of time that I can use it to learn what I want to learn actually. These problems, these challenges were in the first week of the course, but as you(the teacher) mad, as you changed the course scheme, like ok today all members work especially on this skill, then the discussion should be only on this discussion, we do not need to spend a time for other skills or so. This was the only difficult (participant 12).*
- *…The problem was the large number of e-mails, may be you can find some methods to deal with this problem to get, I mean the e-mails more specific tool or so, for example if you have specific question it is ok!!! To give the answer to the specific people who are interested to give this answer, I know this is not easy to find the people that interested about this point, but it is work to think about it (participant 13).*

While reviewing the results of the satisfaction interview some aspects were addressed by the learners themselves. Regarding the first question of the interview, both members of the two groups positively responded to the ease of wiki to use and they scored high agreement about the wide range of the ease of wiki in interaction among them and between them and their teacher. The researcher expected that the reason may be because most of the two groups' members were not familiar with online learning environment in general and of course they were not familiar with wiki itself. We should also take into account that wiki itself does not guarantee that the learning process will occur but it seems to be powerful tool supports the group work and promotes the collaborative and interactive learning situations.

In the second question, low level teacher-learner interaction highlighted that they have the ability to edit, send comments to the others who can respond this kind of edit or comment. The high level setting learners respond that teacher-learner interaction makes the interaction

much easier through teacher interaction with them. The learners believe in their teacher that he can respond their question once they have already sent them. They also emphasized that the variety of opportunities in networking social software such as synchronous as well as asynchronous functions promote the teacher-learner interaction group members where they will be more interacted with their teacher and they can ask him any question and they are ensured that he will respond them. This last advantage was stated as a response of the low level teacher-learner when they respond the third question which highlighted the disadvantages of teacher-learner interaction that can be categorized from low level setting learners as following.

Learners in this setting valued the importance of chat sessions or asynchronous discussion (that they were deprived from them) as factors that promote interaction with the teacher. Thus, they attributed that there was not interaction with the teacher, while the high level setting learners highlighted that just receiving a huge amount of e-mails through wiki per the day can be considered as the most disadvantage they might face through their learning, where everybody if he/she wants to express his/her viewpoint, should send an e-mail to the other's in the same group.

Concerning the fourth question that asked the learners about what would they like to see more in teacher-learner interaction? The results of learners' responses reported a different interest between the two groups. The high level setting learners reported that they are satisfied with the interaction through the wiki and some of them got confused between the interaction and the role of wiki itself and this is considered a common result may be as a result of being new wiki users. Overall they felt a family and their interaction promote their group and collaboration sense. On the other hand the other group highlighted that they hoped to find more synchronous interaction sessions what means they would like to be more in contact with their teacher which value the role of teacher though networking social software.

The last question of satisfaction interview which addressed the barriers or challenges that might face the learners of both two groups. The high level teacher-learner interaction setting reported in most of their responses the problem of receiving a huge amount of mails per day that may affect their interaction among them, and between them and the teacher. One participant pointed out a technical aspect of wiki that anybody can edit any part of the wiki while the others were working in another part, thus this may confuse them between completing the part they already work on it or tracking the new e-mail and responding on its contents. On the other hand the low level teacher-learner interaction learners reported other aspects such as there was no direct feedback between them and the teacher, there was no

enough interaction with the teacher, it was not so good and they need more synchronous discussion with the teacher.

4.4.2. The results of satisfaction questionnaire

After each group assignment, the satisfaction questionnaire was taken by every member of the study included 20 items related to group members' satisfaction towards the interaction between teacher and learner. The satisfaction questionnaire asked learners to respond to each question using a 5 Likert-type scale. The results of satisfaction questionnaire represent the means of the satisfaction of the negative and positive statements in both of control and training groups were as follows: The results showed that the control group scored (38.29) and (35.29) as means to the positive and negative satisfaction statements respectively, while the training group scored (46) and (45) respectively to the same positive and negative statements in the same scale (see figure 33).

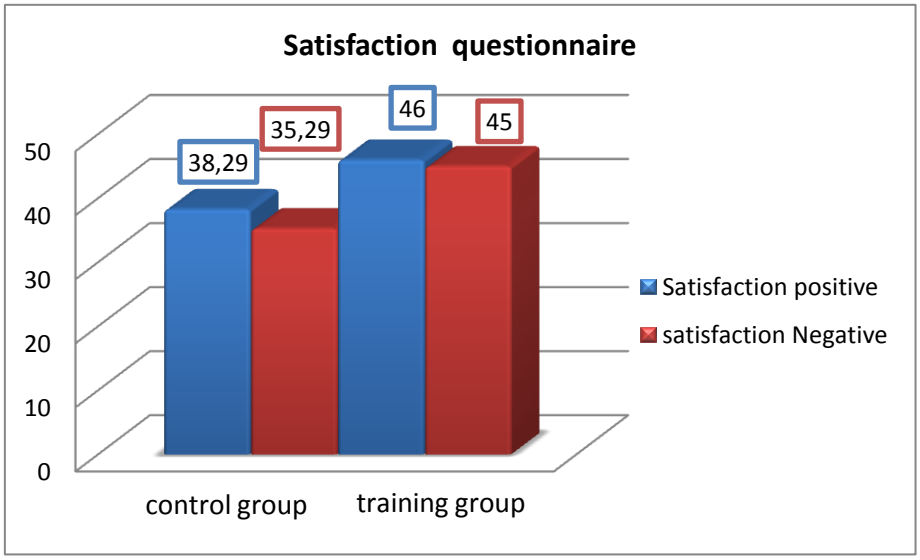


Figure 33: The satisfaction questionnaire means of the positive and negative statements for the two groups.

Through comparing the average of the positive and negative means of the two groups, the results can be addressed in figure (34). The training group scored (91) and the control group scored (73.57) as means to the satisfaction questionnaire of the two groups.

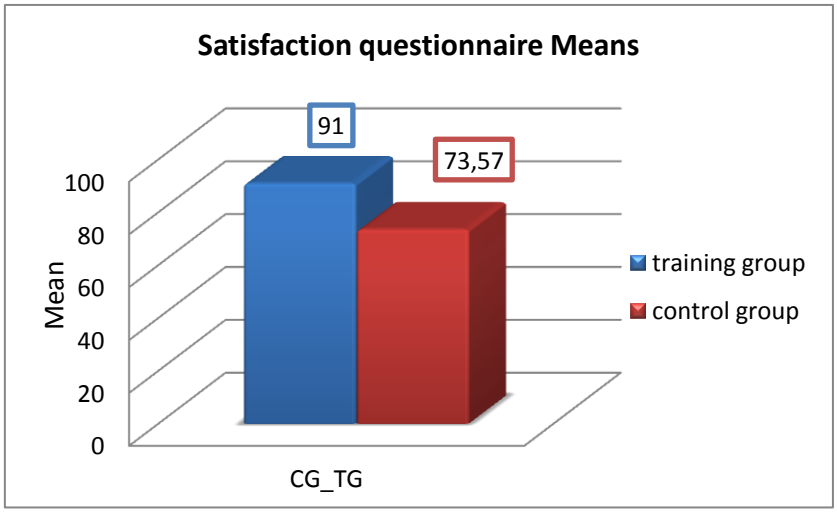


Figure 34: The means of the satisfaction questionnaire of the two groups.

The results of the Mann-Whitney analysis tool for the satisfaction questionnaire represent that there were significant differences between the two groups in the positive statements (0.017) and in the negative statements (0.004) as shown in Appendix (8.30). Also there were significant differences between the two groups of the whole satisfaction questionnaire with (0.005) level of significance (see table 27). Appendix (8.18) reports the results by item for the two methods of interaction.

Statistik für Test[b]

	classroom	satisfaction	interaction
Mann-Whitney-U	4,000	3,000	1,000
Wilcoxon-W	32,000	31,000	29,000
Z	-2,625	-2,781	-3,019
Asymptotische Signifikanz (2-seitig)	,009	,005	,003
Exakte Signifikanz [2*(1-seitig Sig.)]	,007[a]	,004[a]	,001[a]

a. Nicht für Bindungen korrigiert.

b. Gruppenvariable: CG_IG

Table 27: The significant differences between the two groups in the classroom community scale, satisfaction and teacher-learner interaction using Mann-Whitney test.

From the above, it is clear that there are significant differences in the satisfaction questionnaire between the two groups for the training group at the level of significance (0.01). This leads to the rejection of the 'Null hypothesis' and the acceptance of the hypothesis, which confirms the existence of statistically significant differences in satisfaction between the

two groups and this leads to '*The use of different levels of teacher-learner interaction influenced the students' satisfaction through social networking software wiki'.*

4.5. The research hypothesis for the fourth research question was:

Wiki interaction assignments benefit collaboration among learners more than blocking it.

To examine the fourth hypothesis, several statistical tests were calculated in order to examine the learner's interaction. These tests were applied on such scales included: classroom community scale and the wiki activity scores. The first statistical test was calculated on the classroom community scale results as follows (see table 27).

4.5.1. Classroom community scale

The classroom community scale was taken by the participants at one time, after the wiki interaction assignments. After each group assignments, the survey was taken by every member of the study included 20 items related to characteristics of group community, assess the learning and community aspects of the groups' course and provide baseline data for comparison with these items, regardless of the teacher-learner interaction level. Appendix (8.19) shows the averages, standard deviation and standard error of two levels of interaction. The results of the means of the classroom community scale of the negative and positive statements in both of control and training groups, showed that the control group scored (33.86) and (34.29) as means to the positive and negative satisfaction statements respectively, while the training group scored (41.86) and (44.43) respectively to the same positive and negative statements in the same scale (see figure 35).

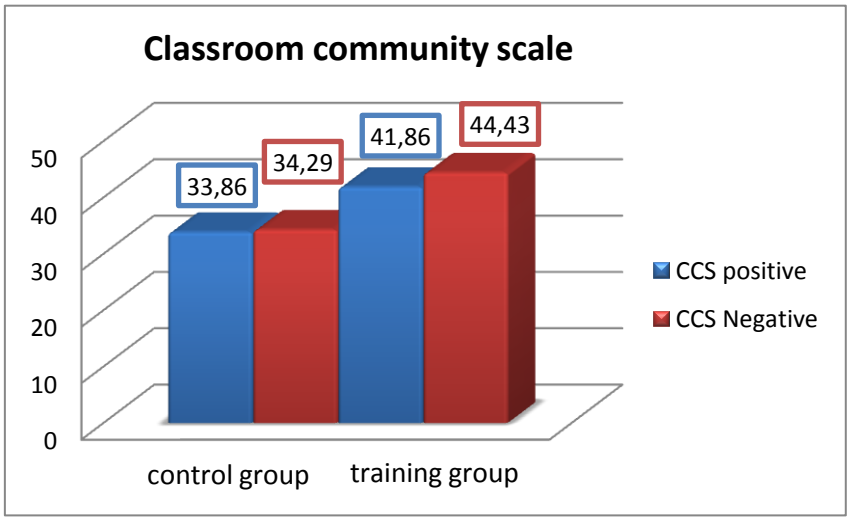


Figure 35: The Means of the classroom community scale results between the two groups in the positive and negative statements.

Through comparing the average of the positive and negative means of the two groups, the results can be addressed in figure (36). The training group scored (86.29) and the control group scored (68.14) as means to the classroom community scale of the two groups (see figure 36).

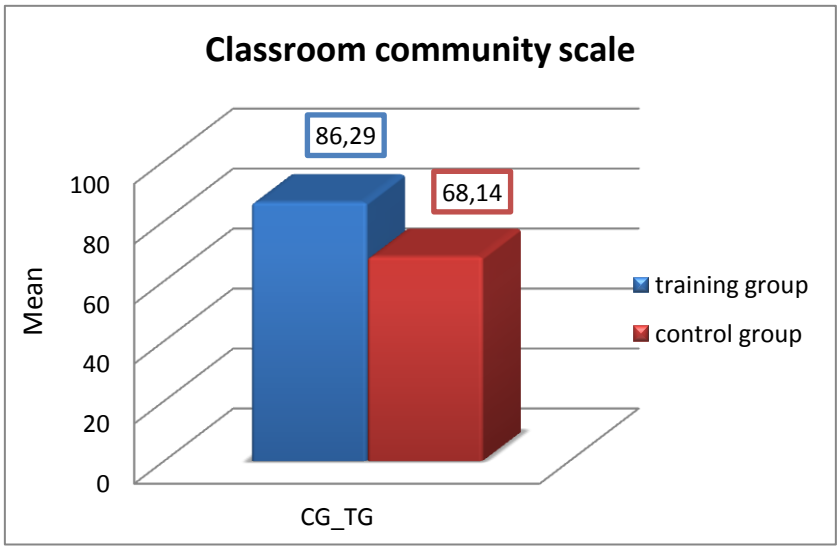


Figure 36: The mean of the classroom.

The results of the Mann-Whitney analysis test for the classroom community scale represent that there were significant differences between the two groups in the positive statements (0.015) and in the negative statements (0.006) as shown in Appendix (8.30). Also there were significant differences between the two groups of the whole classroom community scale with (0.009) level of significance (see table 27).

4.5.2. Wiki interaction

Wiki community reports the date and time of editing the wiki page, where 'Edit / Save' buttons allow participants to modify the wiki page by adding, deleting, or formatting the text, the figures and also the videos. Moreover the comment function allows the participants to add their questions or requests to teacher and can make reply to such comment. The history function allows the participant to review the previous version of each page, compares two versions to see the improvement in such page and can be used to replace the current wiki page with an earlier version of the same page. Therefore the teacher or even the participants can restore the old draft of the wiki page if it has been changed into undesired version or data. The history function of a wiki page identifies who made each edit on this page, which allows the teacher to track participant's share on the online wiki for their assignments.

Building on the idea that has been explained above; table (28) reports the wiki editing activity that took place during the study. High level setting group used the wiki's editing

function much more extensively than the low setting one. High level setting made over twice as many edits (224 vs. 98) than low level setting. Although each group made almost the same number of edits of the high score (58 vs. 62), the members of high level setting made several more edits than low level setting in each of the other content and organization modifies.

During the assignments, there were two deadlines; the assignment deadline was through the assignment period at the beginning of the course, and after complaining of the participants because of the disadvantage of group work that was in interrupting of participants who were working in another skill, the teacher determined a label "New" referred to the new or next assignment as a proof of finishing the skill and moving to another one, the second, a deadline for the final product at the end of the course.

Table (28) represents the participants edits of the content distributed between low, medium and high score and the organization edits of the content (e.g. text formatting).

Descriptive statistics

Participant	Page view count	Total edits	Content edits			Organization edits
			Low score*	Medium Score**	High score***	
Control group						
Participant 1	101	20	0	3	14	3
Participant 2	88	16	1	9	6	0
Participant 3	79	24	4	3	17	0
Participant 4	126	19	1	3	15	0
Participant 5	31	3	2	0	0	1
Participant 6	89	14	2	7	5	0
Participant 7	198	2	1	0	1	0
Group1 totals	712	98	11	25	58	4
Training group						
Participant 8	158	25	1	14	10	0
Participant 9	99	38	4	26	7	1
Participant 10	120	29	0	15	11	3
Participant 11	49	17	1	13	3	0
Participant 12	163	40	3	26	9	2
Participant 13	28	15	2	11	2	0
Participant 14	546	60	9	19	20	12
Group 2 Totals	1163	224	20	124	62	18

Table 28: The participants edits of the content.

*Low score: the idea or process is not visible on the group (a small number of spelling, punctuation and /or word changes).

**Medium score: the idea partially visible from some members (1 or 2 paragraphs of information added or changed).

***High score: the process is completely visible from the entire wiki group and most of them share it (more than 3 paragraphs of content added or edited).

Through analyzing the previous table, high level setting group scored almost twice what the other setting page view counts of the wiki pages where the high level scored (1163) page view counts versus (712) scored by the low level setting. The total edits for each of the two setting was not far from this percentage, high level scored (224) total edits on the wiki course, while the low setting group scored only (98) edits on the wiki course, distributed as follows: (20, 124 and 62) for the high level teacher learner interaction setting of low, medium and high scores respectively, while the low level teacher-learner interaction setting scored (11, 25 and 58) of low, medium and high scores respectively.

The lowest participation of the two groups was participant (5) in the low level setting with (31) page view counts and participant (13) in high level setting with (28) page view counts. However it is serious to record that all participant 5' participations in the low level setting that maybe because his preference of learning style where he stated in the interview "*For me face-to-face programs are much better than the e-learning programs because the interactions using face-to-face programs are much easier and quicker, so if we added this kind of programs to the e-learning programs I would be much better"* or maybe he was afraid to change his work where he stated "*The disadvantages that faced me, was changing my opinions by the others with wrong data (from my point of view"* or he did not have enough time to participate the wiki course. It is also interesting to note that after ending the course, one participant (participant (4) in the low level setting) went back to the wiki course website to revise and improve it, perhaps wanting to contribute because he was a little bit passive user of the wiki at the first sessions, or maybe he has enough time to do that or for another purpose.

4.5.3. Content analysis tool

Between the frequencies of the two groups in cooperative learning on the online content analysis tool of Gawarndina and her colleagues, which ranked collaborative learning as a result of the qualitative analysis, the lowest levels of the first and the fifth highest, as follows:

Level 1 (lowest): Sharing/ Comparing of Information

Level 2: The Discovery and Exploration of Dissonance or Inconsistency among Ideas, Concepts, or Statements.

Third level: Negotiation of Meaning/Co-Construction of Knowledge

The fourth level: Testing and Modification of Proposed Synthesis or Co-Construction

Level 5 (highest): Agreement Statement(s)/Applications of Newly-Constructed Meaning (levels and sub levels included).

4.5.4. Statistics descriptive of the level of cooperative education in a sample study

Content analysis was used to code students' online interaction on the wiki. Each category was independently coded by two researchers. The total study sample scored on the wiki (561) codes as whole amount with ratio of (100%). The control group scored (20.5%) of the codes versus (79.5%) scored by the training group. The first level scored (21.5%) versus (78.5%) by the control and training group respectively in sharing /comparing of information. The control group scored (18.9%) versus (81.1%) scored by the training group in the second level of the online content analysis tool regarding the discovery and exploration of dissonance or Inconsistency among ideas, concepts, or statements. Regarding negotiation of meaning / co-construction of knowledge, the control group scored (22.3%) versus (77.7%) to the training group. There were no posts of higher levels of the online content analysis tool in the levels 4 and 5 of the two groups with the exception of the participations rate (0, 2 posts) scored by the control group versus 10 and 22 posts scored by the training group with the ratios (0% and 8.3%) versus (100% and 91.7%) on the levels of testing and modification of proposed synthesis or co-construction and agreement statement(s)/applications of newly-constructed meaning respectively. This leads to a low of interactive work among members of the two groups in general in the fourth and fifth levels of the tool (see Appendix 8.39).

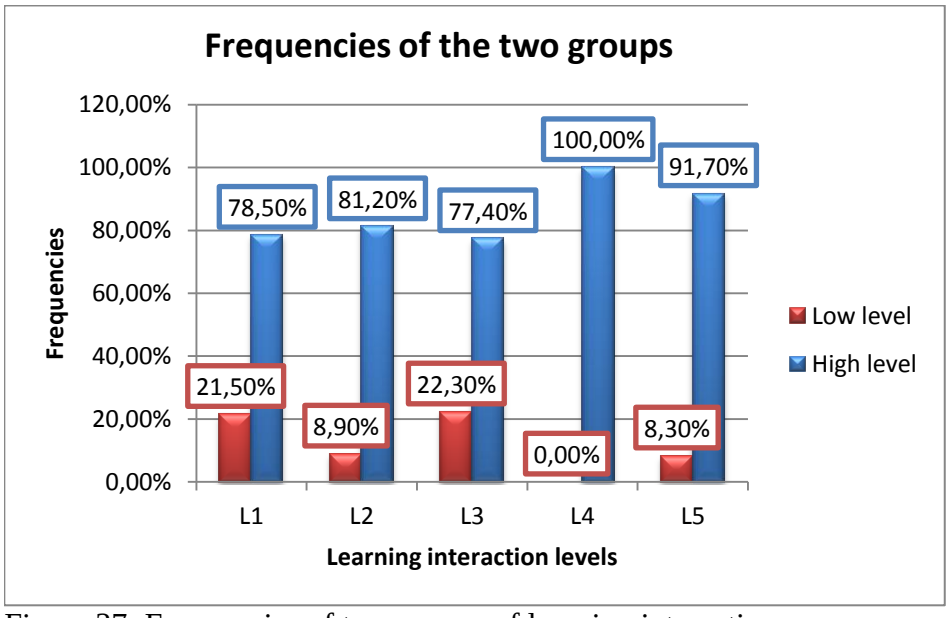


Figure 37: Frequencies of two groups of learning interaction.

In the first level of the online content analysis, the control group scored (11.88%, 0%, 7.1%, 10.9 %) versus (88.12%, 100%, 92.9%) scored by the training group in the first four sub levels of sharing /comparing of information where the last sub level scored approximately the same ratio (49%) by the control group versus 51% by the training group. In the second level of content analysis tool, control group scored (12.5%, 17.1% and 30%) versus (87.5%, 82.9% and 70%) scored by the training group in the three sub levels of the tool. The results of the content analysis tool scored one thirds of two sub levels (the first and the third) of the second main level, while their results on the other sub level, scored low online interaction with ratios (0%, 9.5%, and 0%) on the sub levels. The next fourth and sixth sub levels respectively versus (65%, 0%, 66.7%, 90.5% and 100%) scored by the training group to all the sub levels of the third main level of the online content analysis tool.

The results of the fourth main level of the content analysis tool represent a low level of interactions with posts (1, 1, 1 and 7) of the training group versus (0) posts of the control group of the total of (561) posts of the two groups on all the main levels of the tool.

The last level of the content analysis tool represents (0%) of the control group on the sub levels of summarization of agreement and metacognitive statements by the participants illustrating their understanding and that their knowledge or ways of thinking (cognitive schema) have changed as a result of the interaction versus the whole ratio to the training group on the same sub levels, while the training group scored (86%) versus (13.3%) scored by the control group in the sub level application on new knowledge. The poor interaction in the last two levels is considered normal aspect regarding the time that was available to the two groups to finish the course assignments (see Appendix 8.39 & figure 38).

Another potential reason for both groups receiving lower quality scores on the interaction, especially in the last two levels of online content analysis tool, is the modernity of most of the group members from the two sides with wiki based learning. Learners' interaction is related to teacher-learner interactions and both of the two group did not have in their minds that there is a difference in the two groups about the interaction. One of the most important reasons for receiving lower scores is consensus of learners about some issues like the constantly complaining from the study's start day of the large number of e-mails that the learners were received per the day may be the reason that the learners scored low interaction aspects in the high level of the content analysis tool.

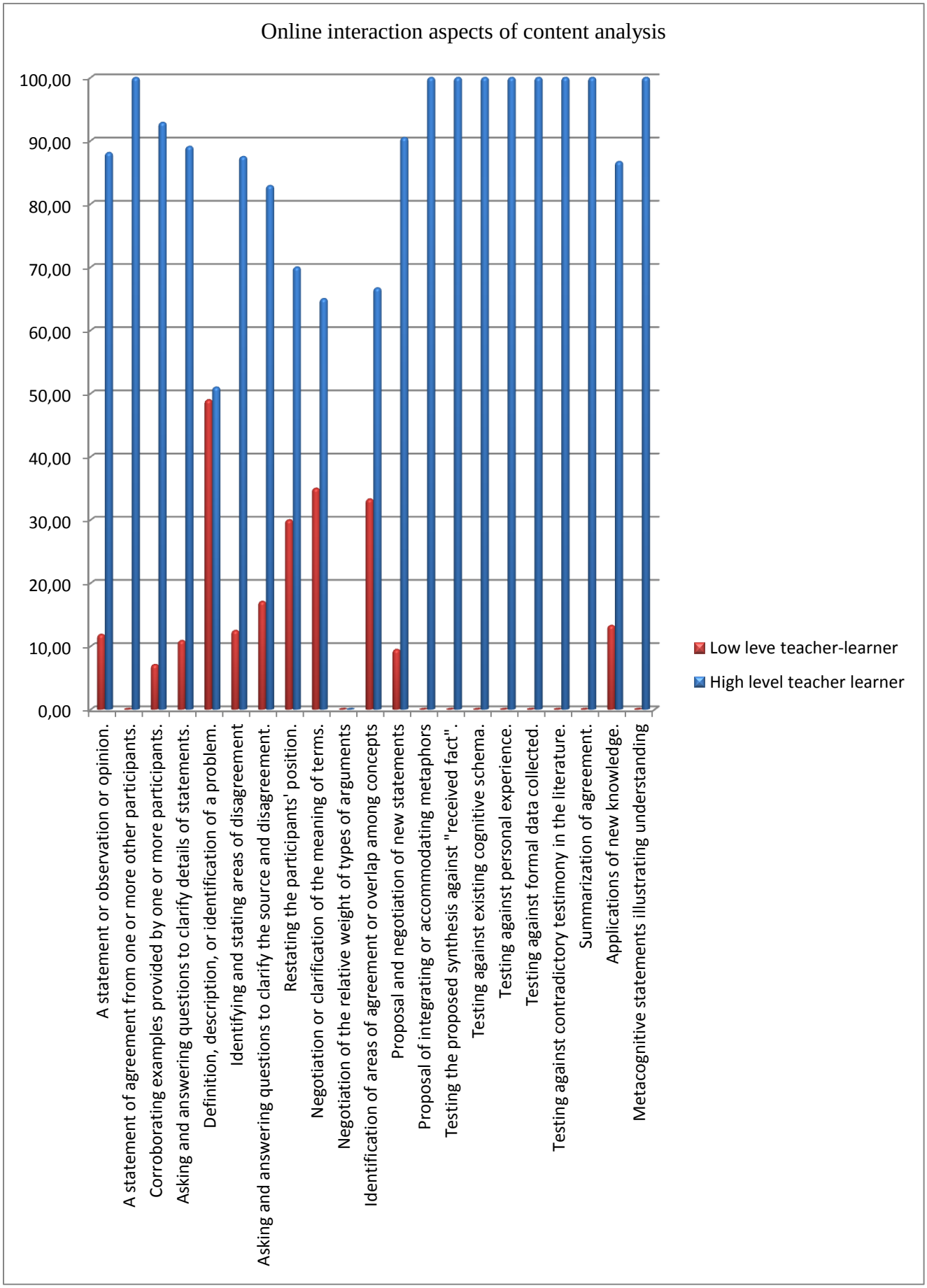


Figure 38: The content analysis results of online interaction.

The results of content analysis represent that the high level teacher-learner interaction setting scored high ratings in the aspects of interaction versus the low level setting as follows:
in the action level which may happen by the teacher or the learner, the high level setting group scored 91.7% versus 8.3% scored by the low level setting in the aspect of doing the acting by the teacher (e.g. to start the topic with a question or a quiz like creating a forum or a discussion activity) which refer to the high level of teacher-learner interaction in this group. The teacher scored twice on creating forums in the high level setting versus no forums in the other setting, while the action that has been done by the learners was as follows:

The high level settings scored 86.4% versus 13.6% scored by the low level setting; this action was distributed in creating forums sessions by the learners in the high level setting with 100% of all the forums, wishes and concepts that have been built, posted or added to the two groups as learners' action through their interaction in the course. The others' actions of posting questions, comments, thanks and respect statements that have been done by the learners were (86.4%, 87.2%, 66.7% and 88.9%) scored by the high level setting versus (13.6%, 12.8%, 33.3%, and 11.1%) scored by the low setting group.

Regarding the reactions of the two groups towards any action in the course, whether from the teacher or other peer, the learners' responses were as follows: From all the negative reactions to the high level setting scored 40% versus 60% to the low level group while the positive reactions results indicated domination to the high level setting with a ratio 94% versus 5.9% to the low level setting.

The teacher scored high ratings of reactions of the learners' actions in the course, with a ratio 91.6% to the high level setting group versus 8.4% in the other one. In the same direction the learners' scored superiority to the high level setting with a ratio of 100% of the posts that applied others' actions (e.g. questions, comments, etc…) of both two groups.

The learners' reactions in the two groups were represented into several types such as the high level setting scored 90% of 'Editing the two wiki page' aspects, 60% of 'Exchanging the others' view points' reaction type, 100% of 'Reinforcement statements', 93.1% of the total number of 'Advices', 85.7% of all the course 'Comments', replied on 93.1% of the 'Replied comments', answered 92.2% of the total 'Answers', asked 78.6% of the course 'Questions', participated 100% of the 'Online chatting sessions' and 'Creating forums' or add forums topics, 97.1% of the 'Feedback' that has been sent in the two courses, 100% of the 'Agreement statements' that posted by the two groups and 100% of attribute versus the low level setting that scored (10%, 40%, 0%, 4.1%, 14.3%, 6.9%, 7.8%, 21.4%, 0%, 0%, 2.9%,

0% and 0%) respectively of all the learners' reactions of both two groups. Also the high level setting scored 27 sequenced comments (comments and reply to comments of the one idea) with the ratio of 100% of the sequenced comments that have been done in the two groups work (see figure 39 and Appendix 8.39).

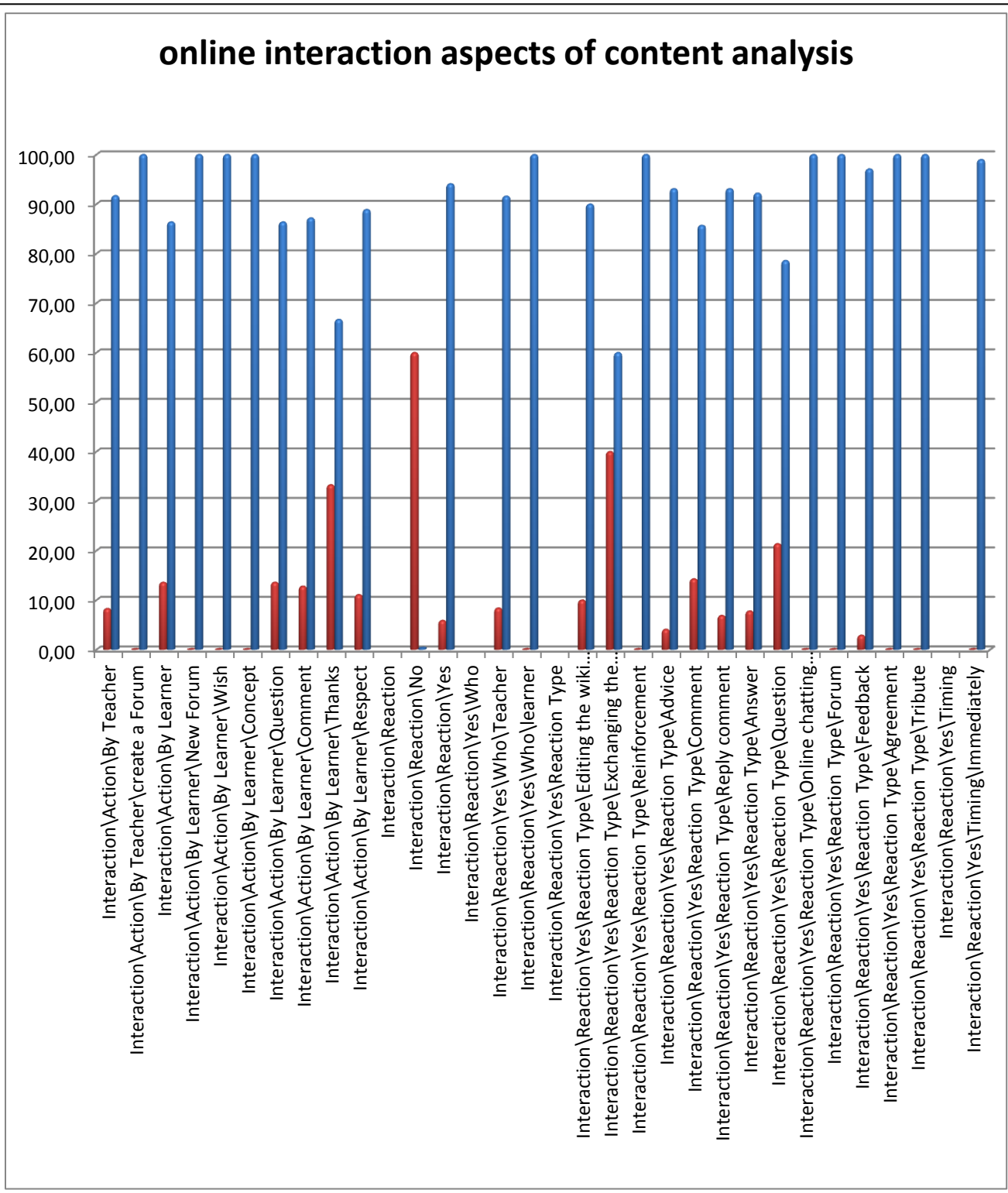


Figure 39: The content analysis results of online interaction and reactions.

4.5.5. Examples of comments and learners' categorization include

The learners' comments through the interaction process through wiki in both two levels of teacher-learner interaction setting were as follows:

The high level setting:

One participant wrote: "… *I have a problem in my profile ... I cannot make upload my picture in my profile"* (participant 9). Another one stated *"I want to ask about, what do you mean by administration block (benefits)"* (participant 8). One participant answered his peer by stating "*HTML, which stands for Hypertext Markup Language, is the predominant markup language for web pages. A markup language is a set of markup tags, and HTML uses markup tags to describe web pages."* The same participant added in another position *"As I understand one of us should add a term to the glossary and the others can write under it. Is it correct?"* and added as a response to a peer question "*It is very easy to do it, but I advise you to watch both videos as a good learning tools."* They also asked a question *"Please can somebody tell me how can i add a new row? The explanation above is not to add new row as I think. It is to add new line."* A response to a question asked about the meaning of backup he answered *"As I think the teacher needs at the end of the course to save a copy of the course with some or all of its parts especially at the end of the course to save the changes and all activities that the students add them to the course, maybe to compare with other students next years or ...etc".*

Another participant asked a question "*can I hide a database entry which was previously approved?*" (Participant 13), another one stated "*When I opened Assign roles then opened Teilnehmer/in, but I cannot find anyone to add or remove I have just find myself"* (Participant 11), also (Participant 10) answered his peer stating "*this Assign roles means add teacher and student in my courses*". The last participant of this high level teacher-learner interaction setting who was the group leader stated "*hi everybody, please say opinion about the assignments answers and try to add yours"* and in another position *"yes, but why shall the teacher save the course? Do you mean that the student has the ability to change the settings of the course, so the teacher should back up the data?"* Also *"Dear Islam thanks for your participation, but Feedback is an activity in Moodle, aims to collect the feedback from the students about an idea or topic while the purpose of discussing this activity in wiki is just to learn how to use it in Moodle(how to add it to the course, how to adjust it, ...etc.) not to collect your impressions about the wiki course, please try to add it to your course in the moodle and thanks again for your activity :D"* She does her duties as a group leader while stating *"to all the group members try to build your database table through the moodle and not through the wiki page."* And *"hi everybody, please don't add any information in the front of*

the page, you are allowed only to add in the assignments answers or in the comment."(Participant14).

The low level setting:

One participant wrote: "*when I make a new block and go to configuring a HTML block there is no icon for insert a pic"* and added in another position "*I tried again to add new HTML block and went to configuring HTML block and also there is no any icon just (Block Title and content)*" (Participant 2). Another participant wrote: "… I *think one option in my edit profile in my moodle account is missing the one concerning the list of interests I can't find it, I have added photo and then optional without the list of interests in the middle.*" (Participant3). Participant 4 wrote: "*Please there are a lot of data and most of them are duplicated (copy/paste). I got lost*." and added also "*I want to assign the role of course creator in different courses, which have administrative rights in every course, but I want each course creator to be able to see only his/her courses and not all the others. I found in moodle.org that in order to do that, before assigning a role I have to check the hidden assignments check box. The problem is that there is no such check box under Assign Roles. Is there any other way to do that?".* Another participant wrote*: "I wrote my username and password and enter the course page, on the right side of the course under Block dropdown menu select any of the choices. Also we can remove it by pressing the Delete icon" (*Participant 6).

Appendix (8.17) illustrates the number of all comments in each of the five phases of the content analysis tool categories as after coding the learners' contributions and participation on the wiki course as reported by the second coder.

The majority of learners' comments were directed to their group generally and especially to the teacher rather than an individual, and approximately (90 %) of learners' comments were related to the course content. In addition there were an unexpected aspect of learners' contributions and participation through the course itself where (45%) of learners' contributions and participation and also edits in the wiki edit area were related to the group work, that may be occurred because of most of the learners were new wiki users. Through high level teacher-learner interaction learners' comments were (95) comments and (12) were considered as responses to previous comments reflected the interaction between learners and the teacher and through the low level setting there were only (15) comments and only one comment was considered as response to previous comment.

Over all the results indicate significant differences in the classroom community scale. The wiki scores and the qualitative analysis of the learners' participation in the wiki course scored high interaction levels to the high level teacher-learner interaction setting. From the

above, it is clear that there are significant differences in the Classroom community scale between the two groups for the training group at the level of significance (0.009). This leads to the rejection of the 'Null hypothesis' and the acceptance of the hypothesis, which confirms connectedness and learning and learning interaction and this leads to '*Wiki interaction assignments benefit collaboration among learners more than blocking it'.*

4.6. The research hypothesis for the fifth research question was

There are significant differences in the features of learners' motivation, attitudes and prior knowledge towards the context of the Moodle course after the teacher-learner interaction at its two levels using wiki.

To examine the fifth hypothesis, several statistical tests were calculated in order to examine the learner's motivation, attitudes and prior knowledge; these tests were applied on such scales included: motivation survey, attitudes towards teacher-learner interaction and learner's prior knowledge. The learner's prior knowledge was explained through the results of the pre-test and the learner's motivation of interaction results was calculated as follows (see table 28).

Through this tool, the learners were requested to respond on three open ended questions (Appendix 8.16). At the end of the study, participants were asked to indicate their responses towards their motivation towards this kind of learning interaction. The results showed that the means of the motivation survey scale of the control group and training group were (9.71) and (13.57) respectively (see figure 40).

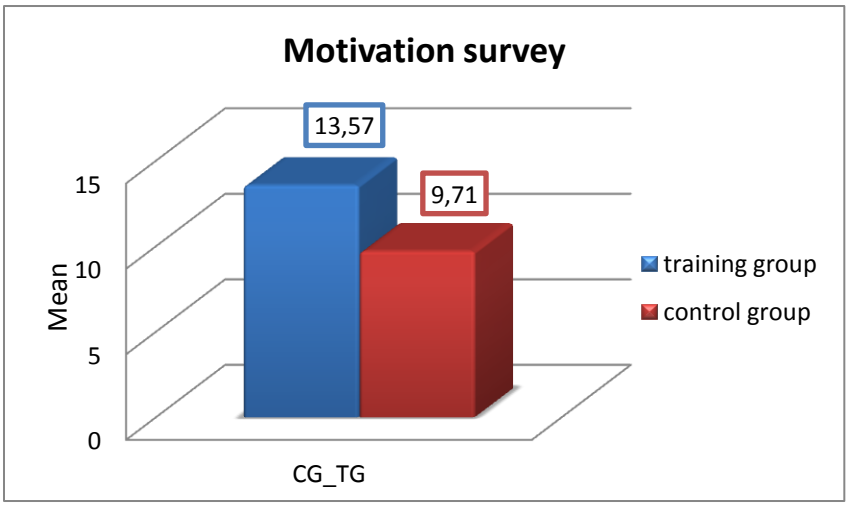


Figure 40: The mean of the motivation survey scale.

The results of the Mann-Whitney analysis test for the motivation survey scale represent that there were significant differences between the two groups on motivation survey scale with (0.008) level of significance (see Appendix 8.30).

Table 29 lists learners' responses on the motivation survey. Regarding the first question of the survey which related to: on a scale of 1 to 5 with 1 is ranked the highest, how much experience you got from the course affects your view points? And how?

A total of ten participants preferred that they gained much experience from the course. Most of high level setting selected the scale (1), which considered the highest value (Four participants from high level setting) and six times as many participants preferred the second level with the scale (2) (Four from low level setting and two from high level setting). There was a difference in the preference between the groups. One participant indicated a preference of scale (3) in the high level setting versus (2) in the other group, whereas one participant in the last one selected the preference (4). The written survey responses from all the participants with their preferences and reasons of their choices reports the most common theme expressed in the survey by participants was that they had no prior experience about the course content and after the course, they gained a lot of experience. One participant also indicated the lack of interaction in the course by stating that "I did not find any interaction with my group!!" while another one expressed himself by stating "It was good by how to participate with others and in space to explain my viewpoints" (see Appendixes from 8.33-8.35)

The most common theme expressed in the surveys by participants was the importance of wiki. Two participants preferred the interaction because it allows them to apply what they learned and supported them. With one of them stating, "Because of the group interactions…" and other participant stated: "Wiki is a very good tool for learning".

The nature of the wiki as a collaborative way was also expressed by two participants with one of them stating about wiki as: "A new way about collaborative learning" and the other stated "This is a very interactive work" (see Appendixes from 8.33-8.36).

Question	Method	Scale preference	Frequency	Percentage
1	Low	1	0	0
		2	1	14.3
		3	1	14.3
		4	5	71.4
		5	0	0
	High	1	0	0
		2	0	0
		3	1	14.3
		4	2	28.6
		5	4	57.1
2	Low	1	0	0
		2	3	42.9
		3	3	42.9
		4	1	14.3
		5	0	0
	High	1	0	0
		2	0	0
		3	1	14.3
		4	2	28.6
		5	4	57.1
3	Low	1	0	0
		2	0	0
		3	4	57.1
		4	2	28.6
		5	1	14.3
	High	1	0	0
		2	0	0
		3	0	0
		4	2	28.6
		5	**5**	**71.4**

Table 29: Motivation scale responses indicating participants' frequencies and percentages.

The results of the satisfaction survey indicated significantly higher scores for high level compared to low level teacher-learner interaction on two of three general group interaction items measured in the survey, "…how effectively do you believe the members of your small group interacted with each other or with the teacher on the assignments? (on a scale of 1 to 5).", and "…how effectively do you feel you interacted with the other peers and/or teacher in your group' assignments? (on a scale of 1 to 5). Participants' written survey responses, stating the motivation towards the two types of teacher-learner interactions and responses for motivation scale.

4. 6.1. Motivation survey responses of the first question

In addition to the written survey, participants responded to question in personal motivation scale to submit written responses to the scale responses. As indicated in (Appendix 8.32, 8.33, 8.34 and 8.35) of the study, participants responded to the motivation scale questions.

4. 6.2. Motivation survey responses of the second question

Some of the scale questions were designed to compare the participant's experience of high / low level teacher-learner interaction through wiki. The responses below reflect the view points of the majority of the participants:

Most of the participants in both of the two groups answered the question: How effectively do you believe the members of your small group interacted with each other or with the teacher on the assignments? (On a scale of 1 to 5) as shown in Appendix (8.34) the low level setting responses were as follows: three members by using the scale (3), other three members by using the scale (4) who indicated that the interaction among the learners was quite low *(participants 3, 4),* and only one participant selected the scale (2) in the low level setting, that refers to the low interaction among the participants and between them and the teacher. In addition in high level setting, the common response principle was the highest scale (four participants), while there were two participants preferred to the scale (2) and finally only one participant preferred the scale number (3) which reported that some participants were active and the others were not *(participant 13)* (see appendix 8.33).

4.6.3. Motivation survey responses of the third question

After asking the learners about how effectively they feel that they interacted with the other peers and / or teacher in their groups. The participants' responses were as follows:

In low level setting only one participant who selected the scale (1) and two participants selected the scale (2) where four participants responded as neutral when they selected the

scale (3). While in the high level setting, the majority of learners selected scale (1) (five participants) while the others two participants were not far from the highest ranking and selected the scale (2) (see Appendix 8.34).

The most common theme expressed in the scale by participants who engaged in the low level teacher-learner interaction concerning the question of "How effectively do you feel you interacted with the other peers and /or teacher in your group's assignments? (On a scale of 1 to 5) " (see Appendix 8.34) were:

The majority of the participants reflect that they were neutral in the interaction and selected the scale (3) (the interaction between me and my group and teacher was neutral and not very strong but not bad *(participant 3)*), One participant reported that he/she was high interacted and selected the scale (1), while two participants used the scale (2) as reported by the low level setting members.

on the other hand most of the participants in high level setting (five participants) scored high responses concerning this question by reflecting the higher scale (number one), and the other two participants selected a quit higher scale (2) one of them reported that he/she effectively interacted specially with the teacher *(*participant 13) (see Appendix 8.34).

4.6.4. Motivation survey responses of the fourth question

This question did not statistically analyze table (29). The participants were asked about the challenges that they may face in wiki while the interaction with the teacher and the participants responses were as following:

At the end of the scale questions, participants were asked to indicate if they experienced any problems. The participants' responses about the barriers or challenges using wiki to interact with the other peers or teacher were represented in Appendix (8.35) and the following responses reflect the view points of the majority of them:

Most of low level setting' members were experienced with barriers and challenges in their interaction through wiki as follows: Two of seven participants were challenged with a lot of e-mails that they received from the group members. One participant stated "one of the big defects I received more than 20 mails every day and it is not possible to catch that *(participant 2)*" and the other stated: "I had some barriers…. a huge amount of e-mails came to me and this is very hard to read them and respond to their questions and comments *(participant 3)*".

Also "The interaction was not strong… when I was asking the teacher, he was not answer immediately" said participant (5), another participant supports his claim by stating

"the interaction between me and my colleagues was not good, we were working together in my group with a weak support from the teacher, he just answered us if we asked him but we want a lot of support." *(Participant 6)* One participant stated "…the interaction between me and the teacher was very low and the amount of knowledge decreased with the lack of interaction." *(participant3)*; remain challenges were as "I thought it was online session or chat with teacher and students…" *(Participant 2)* and one has subjective challenge as facing a technical problem with the internet browser *(participant 1).* The last participant reported that he/she did not challenged by any problems during the interaction process through the wiki by stating "NO" *(participant 7).*

As the last one of the low level setting, four participants of high level setting members reported that they did not challenged by any problems during the interaction process through the wiki by stating "NO" *(participants 8, 9, 10, and 11)*, while one of them stated that "but I think that the wiki has limited opportunities in font format, the plug in and so on" *(participant 10).* And the other three participants their responses were as follows:

"While I was working in skill x another group member was working in another skill y, and so I have received and alerted from him with his/her editing that I have. To go to the other skill to see what are/were editing, what I mean, it take some time that we can see to learn other skills if all members were working in the same point" *(participant 12).*

"At the beginning some tools were not clear for me, but then it became similar. Also some ideas to simplify in the wiki tool should be clearer like add Block and some activities" *(Participant 13).*

"The main barriers that I have experienced was using page history in returning the page to the previous (latest) form that was before my editing which leads to the changing of my points view but on the other side this facility allows the users to see every editing done to the page and the teacher could choose the best" (participant 14).

4.6.4.1. Motivation questionnaire

At the end of the study after each group assignments, two surveys (Classroom Community Scale and attitudes towards teacher-learner interaction ATLIS) were taken by every member of the study. Each one included 20 items related to the motivation of group members towards the course. Participants were asked to indicate their responses about their motivation and the researcher collected their responses from the two scales in one table. Appendix (8.28) lists these responses, and shows the results by item for the two methods of interaction.

4.6.5. Creating a sense of online community and improving communication skills

Creating a sense of community in our online community began with online introductions, warm-up activities look like a real life activities with optional photographs, followed by learners sharing "safe" opinions in mini-cases, and then moving into more complex and controversial cases.

In terms of promoting communication skills, a lot of opportunities have been provided to measure their communication improvement via reducing anxiety through the items numbers (the first numbers from the CCS and the other numbers from the ATLIS separated with "and") 3, 5 and 7, 19, decreasing perceived risks through the items numbers 9 and 11, decreasing fearing failure through the items numbers 12 and 10, 16, 15, while measuring the process of promoting the sense of creating online community via stimulating the students to express themselves through the items numbers 10, 18, 20, share ideas and thoughts 19 and 6, 13, promote reflection with the teacher and others classmates through the items numbers 2, 7 and 2, 12. Learners agreed that online interaction promotes their communication skills by calculating the percentages of the positive statements through strongly agree and agree ranges where (46.03%) of positively agreed in high level setting versus (25.39%) in low level setting on the motivation scale respectively and by calculating the percentages of the negative statements through strongly disagree and disagree ranges where 40.54% of negatively agreed in high level setting versus 26.35% in low level setting on the motivation scale respectively. The Motivation features of the two surveys (ten items from the classroom community scale items number 2, 3, 5, 7, 9, 10, 12, 18, 19, and 20, while the others ten items from the scale of the attitudes towards teacher learner interaction were as follows: items number (2, 6, 7, 10, 11, 12, 13, 15, 16, and 19) (see Appendix 8.28).

The wiki course also stimulated learners to express and share their ideas, thoughts and reflections with the teacher and their peers, supported by the 39 times who strongly agreed, and 19 times who agreed in high level setting versus 9 times who strongly agreed, and 23 times who agreed in low level setting on the positive statements on the motivation scale (see Figure 41). While responding to the negative statements in the motivation scale, the participants' responses scores 40 times who strongly disagreed, and 20 times who disagreed in high level setting versus 11 times who strongly disagreed, and 28 times who disagreed in low level setting on the negative statements on the motivation scale (see Figure 42).

The wiki course created a sense of online community between the teacher and learners with the major acceptance of teacher learner interaction situation that illustrated in figures (41

and 42). Figure (41) highlights that the wiki course created a sense of online community between the teacher and learners by calculating the percentages of the positive statements through strongly agree and agree ranges where 46.03% of positively agreed in high level setting versus 25.39% in low level setting on the motivation scale respectively.

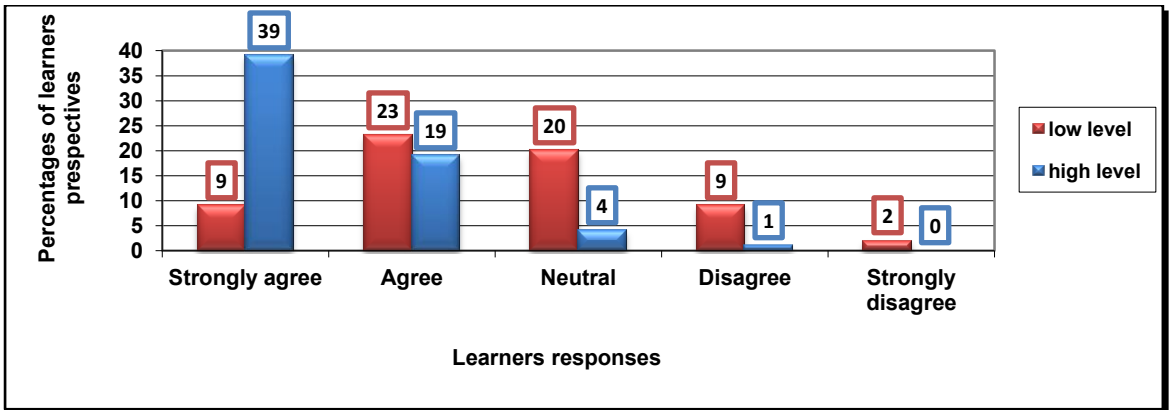


Figure 41: The level of groups' differences participants' positive items motivation perspectives.

Figure 42 highlights that the wiki course created a sense of online community between the teacher and learners by calculating the percentages of the negative statements through strongly disagree and disagree ranges where 40.54% of negatively agreed in high level setting versus 26.35% in low level setting on the motivation scale respectively.

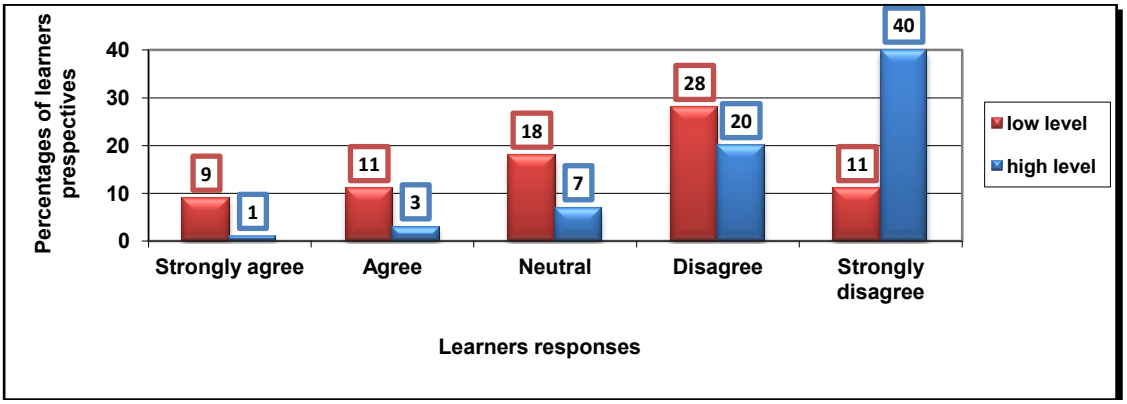


Figure 42: The level of groups' differences participants' negative items motivation perspectives.

Promoting wiki interaction

The teacher-learner interaction setting provided ample opportunities for learners to improve their communication and exchange interaction through some features facilitate the communication in the wiki course such as reducing anxiety via the items numbers (3, 5 and 7, 19) (the first numbers from the CCS and the others numbers from the ATLIS separated with "and"), decreasing perceived risks through the items numbers (9 and 11), and finally decreasing fearing failure through the items numbers (12 and 10, 16, 15), while measuring the

process of promoting the sense of creating online community via stimulating the students to express themselves through the items numbers (10, 18, 20), share ideas and thoughts (19 and 6, 13), however promoting reflection with the teacher and others peers through the items numbers (2, 7 and 2, 12). In fact, the overall majority of high level teacher-learners were motivated to write, and edit the collaborative writings.

4.6.6. The results of teacher-learner interaction scale

At the end of the study, and after finishing each group assignments, attitudes towards teacher-learner interaction scale was taken by every member of the study included 20 items. The means of the teacher-learner interaction scale of the negative and positive statements in both of control and training groups were as follows: The results showed that the control group scored (40.86) and (26.86) as means to the positive and negative aspects of learners' attitudes towards teacher-learner interaction statements respectively, while the training group scored (55.71) and (40.29) respectively to the same positive and negative statements in the same scale (see figure 43 & Appendix 8.20).

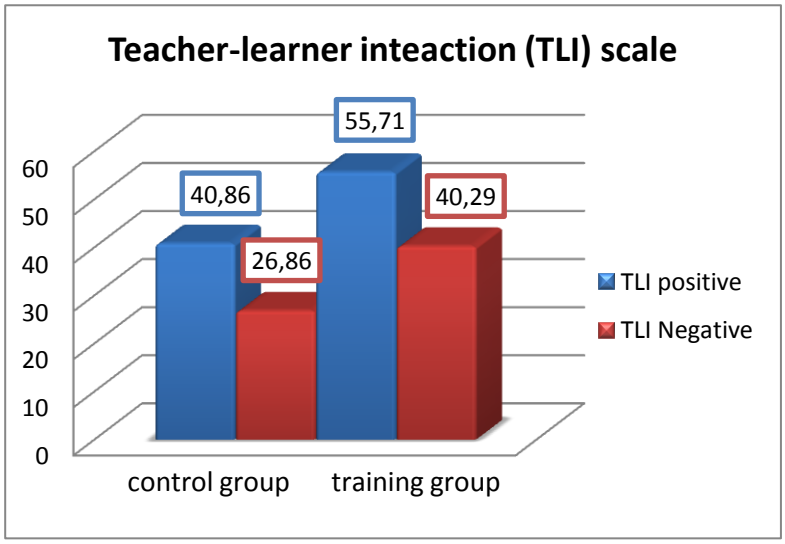


Figure 43: The mean of the teacher-learner interaction scale of the positive and negative statements.

Through comparing the average of the positivity and negative means of the two groups, the results can be addressed as follows: The training group scored (96) and the control group scored (67.71) as means to the whole teacher-learner interaction scale of the two groups (see figure 44).

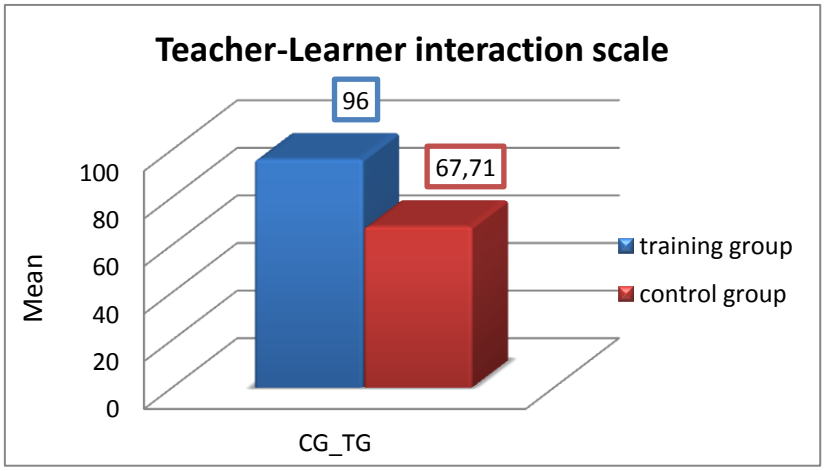


Figure 44: The mean of the whole teacher-learner interaction scale.

The results of the Mann-Whitney analysis test for the teacher-learner interaction scale represent that there were significant differences between the two groups in the positive statements (0.004) and in the negative statements (0.002) as shown in Appendix (8.30). Also there were significant differences between the two groups of the whole attitudes towards teacher-learner interaction scale with (0.003) level of significance (see table 27).

4.6.7. The content analysis results of teacher-learner interaction aspects

The results of content analysis tool through Maxqda software regarding the aspects of interaction represent that all the aspects of both of positive and negative attitudes towards content-learner interaction were approximately rounded the same ratio in the two groups. Both of the two groups scored 50% of positive attitudes' aspects towards the content-learner interaction and the two groups' results regarding the negative aspects were (42.9% versus 57.1%) to the training and control groups respectively. The results of teacher-learner interaction aspects in the learners' responses represent that participants of the control group scored 100% of negative attitudes towards teacher-learner interaction aspects. In contrast, the training group scored no negative attitudes towards the same aspect, while the two groups scored (82.2%) and (17.8%) to the training and control groups respectively as positive attitudes towards teacher-learner interaction aspect. The results of the content analysis tool represent also that, regarding the two groups' attitudes towards learner-learner interaction, the training group scored (81.3%) versus (18.7%) scored by the control group in the same aspect (see figure 45 & appendix (8.38)).

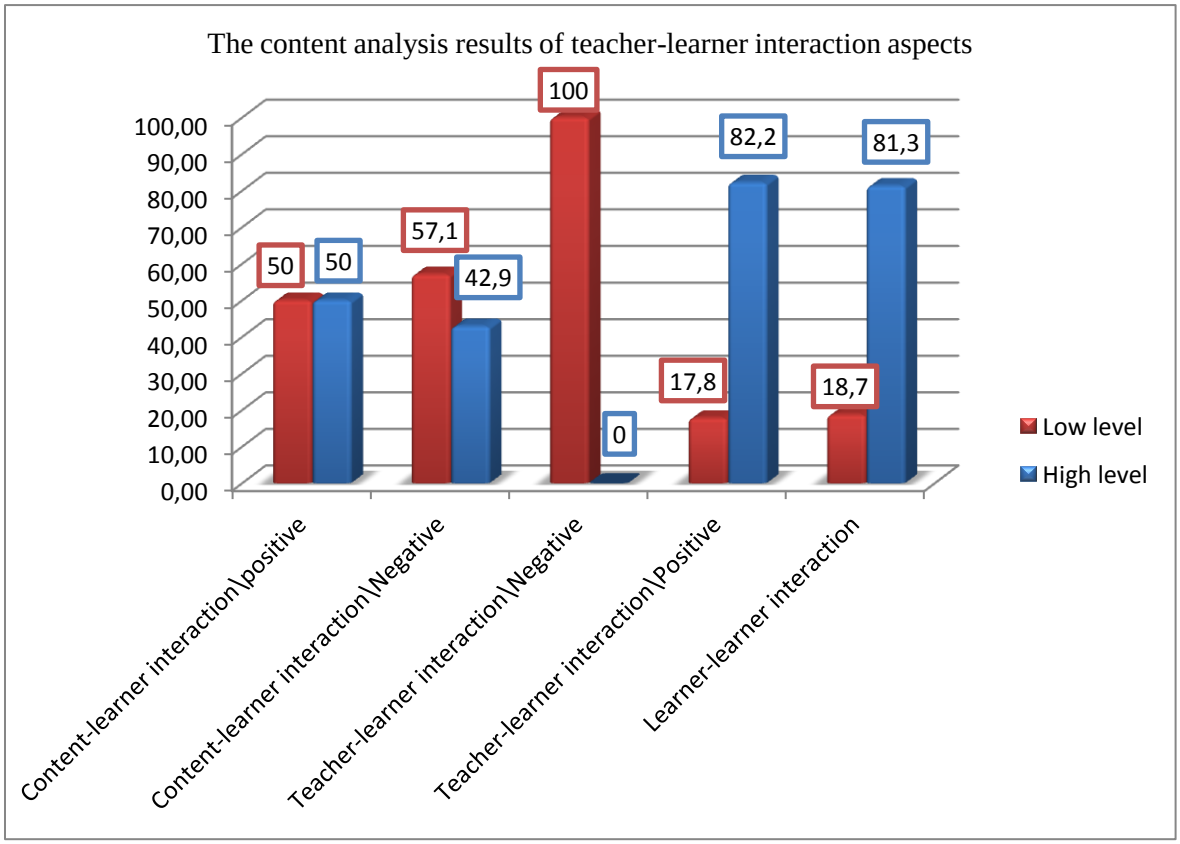


Figure 45: The content analysis results of the learners' attitudes towards the interaction.

Over all the results indicate significant differences in learners' attitudes towards teacher-learner interaction as well as the motivation survey and motivation scale to the high level teacher-learner interaction setting. From the above, it is clear that there are significant differences in the learners' attitudes towards teacher-learner interaction and their motivation between the two groups for the training group at the level of significance (0.003) in the teacher-learner interaction attitudes scale. This leads to the existence of statistically significant differences in attitudes towards teacher-learner interaction and learners' motivation. But there were no significant differences between the two groups in the averages of the learners' degrees in the pre-test. This leads to: there were no significant differences between the two groups in their prior knowledge before starting the experiment and this leads to '*There are significant differences in the features of learners' motivation, and attitudes towards the context of the Moodle course after the teacher-learner interaction at its two levels using wiki'.*

4.6.8. Summary

The results of the first question were as follows: The results of achievement test indicate that in the pre-test results there were no significant differences between the two groups, thus the two groups have the same prior knowledge about the course content and if there are differences in the post-test may be because the influence of the independent variable. After finishing the experiment, the achievement test is reapplied with the same 30-items form and the results of the post-test indicate that there were significant differences at .05 level of probability between the two groups, also the difference between two averages of improvement in each group performance indicate that the high level teacher-learner interaction setting is greater than the other setting with almost the double amount.

The results of the second question were as follows: The results of the first instrument of the study was regarding the satisfaction interview questions reported that, the ease of wiki in facilitating the interaction between the learners and their teacher was the same in two groups (low level and high level setting), may be because the experience of all the two groups members was quite low because most of them were new wiki users and to be engaged in this kind of social networking software is considered an interesting thing by all the members.

In addition, the results of the third question regarding the final product scale indicates that there were statistically significant differences between the two groups at level of significance (0.05) to the training group

The results of the fourth question were as follows: Responses of the low level setting learners' of the second question focused on the aspects of sending comments, edit the wiki and other peers respond to this kind of modifying the course content or answering this question or replying such comment. But the high level setting learners addressed the advantages of teacher-learner interaction which made their learning easier. The lack of teacher-learner interaction in the low level setting addressed as the most disadvantages of this setting. Learners in both groups valued the importance of teacher-learner interaction supporting learners and spending the teacher all the time supporting his/her learners with immediate feedback, answering their questions immediately, guiding their learning, correcting their concepts towards the content and monitoring their performance. Most of the two groups' members addressed receiving a huge number of e-mails as the greatest disadvantage of the interaction with the teacher through wiki where if anybody edits the wiki page or sends a comment, the entire group members were alerted with a notification e-mail of the modifications.

The high level teacher-learner interaction's learners were satisfied with the interaction; they felt that they were a family and the interaction promoted their group work sense. While the other setting reported that they hope to find more interaction with the teacher. Another satisfaction instrument has been applied in this study entitled "satisfaction survey." The results of the survey scored significant differences between the two groups, also online instructions themselves have their advantages which reduce the feeling of frustration and the fear of hurt.

In order to examine learners' connectedness and learning, the 20-items classroom community scale was used in the study and the results of CCL reported that there are significant differences. Generally saying, there are no significant differences in learners' experience of classroom community in the two methods of interaction to the high level setting.

The results of the study indicate that high level setting used the wiki editing function over twice times the other setting (224 versus 98). Although both of two groups made almost the same number of edits of high score (62 versus 58), high level setting members made several more edits than the low level setting in the other content and organization edits (see table 28).

The results of the fifth question were as follows:

Analysing the learners' attitudes towards teacher-learner interaction indicated significant differences between the two groups at the level .05 of significance. Overall there were significant differences in learners' attitudes towards teacher-learner interaction towards the high level setting.

Regarding the results of the motivation survey, there were four open-ended questions; the means results showed that there were significant differences between the two groups in the level of (0.008). As a result of the fifth question, learners in low level teacher-learner interaction setting reported that most of their comments were related to the poor interaction through this setting where most of the other group setting focuses on some technical problems, what means that the high level interaction setting were completely satisfied and motivated in their setting in contrast with the low level setting who were unsatisfied and less motivated.

5. Summary and discussion of results

Interaction is the core of the assignments in this study and the method being studied was participants' interaction with the teacher through web based-wiki software. This is a tool of collaborative and interactive software introduced in the 1990s and further developed largely through the open source software movement. The study was conducted with a sample of students, during winter semester 2010.

5.1. Discussion of research question results

In this research, the raw data was examined by systematically counting the frequency and the number of students' responses. To answer the research empirical inquiries, mixed approaches have been used by incorporating both the qualitative and quantitative data collected proceeding with the different analysis methodologies. For data generation, the following tools were utilized to assess the influence of interaction on learning outcome and learners' satisfaction; three standardized questionnaire, interviews, surveys, attitudes scale, product quality scale, content analysis tool and achievement test were all responded to through the wiki based learning environment.

The study questions were answered as follows:

Research questions from the first to the third inquired about the differences in achievement, satisfaction, and the quality of final product, between those using high level teacher-learner interaction setting as compared to those learning through low level teacher-learner interaction setting, meanwhile question four was conducted to determine the conditions that may benefit or hinder the collaboration do learners using wiki interaction assignments. Finally, the features of the learner's motivation, attitudes and prior knowledge towards the context of Moodle course were incorporated in the last question.

5.1.1. The first research question

Did the use of different levels of teacher-learner interaction influence the students' performance on Moodle course through social networking software wiki?

Understanding the determinants of test scores is essential to identify the causes and sources of differences in cognitive ability. Scores on the tests of learners' academic achievement are currently used in educational accountability systems in widely way. In this study, the results of the achievement test indicated that the differences between the pre and post-tests for each group, for both tests students, scored a considerably higher level in the

high level teacher-learner wiki-based interaction than the low level teacher-learner wiki-based interaction, Appendixes (8.21 & 8.22) indicate the differences between the groups.

The reasons that may explain scoring high level setting's higher scores than low level setting, can be explained highlighted by that the results of the pre-test for both of two groups which indicate that there was not crucial issue due to the prior knowledge between the two groups before starting the experiment assignments, where the Mann-Whitney test illustrated that there are no significant differences at a (0.5) level of probability between the two groups in the pre-test results (see Appendix 8.21).

While evaluating the post-test results produced by the two methods of interaction, the study indicated that the high level teacher-learner interaction group received higher scores than the low level teacher-learner interaction group; what means in other words, there were significant differences between the two groups due to the treatment method and this finding is consistent with much of the literature in educational technology.

Also the improvement and percentages (Appendix 8.23) presented that the differences between the two averages of improvement between the pre/post of the first group versus the second one may be doubled towards the training group.

Among the scores on the test, the differences within the groups reported that the major differences were to the high level setting group which ranges between 1 to 16 of both of the two groups, except two participants in low level setting and one participant in high level setting, it was statistically significant at (0.1) level of probability where most of the differences within groups did receive higher scores for training due to the nature of the multiple choice question. Another potential reason for both groups is the time limitation of the course which was quite short according to the circumstances of the experiment.

This result is consistent with the results of Swan (2001) that reported positively relationship between teacher-learner interaction and the performance of the learners of their achievement test and of course their grades on this test, where among students interacting with their teacher at differing perceived levels. Learners who reported low level teacher-learner interaction also reported the lowest levels of learning; in contrast, learners who reported high level teacher-learner interaction also reported higher levels of learning from their courses. Similarity attributed by (Fredericksen et al., 2000), learners who accomplished greater interaction with their peers and teacher in web-based environment achieved higher levels of learning outcome. The similarity reported by Richardson and Ting (1999) who reported that learners who learned through exchanged written asynchronous correspondence with the teacher were more concerned with the teacher feedback, whereas online learners felt

that all interactions with teachers mattered. Some other studies that also reported that the quality teacher-learner interaction in web-based environments were equal or better than in face-to-face setting (Lenhart et al., 2001b) and Picciano (1998) reported that in web-based learning teacher's activity was related to learners' perceived learning. In contrast, another approach of research adopts the idea of the absence of the teacher-learner interaction in the class that was happened in both traditional form and the online course settings as reported by Beard and Harper (2002). In the same direction some studies examined the influence of both traditional and web-based learning environments on learners' performance and reached that there were no significant differences between interactions quality of learners learning in both two environments (Thurmond et.al, 2002).

5.1.2. The second research question

Are there any differences in the quality of the learners' final product after wiki-based collaboration between different levels of teacher–learner interaction?

The study results in both two interaction methods indicated that, among the majority of the expert responses of the 25 items in the product scale section of criteria list; there were statistically significant differences between the two methods, as reported (see Appendix 8.27).

Most of the remaining items did receive higher scores for low level teacher-learner interaction than for high level teacher-learner interaction, where the items (1 and 2) scores in low level setting: Yes 14.3%, No 85.7% and Yes 0%, No 100%; and in high level setting: Yes 57.1%, No 42.9% and Yes 28.6%, No 71.4% respectively. As stated earlier, the majority of items percentages, except the following items:

Item number 4: where all low level setting participants scored No on this item (Yes 0% vs. 42.9% in high level setting), item number 7: where the opposite was found, all the high level setting participants scored Yes on this item (Yes 100% vs. 57.1% in low level setting), also item number (11and 16). All the low level setting members did not adjust a course start date or add any question to the course (Yes 0% vs. 14.3% in high level setting) and (Yes 0% vs. 28.6% in high level setting) respectively.

Another limitation observed in item number (19) presented that both of the two groups responded the same on this item because of the assessment of the expert about this point, but it would be clear if we consider that each new course in Moodle platform already contains asynchronous communication tool named "News Forum" or "Nachrichten Forum" and these readymade Forums were considered as an asynchronous communication tool in each

participant course. In the same direction the item number 24 where it may happen under the conditions of participating the course assignments from all the participants in both of the two groups (see Appendix 8.27)

5.1.3. The third research question

Did the use of different levels of teacher-learner interaction influence the students' satisfaction through social networking software wiki?

Learners' satisfaction was measured with highlights of the most frequented satisfaction aspects to wiki interaction between the teacher and the learner, which can be discussed via the participants' responses on the satisfaction interview and on the satisfaction survey after a qualitative analysis process using Maxqda software

Most of the high level teacher-learner interaction group members were satisfied with the quality of interaction that they received in the wiki course as excellent. Their expectations for interaction were generally met through four types of interaction offered in this course (wiki page text area, discussion forum via Moodle, add/reply comment function, and online chat sessions via Skype). They were most satisfied with the time that they spent sharing and participating in chatting sessions. However, they valued knowledge and responses to questions posed through comments as well as on the discussion forum.

Because wiki based learning was familiar to participants, where it looks like what they had experienced in their traditional classrooms and educational situations, and as reported in the study results, participants with the high level teacher learner interaction treatment were more acclimated with their learning. Some of the main aspects of satisfaction identified by the participants in the satisfaction survey were as follows:

Descriptive statistical analysis of the satisfaction survey administered to learners at the conclusion of the course provided quantitative data regarding students' satisfaction. The results of the satisfaction survey indicated significantly lower scores for wiki satisfaction if the means of satisfaction survey of both of two methods were compared. There are significant differences in the Mann-Whitney test results in the level of (0.01) between the two groups towards the training group.

This finding, if compared to the research in satisfaction in online learning, can be explained as follows: Studies of online programs further pointed to a number of issues that, if addressed, learner satisfaction will be fostered; these issues included timely, helpful communication and interaction with the teacher; clear instructions regarding course expectations; and learner assignments and requirements. The course of the study received

weaker evaluations with respect to timely. This may be due to circumstances of the course participants, regarding to the helpful interaction with the teacher with its two sub levels, was the core of the study.

Learners may need to be culture exchanged to the conception of teacher-learner interaction and self learning moderated by the teacher, where learners may find online courses offer more reinforcement educational experience. Because of the lack of face-to-face interaction and the geographic separation between the student and teacher, the need high level interaction becomes more important activity that supports learners' learning. The results of this study received relatively stronger interaction with respect to the treatment, data from the research in educational technology suggested that clarity of learner expectations, assignments, and requirements is important to online learners.

These results are consistent with the results of Aase (2000) that reported that learners through web-based learning environment enjoyed the interaction more from their teacher and peers. The similarity reported by Larson and Keiper (2002) where learners participated more in web-based environment discussion sessions than without prior experience in participating such discussion sessions in traditional environments. The similarity reported by Swan (2001) teacher-learner interaction was indeed strongly related to learner's satisfaction and their perceived learning, among students interacting with their teacher at differing perceived levels. Learners who reported low levels teacher-learner interaction also reported the lowest levels of satisfaction with their courses, while learners who reported high level teacher-learner interaction also reported higher levels of satisfaction with their courses. In contrast, Thurmond et al. (2002) that reported less satisfaction by learners who were required to participate in online collaborative work group as a result of completing the requested online assignments through lack of real life interaction opportunities.

5.1.4. The fourth research question

What are the conditions that benefit or hinder collaboration of learners when using wiki interaction assignments?

The most frequented aspects that benefit or hinder wiki collaboration between the teacher and the learner can be discussed via results of the content analysis tool and the participants' responses to the classroom community scale and on survey scale as follows:

Conditions that benefit collaboration of learners when using wiki interaction assignments:

The results of the interview responses expressed by the learners of high level setting indicates that as one participant noted *the interaction using wiki was relatively easy (Participant 14),*

another one stated, *it was a very easy site to handle and work with group (Participant 3), participants could easily explore their viewpoints where each one can change the other's viewpoints* as noted by participant 2. The interaction between the participants has been changed to be much easier and more co-operative, through the wiki assignments; wiki allows participants to be able to share their opinions, send their own ideas to all members in the wiki community and receive their ideas and comments. Finally, participants considered wiki as an effective method and fast way to get a contact with the teacher and with their colleagues where the ability to reply to a certain person you want and getting feedback from the wiki group members about their ideas was already existed (see the interview questions).

Conditions that hinder collaboration do learners when using wiki interaction assignments:

There were several common themes in results expressed by the learners of low level setting indicate that: the wiki was not as familiar way of learning as face-to-face collaboration according to the learners responses. Additionally, through the wiki assignments a huge number of e-mails had been sent by such participant to the others in both of the two wiki groups, which frustrated all the participants in the same group. Some participants addressed this as one of the disadvantages to low setting. The lack of chat sessions or synchronous discussion to interact more with the teacher and to work with their colleagues in their group and exchange knowledge, the interaction between learners and the teacher was weak; there were delays in teacher responses, as the low level setting members stated. They were waiting for more supports and provide from the teacher, changing of their opinions by the others with wrong data was something bad, from their points of view.

The results of the classroom community scale indicate that the participants experienced higher levels of both learning and a sense of community in the high level teacher learner interaction group than in low level teacher learner interaction group.

Overall, the differences between two treatments in the connectivity and learning subscales had statistically significant differences between the two methods.

As noted above, wiki-based interaction was a new tool of interaction for all of the participants in this study. Because of the limited duration of the study, the participants had to change from the wiki community-as a new method and the core of interaction in the study-to the Moodle platform to apply the assignments. In their survey and interview responses, some participants in low level setting stated that, I *expected there are more meetings at least once a day to give answers and explanations (participant 4),* another one stated that *face-to-face programs are much better than the e-learning programs because the interactions using face-*

to-face programs are much easier and quicker (participant5). All of these problems they experienced could be solved when new wiki users became more familiar with working with wiki environment.

The results of the content analysis tool indicated that high level setting had two times more twice edits on the wiki course than low level setting, where both of the two groups participations were (561), high level setting accomplished (446) and (115) participations were the value of low level setting participations, with the percentages distributed as follows: the online interaction of the control group comparing to the training group were (12.8%, 1.8%, 5.5%, 0%, and 0.35%) versus (46%,81.1%, 19.3%, 1.8% and 3.9%) respectively scored to the training group regarding the whole number of online interaction aspects. According to the results of the content analysis tool, there were differences between the two groups in the feature of online interaction through the wiki community due to treatment method.

Taken as a whole, in spite of the difficulties of wiki based interaction expressed by the learners, with high level teacher learner interaction, suitable learning duration and rapidly attention with wiki based learning and being more familiar with it, learners are likely to find that wiki provide a powerful tool to organize documents and learning procedures under the condition of the teacher learning interaction.

The result of this study is consistent with the results of Minocha and Thomas (2007), which reported that to accomplish an effective collaboration through wiki networking social software both providing a clear discussion function and also engaging learners in contextualized social learning activities are required and teacher is a member of this social context.

5.1.5. The fifth research question

What are the features of the learner's motivation, attitudes and prior knowledge towards the context of Moodle course after the teacher–learner interaction (with its two levels) setting using wiki?

Answering this question can be dealt with the results of three tools to explain the features of learner's motivation, attitudes and prior knowledge. These tools are the classroom community scale, teacher-learner interaction scale and the pre-test respectively.

The results of the motivation scale indicated higher scores for high level compared to low level teacher-learner interaction on two of three general group interaction items measured in the survey, "…how effectively do you believe the members of your small group interacted with each other or with the teacher on the assignments? (On a scale of 1 to 5)", and "…how

effectively do you feel you interacted with the other peers and/or teacher in your group' assignments? (On a scale of 1 to 5)". Regardless of the delayed asynchronous nature of interaction in wiki based learning environment, it can be expected that the learners were motivated about the teacher learner-interaction through wiki based learning environment regarding the motivation scale results (see Appendix 8.6).

Participant perspectives of Motivation towards interactions and creating sense of online community

Before creating online courses, teachers should take into account one of the most important factors affects all learning situations, either face-to-face or online, namely motivation. It encourages learners' participation and creates opportunities for all learners to interact and communicate in online learning environment. Motivation can foster positive learner attitudes towards the educational experience and increase learner engagement through learning situation. The results of this study reported that the motivation features scale the means results showed that there were significant differences between the two groups in the level of (0.008).

The sense of community between the teacher and learners and among learners themselves has been created via the wiki online course, as a result of motivating the learner's participation and interaction in wiki based learning setting.

Attitudes towards teacher-learner interaction:

Teachers should deeply understand the cultural and cognitive backgrounds of their learners before positive attitudes towards teacher-learner interaction through wiki can be cultivated. In their responses of the teacher-learner interaction scale, high level setting received higher scores than low level setting for their responses on the attitudes towards teacher-learner interaction scale, even though participants were randomly assigned to the two groups. The results reported that there were significant differences between methods in the teacher-learner interaction scale at a (0.05) level of significance towards the training group.

As stated before, wiki based learning environment is a new trend and way for learning interaction for all the participants in the study. Due to the limitation of time for the study, as a result of some of the sample group's personal circumstances, participants moved from one method of interaction through one online social networking software (while working through wiki to the other method through formal online academic learning management system while applying the assignments in Moodle platform.

Another reason for the attitudes towards teacher-learner interaction via wiki is that not all the participants have the same cultural and cognitive background. Taking participants' cultural backgrounds into account prior to the introduction of wiki based learning environment is critical issue. Because of the variety of the participants' cultural backgrounds, teachers should not assume that all participants from different cultural backgrounds will have the same attitudes toward wiki interaction.

Prior knowledge:

The prior knowledge is the knowledge that derived from previous experience or background by the learners. The differences in the prior knowledge between the participants before applying the treatment can be explained by browsing the results of the pre-test of both of the two groups.

The pre-test was used to determine the cognitive background of the study sample towards the course content. The results indicated that there is no statistically significant difference at a (0.05) level of probability between the two groups before applying the independent variable (see Appendix 8.21).

In pursuit of beneficial potential of wiki during the course assignments, such a wiki page had been established titled with "Glossaries" and has been used by the learners in order to allow them to reflect their learning using the course content to build a list of the wiki course terms, so that they were familiar with terminology of the course content (see figures 18 and 19), after that this knowledge has been used as a prior knowledge to build the new cognitive structure by the participants towards the course content. It is recommended to provide learners with articles, external websites, and power Point slide presentations etc. at the beginning of the course, which can be delivered via the internet and downloaded by learners to support this kind of knowledge construction.

The results of this study was consistent with the result of Swan (2001) who reported that learners who do not have adequate access to their teacher feel they learn less and are less satisfied with their courses.

5.1.5.1. Learning interaction and wiki

Because of the influence of their cultural perceptions regulates their interaction, learners from different cultural backgrounds may interact differently in wiki based learning environments. Wiki as a web 2.0 technology tool is the core grounded in social and cultural aspects to support learning because it facilitates learning through social interaction, which includes

creating, editing, collaborating, and synthesizing multiple ideas. Social aspects in this kind of social software should be accentuated to maximize social interaction in wiki activities by understanding and examining learners' attitudes toward learning interaction in wiki environments.

As reported in participants' written survey responses and their answers to the interview questions, all the study members used the wiki environment as a web-based learning environment where each member posted his/her ideas and comments to the group members and all of them have the ability to respond his/her text. At the same time each of them is requested to use Moodle platform to apply the assignments after finishing each assignment. Where all the changes of the course content through wiki consisted of the group members' posts rounded the course topics. After finishing each session through the wiki community, the group members were requested to do the assignments through Moodle platform, at first using one course, where each group has its own course on Moodle platform with the name of each group (Moodletg1 for the low level setting group and Moodletg2 to the high level setting one). All the members of each group were requested to apply the assignments in this course, and after finishing these tries, they were requested to go to their own courses (each participant had his own course with his name). All the participants were asked to start building their own course through this course, using their own structure after answering of each assignment with their group and through the level of teacher-learner interaction.

Some participants reported that some of the assignments were boring and repetitive and required more time. The reason for this was, when the participants were required to do the assignment of such skill in Moodle learning management system, they should firstly add an activity or a resource to the course area, then they were required to follow the same sequence to add these activities and recourses (e.g. if they were required to insert a label, they should turn editing on, click the "add a resource" drop down window to select the sub menu item "Insert a Label" then set the resource settings. The same should happen if they required adding "Compose a text page" resource; they should follow the same procedures…etc.).

Wikis generally have a history function, allowing wiki pages and documents to be easily examined the previous posts to allow users or specially moderators to return to earlier versions in case errors have been made. The history function allows the teachers to get valuable information about the learning process, e.g. by observing who is active and when, how many are active. This function basically saves all previous versions or modifications of any single page. Here, it is possible to exactly track the editing process of an article, since all

changes have been documented. It also allows a previous version to be opened and saved again, in order to restore the original content. The wiki history function indicated for each group that there were very little interactions among learners, as reported by the expert who analyzed the final product of each participant, participants used a lot of copy and paste approaches to participate through wiki on both of the high and low level teacher learner interaction assignments. Most of the edits of both groups were subject to their skills and writing speed, and most of the participants complained that the writing and thinking processes took a long time. In fact, participants were reluctant and less motivated to write and edit the collaborative writings parts of the content, even if perceived learning and actual learning knowledge and skills improved. As reported earlier they complained from the condition of writing and how they were frustrated when their work has been edited, they should bridge this gap. In the same direction new wiki users need enough time to share ideas, edit the wiki page, and exchange their knowledge.

Wikis core fundamental principles are, anyone can change anything and the wiki content means: ego-less, time-less, and never finished, with open editing principle, a page have multiple contributors and participants, the simplicity of wiki syntax compared to the skills needed to create a typical website allowed students to spend more time developing the content of the wiki course, write, revise and submit an assignment have been easy for learners by wiki, so the teacher and the learner's peers were able to comment on the course edits and offer suggestions, group authoring and track the group work, of all that described earlier are useful for the group interaction in variety of situations.

Increasing interaction between teachers and learners is a critical issue to help the learners accomplish their learning aims and obtain learning outcome. Although wiki can be easily edited by anyone who is allowed access e.g. new wiki users, learner and even teachers, all of these wiki users should know deeply how can they use wiki in interactively way. There were a lot of levels of wiki users contributed with Administrator, Editor, Writer, Reader, and Page-level only, two main levels of users in wiki can be categorized as, Normal uses and Administrators. Normal users or learners who had the ability to add, edit, move and rename pages, upload files etc., while administrators or teachers who had the responsibilities to add/ban users by username or IP address, to protect pages from editing, delete and undelete pages, edit protected pages, etc.

Electronic collaboration features according to Frederick et al. (1999) through the course were as follows: participants were divided into two separated discussion groups each one focused around a topic or specific activity, goal, project or assignment related to the

course content. Both used a moderator or group leader to guide the discussion by tutoring, filtering and posing questions, and/or making comments, suggestions and connections. Users contributed data to share content parts, exchanged knowledge through asking questions and reply the others comments. Participants with the setting of high level teacher-learner interaction interacted via synchronous communication activities such as internet chatting sessions via Skype's online chatting function, or via asynchronous communication activities through posting directly on the wiki page etc., by these features participants were allowed to discuss ideas, debate problems, and share information electronically whenever and from wherever they want. All the wiki users should attend a lot of wiki sessions and wiki projects to learn more about how they can deal with wiki.

The learners should try to learn and participate with non limited time wiki sessions; join additional projects that support content sharing, collaborative and interactive situations among their peers and between them and their teachers or moderators. They should be aware that their participation is very important and valuable and to have qualified writing skills. The results of this study reflected a lack of writing skills the learners already had, resulting in them being unable to express themselves as they intended.

Another way to enhance or improve the interaction with wiki in online learning setting is to use wiki potential capabilities as following, while writing area was seen as a primary means of communication, learners reported that the online chat sessions and discussion forums were a key to promoting both of learner-learner and teacher-learner interaction and sharing of ideas. Teachers need to improve their communication skills and be more familiar with wiki features, ways and methods to make the learners more interactive and to drive the online course specially the wiki environments to achieve the best outcome and satisfaction from the learners. They should attempt to engage learners in dialogues, discussions and debates rather than serving direct answers to questions. Additionally, adding appropriate questions and assignments more related to the wiki page idea and suitable to the duration of the skill, all these features may enrich the interaction through the wiki course. Taken as whole, another way may serve to stimulate learning interaction, through biographical information area or pages, can be provided by the teacher to be filled out, so peers can learn more about each other's interests and or about their teacher, with this setting teacher-learner interaction may be increased.

The majority of participants in this study stated that learning how to use the online wiki software was not difficult. A networked writing program such as wiki provides a unique platform for collaborative writing. Learners can write for real audiences who respond

instantly and who participate in a collective writing activity. Simulations can make learning meaningful by situating something to be learned in the context of a "real world" activity. Moreover, learners need some skills to be ready to use web 2.0 technology tools in general and to use wiki in narrow view, they need sufficient training in and experience with the advantages of synchronous and asynchronous teacher-learner interactions to enhance and improve their learning; they should be encouraged to take perceived risks when posting questions and or comments on the wiki writing area and to explore more creative discussion with their peers and teacher.

Because of the nature of wiki community as explained above, the wiki community has been built under the conditions of the learners' prior knowledge of word processing and online communications skills. All of the participants were aware of how to use wiki and how to make all the font formats, what are the functions of wiki tool bar and buttons. As one participant wrote, *wiki design is very organized and the facilities are very easy to use it (participant 9),* also other participants stated: *For the first time the wiki course was difficult, but after training it was easy (participant 1),* at *first, it was not easy to understand but after, that I realize that it was not so complicated (participant 13), the wiki was not so much complex firstly it needs only to spend some time to work on it and to know different functions then working with wiki became more easy (participant 4),* and *"…these problems and challenges were just in the first week of the course"* said (participant 12).

The difficulties of using wiki were expressed in the method of interaction through wiki community and its own features, the fear of editing the work of others, and a slight feeling of isolation through the course where one participant wrote, *Face-to-face programs are much better than the e-learning programs because the interactions using face-to-face programs are much easier and quicker. (Participant 5)* However, and concerning to the results of the study, by continuous training by the learners on wiki sessions and deeply understand of wiki capabilities and potential features, providing enough time, more clear course expectations and deadlines to develop and complete wiki assignments, regarding to the difficulty of dealing with wiki features and its own design and structure, one participant wrote, *…the Edit button was not easy to be used especially if you want to edit or change an idea or to add some ideas or to wrote something, then you have to click the button (the Edit button). I mean to go out of the main page and then to use the scroll bar and search where I want to edit something, it takes a little time and make some difficulties (participant 12).*

Concerning the difficulty of editing others work's fear, and as one participant wrote, *the page history also disturbed me, because any time anyone could change my editing to the*

page to the last one before, that was not very good (participant 14). While about the method of wiki interaction one participant stated: *when somebody works in a skill, and I am working in another skill then, it is a little difficult to go back or to jump to the other skill and read about it of course at first and to share idea or to edit or to correct, add some information, that of course take a lot of time that I can use it to learn what I want to learn actually (participant 12).* About the time limitation of the study, one participant wrote: *The main* disadvantages *of the wiki are that I have not a lot of time (participant 10).* Through these methods, participants may accomplish more success in learning using wiki community and can also bridge the gap resulting from slight isolation that might occur in the first experience with a wiki based learning situations. Overall, both the study's participants preferred or would like to be engaged into high level teacher learner interaction situation rather than low level teacher learner interaction, with one participant indicated: *…if we added the spirit of face-to-face interaction to the e-learning programs, it would be much better" (participant 5).* Another factor is the fear of change, as one participant wrote earlier (participant 14) while exploring the difficulty of the fear of editing the work of others.

All the participants in this course were volunteers and they were facing deadlines in their own studies in addition to participation in the course, share their ideas, edit the wiki page, do the assignments and build the final product course through Moodle learning management system platform. Participants were students in the university, either juniors or seniors, either graduated or will be graduating, they were engaged in their social activities and daily life interaction with their peers, colleagues and even their supervisors, so they were familiar with the concept of interaction among themselves and between them and their teacher through the traditional learning situations. None of them had any experience with the interaction through wiki based learning. As reported in the study results, after their participation through the wiki course, participants expressed preference towards the teacher learner interaction settings is a positive indication for the future use of wiki based interaction in learning situations.

5.2. Limitations of the study

The main limitations of the study can be explained in the highlight of describing the sample limitations. Participants in this study were divided into two groups, participants in each subgroup were randomly assigned to one of the study groups so that both two groups were comparable and both of the two groups did not have prior experience about interaction through wiki based learning situations, and neither attend nor developed skills nor

implemented wiki sessions before engaging via the study course. The study was designed to compare the results of two different levels of teacher-learner interaction, high level versus low level teacher-learner interaction through wiki online software. The results however, indicated that high level setting scored higher scores in achievement, satisfaction, the quality of the final product (the courses that has been built by the participants after finishing the course assignments), more posting, edits and comments have been posted by high level setting, and the groups' members indicated positive attitudes towards high level teacher-learner interaction.

As reported above, genders were relatively equivalent between the two groups, but there were noticeable differences in academic class levels (seniors and juniors, in-service and pre-service). The study was carried out from 1st of November and continued over a three-week period. Each group spent all the duration of the study working on their own group, to improve the course content, using the course resources, applying the course assignments partially and collaboratively with their peers, finally each participant was informed to build his/her own course through Moodle platform.

Although there were unexpected delays in institutional approval of the students' access activation who were not in Potsdam University - to allow the students to use the Moodle platform of the university, they should have permission from the university to log on Moodle and use the platform to use courses and accordingly build their own courses-, although complications have been stated earlier, the course started on its determined time, where the first days of the course have been imposed to discuss the idea of how to use wiki (it was one of the course units but the extent of participants' use of this unit was not measured in this study, it was not measurable in the course results). The researcher provided a long enough period of time to make the personal interviews for all members of the two groups because of the minimal number of participants in the course; all of them submitted responses in recorded interviews to all of the interview questions.

One of the most important complications that was noticed through the study was the absence of a clear and specific definition of "interaction" in participants' perception. Rather than "online chatting" and immediate feedback approach of participants, contributions have been noticed in the participants' responses in the study tools trying to defining or even referring to the process has been occurred between them and the teacher of the course. Concerning the small size of the sample, the researcher used a lot of tools to get appropriate data to support the study results. Furthermore, because of being the course teacher and researcher in the same time, my presence and procedure might have biased the study towards

the treatment. However, for data collection purposes other experts helped the researcher to administer the instruments and the wiki community itself. Another complication was the circumstances of the sample; where all of them were volunteers and each one had his / her own work, so the time limitations and the lack of the course members were the most difficulties that challenged the study.

5.3. Additional recommendations for future research

It is important to note that the present study was not aimed at advancing a general theory of how technology supports interaction, but rather at exploring how different levels of interactions under the condition of collaborative learning strategies arrangements may affect learners' learning and satisfaction in social networking software environments. Therefore, the conclusions should be limited to the particular characteristics and affordances that these learning environments offer learner and groups of learners. In addition, the experimental nature of this study presents the following limitations to some conditions for effective teacher learner interaction. First, research in interactive learning suggests that, to promote the probability of meaningful and rich interactions, interactive learning groups should encourage learners to interact with their interface, peers, teacher, and also they may interact with the content itself (Rhode, 2009; Ehrlich, 2002; Navarro & Shoemaker, 2000; Rovai, 2002; Swan, 2001). Because the participants of this study had to be randomly assigned to the groups, the possibility of manipulating the heterogeneity of the members was not possible.

Because the effectiveness of interactive learning activities also depends on the quality of teacher-learner interactions and social skills displayed during learning (Thurmond & Wambach, 2004; Jiang & Ting, 2000; Faux & Black-Hughes, 2000; Aase, 2000; Fredericksen et al., 2000) an additional limitation is that learners were not given interactive or communication skills' training before participating in the study. This shortcoming combined with the limited period of time of the study may help explain why the two experimental groups in general did not achieved high level of interaction in the course.

Future researches should examine the extent to which the different interaction levels observed in this study are the result of learners' lack of working experience with the wiki.

Our findings also suggest that the present study could be strengthened by ensuring that students have sufficient experience and skills to successfully learn with others through social networking software. Researchers need to continue investigating the effect of interactions in wiki-based courses and future studies in the teacher-learner interaction topic should include mixed, quantitative and qualitative methods and continue examining the process of wiki

interaction for online courses from social and cultural aspects. Additionally, the future studies should be conducted with a larger sample size so that the results can be generalized.

It would be interesting to study in the direction of qualitative research that focuses on the interactions of the participants in these wikis-based learning environments. Another area to investigate is a comparative research study which should be conducted according to differences in use and effectiveness of wiki functionality placed in learning management systems (e.g. Moodle) versus the same functionality located in an online social software (e.g. Facebook).

Wiki is considered social software; and it would be useful to study its social aspects to maximize social interaction quality in wiki activities by deep understanding and examining students' attitudes toward interactive learning situations in wiki based learning environment. The activity that has been designed in the course might be was to some extent academic-oriented, so it would be useful to study the effectiveness of wiki in the fields that enrich writing skills specifically in language learning.

Finally, research in, and implementation of, interactive tools such as wikis should be done with paying attention to the amount of time spent interacting with the course content. Furthermore, a sufficient duration should be included for participants to become more familiar with the interaction through wiki and with the features of the wiki community itself.

6. Summary and conclusion

Although specific wikis software may be replaced in coming years by new applications, the interaction experience they provide will continue to be more beneficial to users and institutions. Recent research in wiki web-based learning and learning interaction has focused on the attributes of interaction among learners and between teacher and learner, where the literature in this field ensure the importance of this type of interaction and the results of this study to some extent consistent with this literature.

The concept of the teacher-learner interaction in online education is quite new, and at the same time has its own potential importance supporting leaning situation in both of face-to-face or online. The challenge lies in the new role of teacher and learner where the new role of the teacher implies greater sensitivity and ability to deal with issues such as individual differences, characteristics of learners and interaction through wiki based learning. Knowledge society policies should work on a large scale of lifelong learning activities for building new competencies of teachers, learners and all citizens (Nikolov, 2011, p. 55).

Teachers should take into account the cognitive and cultural backgrounds of their learners before positive interaction between teacher and learners through wiki can be cultivated. They should support their experience with more wiki sessions and courses and should be up to date with the new features of this trend. Learners should also be prepared to engage this tool of social networking to serve it in their learning as well as their using in their day life use like Facebook, MySpace, etc. or any other social software. This engaging include familiarizing oneself with the wiki process, understanding of the value of wiki interaction, facilitating positive social relationships and giving sufficient time to do the assignments. Dealing with the human beings challenged with a lot of intervention variables, so, it would be good if the teacher lets some restricted participations through the online course that may benefit the learners and support their learning.

The current study reported that learners who learned with the high level of teacher-learner interaction approach perceived the learning experience as more interesting than those who learned with low level setting. This finding is consistent with the literature comparing correlations between teacher-learner interactions and learners performance and with current efforts in preferring learning or enjoying learning interaction environments for school and online learning (Jiang & Ting, 2000; Faux & Black-Hughes, 2000; Fredericksen et al., 2000).

The finding that the high level teacher-learner interaction group gave higher achievement ratings than the low level teacher-interaction group supports Hypothesis 1. On the other hand, although the high level teacher-learner interaction group outperformed the low one on the post-test, the results of the pre-test produced comparable rating scores. This finding fails to support a part of Hypothesis 5 in the point of differences in the prior knowledge between the two groups. Furthermore, it runs at odds with the small learning advantage found in past research for learning in small groups under the condition of teacher-learner interaction (Lenhart et al. 2001b; Ehrlich, 2002).

The second hypothesis is that there are significant differences in the quality of the final product of the context of the Moodle course through high level teacher–learner interaction as compared to those learning through low level teacher–learner interaction setting using wiki. We asked learners who learned in both two groups to self- build their online courses to act as a final product. It is important to say that another expert analyze the courses of the experiment sample in order to judge the quality of all these course regarding some criteria prior to the statistical analysis session that followed. For instance, several studies have shown that interaction with the teacher improves the outcome of learning process where the quality of final product is referring to deepen learners' understanding (Thurmond &

Wambach, 2004; Murphy & Cifuentes, 2001). Additional research is needed to test this hypothesis by investigating whether the superiority of the final product scale of each group members over individual performance is more pronounced when there is no intervention of the nature program of online courses.

A third hypothesis is that the interaction that presented by the high level teacher-learner interaction group may have shadowed the benefits of learners' satisfaction by increasing the need to rely on peer discussions, and the teacher is one of these peers to construct knowledge together. Research shows that the amount of feedback available in instructional programs can moderate the effects of social interactions on learners' satisfaction (Barkley et al., 2005; Augar et al., 2004a; Baker, 1995; Thurmond et al., 2002; Leong, Ho, & Saromines-Ganne, 2002; Soon et al., 2000).

As predicted by Hypothesis 4, learners in wiki groups perceived higher collaboration during the learning experience than blocking it. However, both of the two groups were less able to transfer what they learned together to create substantive answers, or more contextualized phrases, or a lot of meaningful phrases. This suggests that social networking software may not be an effective approach to scientific contents learning such as learning management systems Moodle as applied in this study, and it may be more effective in language learning. Nevertheless, this conclusion should be approached with caution because the social networking social software, especially wiki method, is likely to be as widely used as the interactive method in the next few years.

Although no data was collected from the participants in this regard, the researcher reported that learners regularly engaged in high level teacher-learner interaction setting and achieved high performance, but had no experience working with the wiki method like the other group members. The effects of interactive learning are significantly more positive when learners have group work experience or instruction.

Perhaps the lower interaction aspects that noticed by the researcher on both two groups should be interpreted as reflecting students' best attempts to interact productively with a new and unfamiliar method, in addition to the experiment circumstances of time and sample number.

However, the analysis of learners' interaction offers alternative interpretations for the lower interaction aspects scores of the wiki two groups. First, the social networking software, especially wiki approach, promoted a relatively larger number of elaboration statements as collaborative tools. This finding indicates that the wiki participants focused more on

transmitting and receiving information and regulating their progress towards the learning goals than on elaborating on the instructional materials.

Because each group member had developed expertise in only one topic, it is likely that students were more aware of their need to evaluate and regulate learning during cooperation to achieve the goal of learning about all topics.

Finally, the analysis of learners' interactions indicated that the high level teacher-learner interaction group setting produced relatively more consensual interactions than the high level setting group. The predominance of consensual interactions during high level teacher-learner interaction seems to emphases the idea that this interactive learning approach promoted knowledge co-construction rather than knowledge transmission among group members.

What we found in our evaluation of the fifth hypothesis, which concerns learners' motivation, attitudes, and prior knowledge, is that it is necessary to focus learning more on fundamental concepts and basic competencies in order to address, constructive, essential, problem-based, and cumulative learning activity. The first aspect of prerequisites and prior knowledge has been discussed above while the interpretation of the first hypothesis. Therefore, we need more elaborations to address learning aspects such as motivation. We should also pay more attention to individual's attitudes. The teacher organizes the online course, sets up the content, and invites the participants. The teacher hoped for small working groups (six to eight collaborating persons organized by him). Interaction in the two groups has accomplished significant differences in the aspect of learners' motivation towards the high level teacher-learner interaction group setting versus the other group setting, and this finding is consistent with the literature in the field as reported in (Harding et al., 2007; Byers, 2000; Miner, 2003; Riccomini, 2002). Also the attitudes towards teacher-learner interaction scored significant differences towards teacher-learner interaction setting versus the other group setting and this finding is consistent with the literature in the field as reported in Fraser et al. (2010) and Maulana et al. (2011).

7. References

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8. Appendixes

8.1. Experts' letter

Dear Sir/Madam,

I am a PhD. Student at Potsdam University and would like to conduct a research project in the faculty of Education. The title of this research project is:

"SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION
INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION"

Therefore this objectives list has been produced to help inform the development of the main objectives of the wiki course. It is divided into two main parts:

1- General objectives.
2- Educational objectives.

It would be my pleasure to review the attached list. This invites you to express your level of agreement with each item as an appropriate objective for such a course. You will find a space at the end of each part to write any comments and/or any suggestions.

- Please, rate the level of representation with regard to research aims being measured on a scale from 1 to 4, with 4 is the most representative value.
- Please record the clarity level of each item, as well as on a scale of four points.
- Please, evaluate the level and clarity of the instructions to the participants, on the scale of the four points.

Thanks for your valuable time and if you need further information, you can contact me at any time.

My best regards,

Ibrahim Agamy
PhD. student, Faculty of Education
Potsdam University
Universitätskomplex II Golm, Haus 9, Zi. 1.16
Karl-Liebknecht-Straße 24-25
14476 Potsdam

E-mail: agamy@uni-potsdam.de

Name:

Position:

Institution:

E-mail:

Address (optional):

Tel. (optional):

Background context to the study:

This research aims to attain the following objectives:

- To investigate the influence of wiki in knowledge construction concerning "Moodle" course, this investigation involves determining the main objectives for learning, the basic knowledge and skills that are prerequisites for teachers to be able to build a course using such a learning platform.
- To investigate the impact of the high level teacher-learner interaction on learners' achievement in online courses using wiki as a web 2.0 tool.
- To investigate the impact of the high level teacher-learner interaction on learners' Satisfaction in online courses using wiki as a web 2.0 tool.
- To design a constructivist learning environment to represent the Moodle course for pre-service teachers.
- The wiki platform will be built in highlight with the characteristics of constructivist collaborative learning environment and concerning the independent variables in the research the teacher-learner interaction with its two levels, so forth, and a constructivist learning environment aims to provide interesting, relevant, and engaging topics. Therefore, the topics should not be overly prescribed so that some aspects of the content are emergent and definable by the learner.
- To implement Moodle course using collaborative learning environment with its opportunities to facilitate Knowledge construction.
- A list of objectives has been developed to building online course in highlight of the area state of art.
- To evaluate the influence of use of wiki environment in teaching and learning Moodle course.
- Accordingly this questionnaire has been produced to help inform the development of the main objectives of the new Moodle course.

Kindly, you are invited to express your level of agreement with each item as an appropriate objective for such content. In addition you will find a space at the end of each part to write any comments and/or any suggestions.

8.2. The achievement test objective

Content topics	Categories in the cognitive domain according to Bloom's Taxonomy	objectives
What is Moodle	remember	1.1. To be aware to diverse terms that related to building online courseware such as collaborative learning, content sharing, and knowledge construction.
	Remember	1.2. To know what is the term "web1.0/web 2.0" means
	analyze	1.3. To know the differences between course management systems, learning management systems, Learning content management systems or learning platform
	apply	1.4. To be able to open the Learning management system platform.
	Analyze	1.5. To identify advantages and disadvantages of using Moodle in building online courses.
	Remember	1.6. To be aware of the impact of building online courses on Education.
	Remember	1.7. To recognize some applications of online courses in Education.
	Remember	1.8 To become aware of some issues related to the use of online courses.
	Remember	1.9. To know what means the acronym "MOODLE"?
	apply	2.1. To be able to logon the Moodle platform.
	Apply	2.2. To be able to logout the Moodle platform.
	Analyze	3.1. To be able to anatomy the main window of the Moodle platform.
	Analyze	3.2. To recognize the differences between the Moodle's window before /after logon process.
	Remember	3.3. To know the name of the windows of Moodle platform.
	Apply	4.1. To be able to adjust the Language function according to the favorable language to him or her.
	Remember	4.2. To be aware of the conditions of forcing Language.
ation	remember	1.1. To be aware of the function of all icons in the platform e.g. "assign roles", "Hide/show the Block", "Delete the Block", "move the Block up/down", "move the Block right/left", "move the activity or resources up/down", "update the

		setting of activity" and the icon of Groups conditions.
	Analyze	2.1. To be able to anatomy of the "Edit course settings".
	Apply	2.2. To be able to add a full name and short name to the course.
	Remember	2.3. To be aware of the course ID number.
	Apply	2.4. To be able to write an expressed summary to the course.
	Analyze	2.5. To know the differences between the different kinds of course format e.g. "LAMS", "SCORM", "Social", "Topics", "Weekly", "Weekly format, CSS/no tables", "Wiki-Like" formats.
	Apply	2.6. To be able to adjust the number of weeks/topics in the course.
	Apply	2.7. To be able to add a course start date.
	Apply	2.8. To be able to hide section(s) in the course
	apply	2.9. To be able to specify how many recent items appear on the course homepage.
	Apply	2.10. To be able to control show grades.
	Apply	2.11. To be able to show activity reports in the course.
	Apply	212. To be able to control the "maximum upload size setting".
	Analyze	2.13. To be able to specify the course is a Meta course or not.
	Analyze	2.14. To be able to adjust the default role of the participant.
	Apply	2.15. To be able to enroll or Unenrol a participant.
	Create	2.16. To be able to set a start and end date to "Course enrollable"
	apply	2.17. To be able to set the "enrolment duration".
	Create	2.18. To be able to specify the function "Enrolment expiry notification".
	Create	2.19. To be able to control the availability of the course.
	Apply	2.20. To be able to adjust the function of "Enrolment key".
	Apply	2.21. To be able to allow users to login the course as a guest.
	Remember	3.1. To be aware of the importance of the administration block functions.
	Analyze	3.2. To recognize the differences between the administration function.
	Apply	3.3 To be able to use the function "Turn editing on" from the Course Administration Block.
	Analyze	3.4. To be able to describe the differences between the two modes of the "Turn editing on function".
	Analyze	3.5. To be aware of the functions in the Course administration block e.g. "Settings", "Backup", "Restore", "Import", "Reset", "Questions", "Scale",

		"Files", "Grades", and "Unenrol me from".
	Apply	4.1. To be able to edit his or her profile.
	Remember	5.1. To recognize the different kinds of participants roles.
	Analyze	5.2. To be able to assign a role of participants.
	create	6.1. To be able to create a group of students.
	Apply	7.1. To be able to backup the course.
	Create	8.1. To be able to restore such a course from another platform.
	Create	8.2. To be able to import activities from another course.
	Apply	8.3. To be able to empty a course of user data.
	Apply	9.1. To be able to add or edit a question.
	Analyze	9.2. To able to add or edit categories of the question.
	Create	10.1. To be able to create and use a "Scale".
	Apply	11.1. To be able to edit, delete or upload Files to the course.
	Create	11.2. To be able to create zip archive.
	Apply	12.1. To be able to show the students grads.
	Apply	12.2. To be able to adjust the Grade function.
	Apply	13.1. To be able to activate emails being sent to an address.
	Apply	13.2. To be able to specify email digest type.
	Apply	13.3. To be able to specify if email copies of posts that will be added to forums or not.
Working With resources	remember	1.1. To recognize the meaning of the resource in Moodle.
	Apply	2.1. To be able to add a resource.
	Apply	3.1. To be able to add a "book" Resource.
	Apply	3.2. To be able to adjust "book" settings.
	Apply	4.1. To be able to insert a "label".
	Apply	4.2. To be able to adjust "label" settings.
	Apply	5.1. To be able to "compose a text page".
	Apply	5.2. To be able to adjust "compose a text page" settings.
	Apply	6.1. To be able to compose a web page.
	Apply	6.2. To be able to adjust "compose a web page" settings.
	Apply	7.1. To be able to add a link to a file or website to the course.
	Apply	7.2. To be able to adjust "a link to a file or website" settings.
	Apply	8.1. To be able to display a directory in the course.

	Apply	8.2. To be able to adjust “display a directory” settings.
	Apply	9.1. To be able add an IMS content Package.
	Apply	9.2. To be able to adjust “an IMS content Package” settings
Working with activities	remember	1.1. To recognize the meaning of the activity in Moodle.
	Apply	2.2. To be able to add an activity.
	Apply	3.1. To be able to adjust the online text settings.
	Create	4.1. To be able to make Forum Tracking.
	Apply	5.1. To be able to send email alerts to teachers.
	Apply	6.1. To be able to conduct an online Text.
	Create	7.1. To be able to make “advanced uploading of files” into the course.
	Apply	8.1. To be able to adjust the Grade function to the assignment.
	Apply	9.1. To “Upload a single file” activity to the course
	create	9.2. To be able allow learners to edit the uploaded files.
	Apply	9.3. To be able to specify the maximum number of uploaded files.
	Apply	10.1. To be able to add “Offline” activity to the course.
	Apply	11.1. To use the “Chat” activity to communicate with the other peers in the course.
	Apply	11.2. To be able to set a determined time for chatting between participants.
	apply	11.3. To be able to repeat sessions in the chatting activity.
	Apply	11.4. To be able to save past sessions for some days after the chatting process.
	Apply	11.5. To be able to allow or not allow the participants to view past sessions.
	Apply	11.6. To be able to restrict answering to such a period via the course.
	Apply	12.1. To be able to add “Choice” activity to the course.
	Apply	13.1. To be able to add “Database” to the course.
	Create	13.2. To be able to enable the database in such a period “from/to”.
	Create	13.3 To be able to enable/disable the database to be viewable.
	Apply	14.1. To be able to provide “Feedback” to the participants in the course.
	Apply	14.2. To be able to open/close the feedback in such a period.
	Remember	15.1. To be aware of the use of “Forum” activity in learning process.
	Create	15.2. To use one of the Forums formats and the reason to select this type.
	Apply	15.3. To be able to force everyone to be subscribed in the forum.
	Create	15.4. To specify the maximum attachment size of the file that may the participants my upload via the Forum.

	Apply	16.1. To be able to rate posts by using Scale.
	Apply	17.1. To be able to restrict rating to posts.
	Apply	17.2. To be able to allow or not allow the participants will be blocked from posting after giving number of pots.
	Apply	18.1. To add a glossary to the course.
	Apply	19.1. To be able to add lesson to the course.
	Apply	19.2. To be able to set a countdown counter in the lesson.
	Create	19.3. To be able to set the value of the maximum number of answers in the lesson.
	Apply	19.4. To be able to specify the maximum grade in the lesson.
	Evaluate	19.5. To be able to allow learners to review the lesson again from the start.
	Apply	19.6. To be able to specify the maximum number of attempts the learner makes in answering any of the questions in the lesson.
	Evaluate	19.7. To be able to control appearing of the default feedback after the learner answers a question.
	Apply	19.8. To be able to determine the minimum number of questions in a lesson.
	Apply	19.9. To be able to show number of the lesson pages or Cards.
	Apply	19.10. To be able to display the lesson as a slide show.
	Apply	19.11. To be able to show a list of the pages in the lesson.
	Apply	19.12. To allow the lesson bar displays the percentage of the lesson progress.
	Apply	19.13. To make the lesson is a password protected lesson.
	Create	19.14. To be able to allow or not allow the lesson to be dependent upon another lesson.
	Apply	19.15. To be able to determine a time that the learners must spend in the lesson.
	Apply	19.16. To be able to determine a minimum percentage which the learner must gain a grade better than it in the lesson.
	Create	19.17. To be able to create a background sound at the beginning of a lesson.
	Understand	19.18. To use the pull down menu to select a choice for the student to go to another activity.
	Apply	19.19. To be able to Display the 10 high scores in the lesson.
	Apply	19.20. To make such lesson's settings as defaults for next time lessons.
	Remember	20.1. To recognize the function of "Quiz" activity in a course.
	Understand	21.2. To be able to specify when the learners can access the quiz.

	Apply	22.3. To be able to specify when the quiz will be closed.
	Apply	23.4. To be able to specify a time limit to complete the quiz.
	Apply	24.5. To be able to control the delay time between first and second attempt in the quiz.
	Understand	25.6. To be able to determine unlimited number of questions per page in the quiz.
	Apply	25.7. To be able to set the order of questions in the quiz is randomly shuffled.
	Apply	25.8. To allow learners to have multiple attempts at a quiz.
	Apply	25.9. To set the adaptive mode to allow the learner to do multiple responses.
	Apply	25.10. To be able to adjust the grading method to be the Average grade.
	Apply	25.11. To be able to apply penalties to allow learners try again after a wrong response.
	Apply	25.12. To be able to specify how many digits will be shown after the decimal digits when the grade is displayed.
	Create	25.13. To adjust what the students may review such as Responses. Scores, Feedback, Answers and General Feedback after the quiz is closed.
	Apply	25.14. To be able to show the quiz in a new window.
	Apply	25.15. To be able the quiz requires password to be accessed.
	Apply	25.16. To be able to specify the learners levels according to their percentages.
	Apply	26.1. To be able to upload a package file contains SCORM course definition files.
	Apply	26.2. To be able to display the Grade “Highest grade” gained by learners in all passed learning objects.
	Apply	26.3. To be able to display the maximum scores that may the learners gain.
	Apply	27.1. To be able to add a new survey to the course.

8.3. The achievement test

Dear student,

I am conducting a research project at Potsdam University in the faculty of education on:

"SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION"

This test is used as a part of my doctoral fulfillments in instructional technology at Potsdam University. Therefore this test has been produced to help inform the development of the main objectives of the wiki course.

I would be pleased if you would participate in this test, if you decide to share test, you will be asked to complete a series of short multiple choices questions (please read the instructions in the next page).

Thanks for your valuable time and if you need further information, you can contact me at any time.

With my best regards,

Ibrahim Agamy

PhD Student

Potsdam University

Faculty of Education

Universitätskomplex II Golm, Haus 9, Zi. 1.16

Karl-Liebknecht-Straße 24-25

14476 Potsdam

email: agamy@uni-potsdam.de

Student information and the test instructions

Please write your data.

Name:

Gender:

E-mail:

Tel. (optional):

Instructions:

Before responding the questionnaire, please read the instructions below:

1. Read each statement carefully.
2. Go through the test once and respond to all items if possible.
3. The test consists of 60 multiple choice questions with just one correct answer.
4. The test should take a total of 45 minutes to complete.
5. Go through the test again; spend a reasonable amount of time on each problem, but move on if you get stuck.
6. Save time at the end to double-check your answers and make sure you haven't made any errors.
7. Change your answers if you wish.
8. At the end of the test, please select one answer of the four choices.

Thanks for your valuable time and if you need further information, you can contact me at any time.

With my best regards,

Ibrahim Agamy

PhD Student

Potsdam University

Faculty of Education

Universitätskomplex II Golm, Haus 9, Zi. 1.16

Karl-Liebknecht-Straße 24-25

14476 Potsdam

email: agamy@uni-potsdam.de

The achievement test

1. Using a……. Moodle allows the teacher and/or students to build, display and search the entire record about any topic.
    a. Grades Block.
    b. Database activity.
    c. Display a directory resource.
    d. Recent activity Block.
2. To create a course via Moodle platform:
    a. All the students must be online.
    b. Have a username and password.
    c. Have a domain via the internet.
    d. All of the above.
3. In Moodle teacher can make access control by password protect or enrolment key to
    a. The whole course.
    b. The lesson.
    c. The forum.
    d. A and B.
4. In Moodle teachers can add an entry to the database by:
    a. Inserting the entry.
    b. Informing the students to add it.
    c. Uploading entries from a file.
    d. None of the above.
5. Moodle allows teachers to be able to make a backup to the course with:
    a. All the assignments.
    b. Some assignments.
    c. Course files.
    d. All the above.
6. Teachers can use the "Edit course settings" in Moodle to ……
    a. Specify the Enrolment key.
    b. Adjust students' enrolment settings.
    c. Assign students roles.
    d. A and B.

7. The Database module allows the teacher and/or students in Moodle to:
    a. Build a bank of record entries.
    b. Display a bank of record entries.
    c. Search a bank of record entries.
    d. All of the above.
8. The Recent Activity block lists the course activity, such as:
    a. Updated resources.
    b. Forum posts
    c. Updated activities.
    d. All of the above.
9. Uploading a Word document in Moodle and making it available for use by learners. Therefore, the teacher should add:
    a. A resource**.**
    b. An activity.
    c. A Block.
    d. The file directly.
10. Students can Browse the Glossary items in Moodle by all of the following methods except:
    a. Alphabet.
    b. Category.
    c. Author.
    d. Names.
11. Moodle is considered a …….
    a. Course management system.
    b. Virtual Learning Environment.
    c. Modular Object-Oriented Dynamic Learning Environment.
    d. All of the above.
12. To create and maintain a schedule of course assignments, tests, and other important dates, teacher should add
    a. Database activity.
    b. Remote RSS feeds Block.
    c. Upcoming events Block.
    d. Recent activity Block.

13. Moodle provides…… as a simple single question survey that can be used to facilitate discussion or to act as a polling instrument.
    a. A choice.
    b. A question.
    c. A survey.
    d. A Grade.
14. Moodle allows teachers to create a database that allows easy searching and sorting capabilities as well as course terms using:
    a. Glossary activity.
    b. Database activity.
    c. Quiz activity.
    d. Survey activity.
15. In the "Edit course settings" page, teacher can:
    a. Adjust his/her students' roles.
    b. Determine the course format.
    c. Add resources.
    d. Add activities.
16. Teachers can specify the largest size of files that can be uploaded by students in their Moodle course using:
    a. Settings block.
    b. Files Block.
    c. Scales Block.
    d. Assign roles Block.
17. As a teacher, you will be able to add or edit a question by:
    a. Adding an activity.
    b. Adding a resource.
    c. Using the administration Block.
    d. None of the above
18. The function "Choice 1" in the multiple choice question, the teacher sets
    a. The choice answer.
    b. The choice image
    c. The grade of the choice.
    d. A and C.
19. To inform his/her course members with the deadline of the course, teacher can use:

a. A label.
b. A Feedback.
c. The Latest News block.
d. A and C.

20. In Moodle, teacher can allow the web page which composed in the course as a new window:
    a. To be resized.
    b. To be scrolled.
    c. To be hidden.
    d. All of the above.
21. The teacher in Moodle can:
    a. Add a link to his/her personal web site in the course.
    b. Add a link to a PowerPoint file in the course.
    c. Add a word file in the course.
    d. All of the above.
22. Using the chat activity in Moodle, students can:
    a. See the past chat sessions.
    b. Use the Emotions icons.
    c. Chat with their personal contacts.
    d. None of the above.
23. Answering to a choice in a fixed time period:
    a. Can be restricted.
    b. Is not allowed.
    c. A and B.
    d. None of the above.
24. Via Moodle through the Feedback activity, teacher can:
    a. Add a question to the activity.
    b. Export question to Excel.
    c. Alert students after submit.
    d. All the above.
25. Moodle allows teacher in the forum activity to:
    a. Grade the students.
    b. Create an asynchronous discussion.
    c. Create a synchronous discussion

d. A and B.

26. Who can add a Glossary concept in the course?

a. The teacher.

b. The student.

c. Both of teacher and student.

d. No one.

27. To add an assignment to the course area, teacher should:

a. Insert an activity

b. Add a resource.

c. Turn editing on and add an activity.

d. Turn editing on and add a resource.

28. To jump between his/her courses teacher should use …… block:

a. My courses.

b. Course site description.

c. Course updates.

d. Course settings.

29. In moodle, the teacher adds the Choice activity to:

a. Specifies a choice of multiple responses.

b. Be useful as a quick poll.

c. Allow the class to vote on a direction for the course.

d. All of the above.

30. Teacher can prevent students from enrolling themselves in a course by:

a. Setting course enrollable to “No”.

b. Setting an enrolment key.

c. A and B.

d. None of the above.

8.4. Content analysis tool for online collaborative learning[1].

The process of knowledge construction during group interaction will happen via the five phases below:

Phase I

Sharing/ Comparing of Information

Concepts and statements that will occur in this phase:

a. A statement or observation or opinion.
b. A statement of agreement from one or more other participants.
c. Corroborating examples provided by one or more participants.
d. Asking and answering questions to clarify details of statements.
e. Definition, description, or identification of a problem.

Phase II:

The Discovery and Exploration of Dissonance or Inconsistency among Ideas, Concepts, or Statements

Concepts and statements that will occur in this phase:

a. Identifying and stating areas of disagreement.
b. Asking and answering questions to clarify the source and extent of disagreement.
c. Restating the participants' position, and possibly advancing arguments or considerations in its support by references to the participants' experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view.

Phase III:

Negotiation of Meaning/Co-Construction of Knowledge

Concepts and statements that will occur in this phase:

[1] Gunawardena, C. , Lowe, C. & Anderson, T. (1997). Analysis of a Global Online Debate and the Development of an Interaction Analysis Model for Examining Social Construction of Knowledge in Computer Conferencing. Journal of Educational Computing Research 17(4), pp.397-431

a. Negotiation or clarification of the meaning of terms.
b. Negotiation of the relative weight to be assigned to types of arguments.
c. Identification of areas of agreement or overlap among conflicting concepts.
d. Proposal and negotiation of new statements embodying compromise, co construction.
e. Proposal of integrating or accommodating metaphors or analogies.

Phase IV:

Testing and Modification of Proposed Synthesis or Co-Construction

Concepts and statements that will occur in this phase:

a. Testing the proposed synthesis against "received fact" as shared by the participants and/or their culture.
b. Testing against existing cognitive schema.
c. Testing against personal experience.
d. Testing against formal data collected.
e. Testing against contradictory testimony in the literature.

Phase V:

Agreement Statement(s)/Applications of Newly-Constructed Meaning

Concepts and statements that will occur in this phase:

a. Summarization of agreement.
b. Applications of new knowledge.
c. Metacognitive statements by the participants illustrating their understanding and that their knowledge or ways of thinking (cognitive schema) have changed as a result of the interaction.

8.5. Final Product Scale Criteria

Serial	Main criteria	Sub criteria
1	General information	Does the course name express the course main idea?
2		Is the component organization consistent throughout the course?
3		Is the material displayed attractively?
4		Is there a brief description about the course?
5		Is there determined time or deadline to complete the course?
6		Does each section of the course or topics begin with a summary?
7		Is there effective use of the Upcoming events, calendar block?
8		Are there learners enrolled in the course?
9		Has the course another teacher?
10		Is there a balanced use of graphics, text and sound?
11		Are spelling and grammar used correctly?
12		Does the course format give an accurate indication of how the material is arranged?
13		Are the photographs, animations and other forms of multimedia used in the course?
14		Is the courseware screen layout (screen elements- titles, text areas etc.) easy to understand?
15	Learning Activities	Are there varieties of learning activities?
16		Is there synchronous communication tool in the course?
17		Is there asynchronous communication tool in the course?
18		Is there a Glossary defines unusual terms used in the course?
19		Is the Multiple-choice activity included?
20		The participant added a database activity to the course.
21		The participant added a short answer question to the course.
22		Does the courseware provide opportunities for leaner-learner collaboration?
23		Does the courseware Provide feedback to the learners?
24		Is the use the course in other LMS (backup file) provided?
25		Does the courseware provide opportunities for learner- learner or teacher-learner discussions?
26	Learning Resources	Are there various learning resources?
27		Is there a Book with at least one chapter in the course?
28		Has the course a text or PDF, PPT or any external files?
29		Are there links to external sources of information accurate?
30		Are Learners linked to resources beyond the course material?

8.6. Motivation scale questions

Dear student

I am conducting a research project to my doctoral fulfilments at the Faculty of Education, Potsdam University entitled:

"SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION"

This interview is a part of this project in instructional technology at Potsdam University; therefore this interview has been produced to help inform the teacher-learner interaction in the wiki course.

I would appreciate it much if you can participate in this interview, if you decide to share the interview, you will be asked to complete a series of questions concerning your interaction through the course.

Thanks for your collaboration. Please feel free to contact to me at anytime if you need any further details.

Sincerely,

Ibrahim Agamy

PhD Student

Potsdam University

Faculty of Education

Universitätskomplex II Golm, Haus 9, Zi. 1.16

Karl-Liebknecht-Straße 24-25

14476 Potsdam

email: agamy@uni-potsdam.de

Student Information and the survey Instructions

Please write your data.

Name:

E-mail:

Tel. (optional):

Instructions:

Before responding the open-ended question questionnaire, please read the instructions below:

1. Read each statement carefully.
2. The interview consists of 8 open-end questions.
3. The survey should take a total of 35 minutes to complete.
4. Write the response that comes closest to how you feel about the learning interaction.
5. Please respond to all items if possible.

Take a moment to reflect on these issues:

1. On a scale of 1 to 5, with 1 is ranked the highest, how much experience you got from the course affects your viewpoints? And how?

……

……

……

……

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…….....**.....**

.....

2. In the highlight of the main aspects of learning interaction as a powerful way to encourage participants to be able to progress successfully through their learning situations, to be social learners who have good co-operative learning skills and strategies and be able to interact effectively, how effectively do you believe the members of your small group interacted with each other or with the teacher on the assignments? (On a Scale of 1 to 5).

……

……

3. With understanding the learning interaction that was described earlier, how effectively do you feel you interacted with the other peers and/or teacher in your group' assignments? (On a Scale of 1 to 5).

…….....

.....

4. Have you experienced any barriers or challenges using wiki to interact with the other peers or teachers? If yes, please specify and explain how did you deal with them using wiki?

……

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Please write down any further comments or opinions.

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……

8.7. Satisfaction Interview

Dear Student,

I am conducting a research project to my doctoral fulfillments at the Faculty of Education, Potsdam University entitled:

"SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION
INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION"

The interview is a part of this project in instructional technology at Potsdam University aiming at measuring your satisfaction about the wiki course.

I would appreciate it much if you can participate in this interview and answer the questions concerning your satisfaction about the course.

Thanks for your collaboration. Please feel free to contact to me at anytime if you need any further details.

Sincerely,

Ibrahim Agamy

PhD Student

Potsdam University

Faculty of Education

Universitätskomplex II Golm, Haus 9, Zi. 1.16

Karl-Liebknecht-Straße 24-25

14476 Potsdam

email: agamy@uni-potsdam.de

Student Information

Please provide the following data.

Name:

E-mail:

Tel. (Optional):

Instructions:

Please read the instructions below before answering the questionnaire,

1. Read each statement carefully.
2. The interview should take a total of 30 minutes to complete.
3. State the response that comes closest to your satisfaction about the learning interaction.
4. Please be aware that there are no correct or incorrect responses.

Reflecting on your Satisfaction

1. How easy was the wiki to use for interaction between you, your colleagues and the teacher? Describe any problems you might encounter in the wiki course.
2. What were the main benefits of teacher-learner interaction in collaborative learning environment via wiki?
3. What were the main disadvantages of teacher-learner interaction in collaborative learning environment via wiki?
4. What would you like to see more in teacher-learner interaction? (Please State the problems that you might encounter).
5. Have you experienced any barriers or challenges using wiki to interact with the other peers or teachers? If yes, please specify and explain how did you deal with them using wiki?

Please state any further comments or opinions.

……

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……

……

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……

8.8. Satisfaction Survey

Dear Student,

I am conducting a research project to my doctoral fulfilments at the Faculty of Education, Potsdam University entitled:

"SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION"

The survey in the next pages is a part of this project in instructional technology at Potsdam University aiming at measuring your satisfaction about the wiki course.

I would appreciate it much if you can participate in this survey and complete the questionnaire concerning your satisfaction about the course.

Thanks for your collaboration. Please feel free to contact to me at anytime if you need any further details.

Sincerely,

Ibrahim Agamy

PhD Student

Potsdam University

Faculty of Education

Universitätskomplex II Golm, Haus 9, Zi. 1.16

Karl-Liebknecht-Straße 24-25

14476 Potsdam

email: agamy@uni-potsdam.de

Student Information

Please write your data.

Name:

Gender:

E-mail:

Tel. (optional):

Instructions:

Before responding the questionnaire, please read the instructions below:

1. Read each statement carefully.
2. Select the response that comes closest to how you feel about the course.
3. Please be aware that there are no correct or incorrect responses.
4. If you neither agree nor disagree with a statement or are uncertain, kindly select Neutral.
5. Do not spend too much time on any one statement, but give the response that seems to describe how you feel.
6. Please respond to all items.

Satisfaction questionnaire instrument

	The statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I feel that communication via the course was something boring.					
2	I feel panic via editing my teacher posts.					
3	I trust interactive learning situations.					
4	I respect teacher-learner interaction learning situations.					
5	I feel that the self-learning situations are more suitable to me.					
6	I feel that interaction with others has no effect on learning.					
7	I do not feel comfortable while participating.					
8	I hope, all the courses are presented into interactive way.					
9	I feel satisfied via peers' interaction.					
10	I feel that most students easily expressed themselves.					
11	I feel that the course avoided Psychologically difficulties of hurt and frustrating.					
12	I feel confident about updating and spreading my work.					
13	I feel motivated towards the course.					
14	I feel satisfied via teacher interaction.					
15	I do not feel confident in the authenticity of learning via wiki.					
16	I feel that the course undermines the social cohesion amongst us.					
17	I felt panic to participate in any incoming wiki sessions.					
18	I feel that there is an exaggeration in the assessment of learning interaction.					
19	I felt happy while participating with the others.					
20	I did not trust the other's viewpoints.					

- Please write down any further comments or opinions.

……

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8.9. Teacher-learner Attitudes Scale instrument

Dear student

I am conducting a research project to my doctoral fulfilments at the Faculty of Education, Potsdam University entitled:

"SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION
INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION"

This teacher learner attitudes scale instrument is used as a part of my doctoral fulfillments in instructional technology at Potsdam University.

Therefore this scale has been produced to help inform the learners' attitudes towards the teacher learner interaction aspects of the wiki course.
I would be pleased if you would participate in this scale, if you decide to share the scale, you will be asked to complete a series of statements concerning the course.

Thanks for your valuable time and if you need further information, you can contact me at any time.

Ibrahim Agamy

PhD Student

Potsdam University

Faculty of Education

Universitätskomplex II Golm, Haus 9, Zi. 1.16

Karl-Liebknecht-Straße 24-25

14476 Potsdam

email: agamy@uni-potsdam.de

Student Information

Please write your data.

Name:

Gender:

E-mail:

Tel. (optional):

Instructions:

Before responding the questionnaire, please read the instructions below:

1. Read each statement carefully.
2. Select the response that comes closest to how you feel about the course.
3. Please be aware that there are no correct or incorrect responses.
4. If you neither agree nor disagree with a statement or are uncertain, kindly select Neutral.
5. Do not spend too much time on any one statement, but give the response that seems to describe how you feel.
6. Please respond to all items.

Teacher-learner Attitudes Scale instrument

	The statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I felt the tutor engaged me in communicated social situations.					
2	I felt that the tutor treated the barriers resulting from the individual differences.					
3	I did not get immediate feedback from the teacher.					
4	I felt the tutor prepared productive course topics.					
5	I felt that most students were panic about interacting with the other peers and/or teacher.					
6	The tutor provided me the capability of interacting with others.					
7	I felt noisy to receive learning posts or alerts.					
8	The tutor guides and facilitates my learning.					
9	I felt our final approach does not cover the desired general goals of the course.					
10	I asked for but i did not receive help from the group members and/or the teacher.					
11	I felt i had been actively participated in real-life learning activities.					
12	I did not have a real effective contact with the tutor and my colleagues.					
13	The course was underestimated in terms of the expectations, deadline and ease of accessibility.					
14	I felt our final achievements demonstrated a deep understanding of the content concepts that we have created.					
15	The tutor dealt respectfully the problems encountered us.					
16	I positively interacted with my colleagues and /or teacher.					
17	The tutor interactively managed the course.					
18	The tutor planned and organized tasks very similar to those in face to face.					
19	I did not feel confidence that others red my posts and post their ideas freely.					
20	I had the ability to interact positively and my colleagues and/or the teacher responded to my mistakes.					

- Please write down any further comments or opinions.

8.10. Classroom community scale

Dear student

I am conducting a research project to my doctoral fulfilments at the Faculty of Education, Potsdam University entitled:

"SOCIAL NETWORKING SOFTWARE IN HIGHER EDUCATION INVESTIGATING THE INFLUENCE OF USING DIFFERENT INTERACTION LEVELS ON LEARNERS' ACHIEVEMENT AND SATISFACTION"

This 20-item classroom community scale (CCS) developed by Rovai (2002) is used as a part of my doctoral fulfillments in instructional technology at Potsdam University.

Therefore this scale has been used to help inform the community Connectedness and learning aspects of the wiki course.
I would be pleased if you would participate in this Scale, if you decide to share the scale, you will be asked to complete a series of Statements concerning the course.

Thanks for your valuable time and if you need further information, you can contact me at any time.

Ibrahim Agamy

PhD Student

Potsdam University

Faculty of Education

Universitätskomplex II Golm, Haus 9, Zi. 1.16

Karl-Liebknecht-Straße 24-25

14476 Potsdam

email: agamy@uni-potsdam.de

Student Information

Please write your data.

Name:

Gender:

E-mail:

Tel. (Optional):

Instructions:

Before responding the questionnaire, please read the instructions below:

1. Read each statement carefully.
2. Select the response that comes closest to how you feel about the course.
3. Please be aware that there are no correct or incorrect responses.
4. If you neither agree nor disagree with a statement or are uncertain, kindly select Neutral.
5. Do not spend too much time on any one statement, but give the response that seems to describe how you feel.
6. Please respond to all items.

Classroom community scale[1]

The statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. I felt that students in this course care about each other.					
2. I felt that i am encouraged to ask questions.					
3. I felt connected to others in this course.					
4. I felt that it was hard to get help when i had a question.					
5. I did not feel a spirit of community.					
6. I felt that i received timely feedback.					
7. I felt that this course is like a family.					
8. I felt uneasy exposing gaps in my understanding.					
9. I felt isolated in this course.					
10. I felt reluctant to speak openly.					
11. I trusted others in this course.					
12. I felt that this course results in only modest learning.					
13. I felt that i could rely on others in this course.					
14. I felt that other students did not help me learn.					
15. I felt that members of this course depend on me.					
16. I felt that i was given ample opportunities to learn.					
17. I felt uncertain about others in this course.					
18. I felt that my educational needs were not being met.					
19. I felt confident that others will have supported me.					
20. I felt that this course did not promote a desire to learn.					

- Please write down any further comments or opinions.

[1] Rovai, A. P. (2002). Development of an instrument to measure classroom community. Internet & Higher Education, 5(3), 197-211. (ERIC Document Reproduction Service No. EJ663068), **With permission of the owner of the tool 5. October 2010.**

8.11. Experts' list

Prof. Dr. Alfred P. Rovai
Associate Vice President for Academic Affairs,
Regent University, USA.

Prof. Dr. Angela Ittel
Department of Educational Psychology,
Institute of Education,
Faculty of Humanities.

Prof. Dr. Abd El Salam
Associate Professor at
Max Planck institute

Mr. Frederic Matthé
AG eLEARNiNG group

8.12. University registration form

Dear Colleagues,

We are now ready to start the course, Please as a requirement to use the Moodle Platform of Potsdam University please do the next steps or call me to do it myself (let me translate the points in English because we have a lot of members who do not know German language).

1. Click registration, to open the registration page.
2. Write the data as following:

   Name: write your family name.

   Vorname: write your first name.

   E-mail:

   E-mail wiederholung: rewrite your e-mail.

   Enrichtung: write your institute or even focus area

   Moodle passwort: write password that you will use (please write your usual password).

   Betreuende Einrichtung an der Universität Potsdam

   The next part is my data please, fill it as following:

   Dozent: Ibrahim Elkhouly

   Dozent mail: agamy@uni-potsdam.de

   Lehrveranstaltung: How to use Moodle?

   Semester: Select "Wintersemester 2010/2011".

   Zustimmung: click the check box beside the text.
3. Click the button "Abschicken".
4. You will be informed with the next message: *"Sie haben uns nachfolgend....“*
5. You will be alerted with an e-mail from "Moodle-ext@uni-potsdam.de" titled with *"Uni Potsdam: Antrag auf Enrichichtung....“* (Please check your Spam or Bulk mail).
6. Open the mail and then Click the link: *Bitte aktiviren Sie Ihre Anmeldung über folgenden ...*
7. Write your password (that you already wrote before).
8. The next message will be appeared: *"Ihre anmeldung wurde in Moodle aktiviert. Nach...".*

9. Wait for a mail informed you that *"Ihre Anmeldung in Moodle wurde akzeptiert. Ihnen wurde folgender Anmeldename zugewiesen: username".*
10. The word instead of red highlight word is your username.

Please inform me when you have the username.

With my best regards,

Ibrahim M. Agamy
Humanwissenschaftliche Fakultät
Erziehungswissenschaft
AG eLEARNiNG
Kompetenzzentrum für
E-Learning und Mediendidaktik

Potsdam Universität, Golm, Haus 9, Zi. 1.1**6**
Karl-Liebknecht-Straße 24-25, 14476
Tel.: (0049) 017653422588
Office :(0049) 03319772497

8.13. Meeting topics

Pre-test Lunch meeting

Attendees:

- The teacher.
- All the groups' members.

Date/Time/Location:

Friday 5th November2010/ 19 O'clock /Room 1.16

Agenda

- 10 minutes: Overview about the course and its aims.
- 25 minutes: What needs improvement (applying the pre tools)

- (During this part collect the students' e-mails, other demographic data, determine fixed dates to the next meetings).
- 10 minutes: Opening the Wiki course.
- 30 minutes: Discussion of the key issue of the week (The Wiki unit).
- 5 minutes: Wrap-up.

Notes

Add notes occur through the meeting:

1.

Action items

- Add any action items to this section to make sure they don't get forgotten or dropped.
    - …….
    - ……
- During the wrap-up phase of the meeting, review the notes and add any additional action items that spring to mind:
- Each action item should specify the task, the person responsible, and the due date. Here it is an example:
- The .....Task..... (Ibrahim Agamy by 3/11/2010)

Comments (0)

8.14. Meeting summary.

Dear Colleagues,

We discussed some points in our meeting and here you are the summary of the meeting, please open the attached file.

Instructions for wiki GroupsMembers

We deal with two web sites:

1. **The first website is** http://moodletg1.pbworks.com

This web site is the wiki, where we will study the next units:

- Wiki.
- What is Moodle?
- Administration Block.
- Resources.
- Activities.

The first unit is just to help us to know how to use the wiki, after that we will study the next units.

We are waiting for you participations as following:

- Read the text in the page.
- If you find the symbols  that mean: write your idea about this point and the others can edit it in a good written structure paragraph.
- When you find the word "**assignments**" that means you have to write your idea about the assignment.
- When you find the phrase "**Practice Homework assignments**" that means you have to apply these skills by Moodle itself.

2. **The second website is** https://moodle.uni-potsdam.de

This is the Moodle platform of Potsdam University; here you can use your username (that the university sent you) and password, to login into Moodle.

What will we do in Moodle?

- Applying the skills which stated in wiki, that under the title “ **Practice Homework assignments**” in the course named “How to use Moodle”. You can ask your colleagues and / or me, if you cannot do any skill using a Forum called “Nachrichten Forum” in the course area.
- After that everybody is requested to go to his own course (everybody has his course with his family name.), and try to apply the skill that he/she already learnt towards building his course in his field.

With my best regards,

Ibrahim Agamy

8.15. Experts' letter of content analysis tool

Dear Sir/Madam

In this part there are four files (three word files and one xls file)

1. The **word** file "Content analysis form of knowledge social construction through online environments", it contains at first the tool of content analysis developed by Gunawardena, et al. (1997[1]) with its five levels Sharing/ Comparing of Information; The Discovery and Exploration of Dissonance or Inconsistency among Ideas, Concepts, or Statements; Negotiation of Meaning/Co-Construction of Knowledge; Testing and Modification of Proposed Synthesis or Co-Construction and Agreement Statement(s)/Applications of Newly-Constructed Meaning. And also with its sub levels.

Please in the column "Analysis" add the number to refer to the level number and the letter to refer to the sub level, for example the key (1b) refers to the first level/the sub-level b as shown in the first table of the word file (as defined at the first of the file). At the end of the first table there is a big table under the title "The wiki Scores table" contains some columns determine: the topic of the wiki course, the analysis key (that has been explained earlier), the posts that the students sent, and finally the remarks column.
Note: the training group members' names highlighted the blue color and the control group members' names highlighted the red color

2. The **word** file entitled "interaction analysis MoodelTG" shows the interaction analysis to the training group (TG), according to the file "Content analysis form of knowledge social construction through online environments" after finishing the sum process of each of the training group students.
3. The **word** file "interaction analysis MoodelCG" shows the interaction analysis to the control group (CG), according to the file "Content analysis form of knowledge social

[1] Gunawardena, C. , Lowe, C. & Anderson, T. (1997). Analysis of a Global Online Debate and the Development of an Interaction Analysis Model for Examining Social Construction of Knowledge in Computer Conferencing. Journal of Educational Computing Research 17(4), pp.397-431

construction through online environments" after finishing the sum process of each of the control group students.

4. The **Excel** file "Content analysis form of knowledge social construction through online environments" shows the responses of each students on the scale, where the sum column refers to the "Sum" of responses of the student on this level in all of his participations, and the column "levels sum" refers to the sum of each level.

8.16. INTERVIEW QUESTIONS AND ANSWERS

Reflecting on your Satisfaction

1. **How easy was the wiki to use for interaction between you, your colleagues and the teacher? Describe any problems you might encounter in the wiki course.**

Participant 1:

For the first time the wiki course was difficult, but after training it was easy. The wiki page is very easy to use and not complicated and doesn't have any difficulties.

Participant 2:

Wiki is good and helpful website in teacher interaction collaboration because it hasn't hard keys or code and it is very useful to add create a new page/add pictures and uploading videos.

Participant 3:

I think wiki is a very easy site to handle and work with, as all the instruments and activities is explained and there isn't anything complicated or coded in the using of the site wiki.

Participant 4:

In my opinion the wiki was not so much complex firstly it needs only to spend some time to work on it and to know different functions then working with wiki became more easy.

Participant 5:

The wiki was easy for me and actually there was no problem to me.

Participant 6:

Wiki is very easy to use; it hasn't more details, any way it is an easy website to use.

Participant 7:

The wiki page was very easy and it was not complicated and without a lot of details. It was very easy for me.

Participant 8:

I think that the using of wiki was very easy because i could put valuable information at any time and the others can see it in the same time and send me their opinions.

Participant 9:

Wiki design is very organized and the facilities are very easy to use it, group members add a lot of information but the content of the wiki (Moodle skills) distribute me in sometimes.

Participant 10:

I think the wiki is so easy to use; i can make edit and save, send comments, used skype, add pictures, add videos in easily way.

Participant 11:

I saw that all items of wiki very clear, very benefit and i was in good interaction with my colleagues and my teacher

Participant 12:

Well, i think wiki was very useful at any rate and easy, and the interaction was also very good, regarding to the problems, well i can say that : the Edit button was not easy to be used especially if you want to edit or change an idea or to add some ideas or to wrote some thing, then you have to click the button (the Edit button), i mean to go out of the main page and then to use the scroll bar and search where i want to edit something, it takes a little time and make some difficulties.

Participant 13:

Actually, wiki was easy to use, the tools and the main page in wiki like to edit some idea and to discuss with the colleagues and the teacher, it was easy to use this tool, that what i mean edit or comments or Skype, but just one problem to the contents "How to add blocks?" it relates to Moodle and it was not for me it was not easy to understand at first but after that i realize that it was not so complicated.

Participant 14:

For me the interaction using wiki was relatively easy as it give some tools that collaboratively help you, as an example, you have edit save tool, add comments and plug-ins, all of these tools make the interaction between the members much easier, concerning the problem that i have met, really i cannot remember any problem that really faced me during the course.

2. **What were the main benefits of teacher-learner interaction in collaborative learning environment via wiki?**

Participant 1:

The main benefits of teacher-learner interaction in collaborative learning via wiki by comments or by edit and save in the wiki course.

Participant 2:

Exploring his viewpoints.

Each one can correct of the others.

Participant 3:

I gained a lot of benefits as the teacher learner interaction was very good as any edit or comment that i did, was send directly to my colleagues and teacher and i will get immediate response and replies from them.

Participant 4:

I interacted with the teacher through the wiki by two ways, the first through comment option which enable me to ask the teacher and my colleagues directly about what i need.

2. Through the wiki itself by answering and writing directly what opinions

Participant 5:

The main benefits that i see is that you edit and save to the page and comment (you can add a comment or even reply if you want.)

Participant 6:

I can say that using wiki page supports the interaction, i can write what i want and my teacher can review it, in the same time i can also ask any questions using add comment.

Participant 7:

It helped me to understand the topics and the program items.

Participant 8:

From my point of view the wiki has many advantages for example, i can add my opinions by using edit and save function, as well as i can add a comment or questions by using add comment, moreover i can reply easily to the comments, not only but also through the skype make online chatting.

Participant 9:

I have found speedily responses and immediate feedback from the teacher and students by (Forum, Skype chat sessions, mobiles and comments).

Participant 10:

I think, the main advantages in the wiki that support:

a. Add comment.
b. Make chat online.
c. Make edit and save, that means all the group members will receive an email with this change.

Participant 11:

In my point of view wiki is very easy to use, add through adding and save functions add comments where i can send my ideas to all in the wiki and receive their ideas and comments; also online chatting through Skype is very very nice things in wiki.

Participant 12:

Ok, the main benefits, i think there are a lot of benefits in wiki, i can summarise some of them like the ability to add comments, and these comments will be sent to the others, so you can get feedback from them about your idea or so, also Edit button is very useful to add my own ideas and not only to add them but also to save them.

Other benefits for example Skype to make chat with the others, they are online. The forum property is also very useful to share the others what you want to share or what you want about special ideas or general ideas.

Participant 13:

Yes, it was an effective method to get a contact with the teacher and with the colleagues also, and to discuss about to express your idea to discuss with them using edit or comment or Skype, yeeh, i mean it is fast way to discuss your idea with the others.

Participant 14:

Actually there are many benefits of using this kind of interaction, as an example adding comments, by this tool you have the ability to add any comment you need to explain your opinion, also using reply button gives you the ability to reply to a certain person if you want, you can also have Edit and save, button which gives you the opportunity to write on the main page the point of view that you see and this point of view also could be changed by the administrator by using the page history which allow him to choose any form done to the page by the others.

Other thing is Skype, this kind of interaction, makes the interaction between the members of the group much easier and more co-operative.

3. **What were the main disadvantages of teacher-learner interaction in collaborative learning environment via wiki?**

Participant 1:

…i did not find online discussion.

Participant 2:

It was not teacher interaction in CLE (Collaborative Learning environment) via wiki.

I was waiting for more supports and provide from the teacher.

Participant 3:

To be honest i thought the interaction between me and the teacher should have been more as there was no chat sessions or online chatting to interact more with the teacher and to work with my colleagues in my group and exchange knowledge.

Participant 4:

When i asked a question i had to wait a period could be reached to a day to receive the answer from the teacher.

There is no synchronous discussion with the teacher.

Participant 5:

The disadvantages that faced me, was changing my opinions by the others with wrong data (from my point of view).

Participant 6:

I cannot contact my colleagues and teacher using an online chat program, for example (yahoo messenger) i think that this may help us to learn better.

Participant 7:

The most problem was the absence of online chatting and delayed response.

Participant 8:

Although the wiki has a lot of advantages, it has also some disadvantages such as, i felt with some confusion from receiving many emails in the day and i did not read most of them.

So i hope to solve this problem in the future.

Participant 9:

I did not face any problems during the interaction between the teacher and me.

Participant 10:

The main disadvantages of the wiki are that i have not a lot of time to read all the mails from the wiki group members. When anybody edited and saved the wiki, i got a new mail. In the other side the mails contains the new data that changed.

Participant 11:

I did not see any disadvantages.

Participant 12:

Ok, after i speak about a lot of benefits, what would be disadvantages really?!!!, well as i think it was no disadvantages or difficulties in wiki except, there are received emails when every member edit or make anything, then the wiki will send a lot of emails to all members and when i opened my email, i have a chock mail, that i have hundred or two hundred mails!!!!!, i cannot read all of them. It was a little bit disadvantages.

Participant 13:

Some times that was the huge number of emails, sometimes disturb me because, i remember in one day they were more than ten mails and i opened some of them and when i checked , it was just formal information and easy to … not easy to use but easy to me because this, i have discussed also i lost some times and opened these emails, and the other point is the last time i

omit some emails and maybe there was some benefit information or some good information, that was the point the number of the emails.

Participant 14:

The disadvantage was not very serious but the main was the amount of emails that the users received, really it was very panic, and time by time i stopped reading them, also during the writing, there was no flexibility in the font formatting, the page history also disturbed me, because any time anyone could change my editing to the page to the last one before, that was not very good

4. **What would you like to see more in teacher-learner interaction? (Please State the problems that you might encounter).**

Participant 1:

I would like to see more in teacher learner interaction online discussion because sometimes i have questions and i need immediately answers.

Participant 2:

I would like to see more effectively teacher interaction.

I hope to find online chatting with teacher and students every time.

Participant 3:

I want to see more interaction between me and the teacher. As i mentioned before like chat sessions and online chat to be immediate replies to my comments and questions and there will be a direct feedback between me and the teacher and also with the colleagues in my group.

Participant 4:

I was expect to make more meetings or telephone calls at least once a day to gave me answers and explanations , but there were only one meeting after each unit.

Participant 5:

For me face to face programs are much better than the e-learning programs because the interactions using face to face programs are much easier and quicker, so if we added this kind of programs to the e-learning programs i would be much better.

Participant 6:

More interaction ways with me and my colleagues and with my teacher.

Participant 7:

More online chatting and more interactions.

Participant 8:

Really, i am satisfied with this course because my imagination before the course did not changed after ending the course.

Participant 9:

I think the course covered a lot of my desired and my goals about the collaborative e-learning system.

Participant 10:

I would like to see competitive group works, in other words two groups do all their bests to success and to get better learning. I think this will support the interaction between group members.

Participant 11:

I do not have a problem, i think that the course was very good a benefit for me.

Participant 12:

Really, before i attend to this course, i did not have any idea about wiki, so it was for me enough what i saw in wiki and it was more than i expected, i think there were no problems.

Participant 13:

Actually, my expectations from the teacher was very good, because he was closed to the participants, any one has a question or has something that not clear, the teacher reaction or the teacher response by email or by mobile phone and phone also, especially for me, sometimes i had some questions or so and after of couple of minutes get the answer.

Participant 14:

Actually my imagination about the online learning programs was just receiving and sending emails with the scientific content, after i attended this course i found it is completely different, the interactions and co-operations between the members made the course more attractive and differ than that i have imagined, actually i do not have any problems, i do not see any problems that could be counted.

5. **Have you experienced any barriers or challenges using wiki to interact with the other peers or teachers? If yes, please specify and explain how did you deal with them using wiki?**

Participant 1:

Yes, because i had one problem to add a PowerPoint document but i found the problem from Opera (internet browser) and after that i resolved it.

Participant 2:

I received more than twenty emails per the day in the wiki and it was not possible to read all of them.

Participant 3:

- Teacher interaction and interaction with the peers.
- Amount of email.

I faced some barriers like the low interaction and communication between me and the teacher and the other colleagues as there was no direct feedback between each other.

Second, if anyone in my group or my teacher edited or changed in the wiki i received a huge amount of mails which is very difficult to read and respond to them and to their questions and comments.

Participant 4:

As i said previously there were no enough interaction with the teacher, so i was not obtain answers directly or to make calls or meetings at least once a day.

Participant 5:

The interaction between me and my teacher was not so good, i hope in the next time if i attend any other e-learning programs, i could find more interaction.

Participant 6:

As i said before, i faced the problem of lack of online chatting to use it to be more connected with my colleagues and teacher.

Participant 7:

Yes i hope if there is more online interaction and face to face meetings.

Participant 8:

…No but as i mentioned from before, that the main problem with using wiki was several mails in the day.

Participant 9:

I did not face any barriers or challenges in the wiki to interact with the other peers.

Participant 10:

…No i did not face problems in wiki.

Participant 11:

No i do not have any barriers.

Participant 12:

Ok, one of the barriers i can describe as following when some body works in a skill, and i am working in another skill then, it is a little difficult to go back or to jump to the other skill and

read about it of course at first and to share idea or to edit or to correct, add some information, that of course take a lot of time that i can use it to learn what i want to learn actually.

These problems, these challenges was in the first week of the course, but as you mad, as you changed the course scheme, like ok today all members work especially on this skill, then the discussion should be only on this discussion, we don't need to spend a time for others skills or so. This was the only difficult.

Participant 13:

Yes, as i said in the answer of the third question, the problem was the large number of emails, may be you can find some methods to deal with this problem to get, i mean the emails more specific tool or so, for example if you have specific question it is ok!!!, to give the answer to the specific people who are interested to give this answer, i know this is not easy to find the people that interested about this point, but it is work to think about it.

Participant 14:

Actually no, i did not encounter any problem or any challenge or have barriers, i face no.

8.17. Participants' contributions after coding

The process of knowledge construction during group interaction happened via the five phases below for the two groups:

				Number of statements													
Level number	The Level	Sub level	Sub-level	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14
1	Sharing/ Comparing of Information	A	A statement or observation or opinion.		1	6	2		1	5		10	7	4	1		5
		B	A statement of agreement from one or more other participants.								1	7	3	2	5		2
		C	Corroborating examples provided by one or more participants.								2	1	1	1			1
		D	Asking and answering questions to clarify details of statements.				1				2	2		2			7
		E	Definition, description, or identification of a problem.	11	13	8	4	1	12	3	18	11	9	6	15	8	10
2	The Discovery and Exploration of Dissonance	A	Identifying and stating areas of disagreement.			1											1
		B	Asking and answering questions to clarify the source and extent of disagreement.								1		1				4
		C	Restating the participants' position, and possibly advancing arguments or considerations in its		1		2	1			4				1		

			support by references to the participants' experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view.														
3	Negotiation of Meaning/Co-Construction of Knowledge	A	Negotiation or clarification of the meaning of terms.	3	1	2	6			2	4		1	1	11	2	7
		B	Negotiation of the relative weight to be assigned to types of arguments.														
		C	Identification of areas of agreement or overlap among conflicting concepts.	2	1	5					1						4
		D	Proposal and negotiation of new statements embodying compromise, co construction.	3		2	3		1			3	5		8	4	6
		E	Proposal of integrating or accommodating metaphors or analogies.			1	1										
4	Testing and Modification of	A	Testing the proposed synthesis against "received fact" as shared by the participants and/or their culture.														
		B	Testing against existing cognitive schema.														
		C	Testing against personal experience.			1											

		D	Testing against formal data collected.			1											1
		E	Testing against contradictory testimony in the literature.														
5	Agreement Statement(s)/Applications of Newly-Constructed Meaning	A	Summarization of agreement.														
		B	Applications of new knowledge.														
		C	Metacognitive statements by the participants illustrating their understanding and that their knowledge or ways of thinking (cognitive schema) have changed as a result of the conference interaction.														

8.18. Satisfaction survey results

	Method	Avg.	SD	SE	Median
1. I feel that communication via the course was something boring.	Low	2.57	0.98	0.37	3
	High	1.29	0.49	0.18	1
2. I feel panic via editing my teacher's posts.	Low	2.00	0.00	0.00	2
	High	1.71	0.76	0.29	2
3. I trust interactive learning situations.	Low	3.86	0.90	0.34	4
	High	4.71	0.49	0.18	5
4. I respect teacher-learner interaction learning situations.	Low	4.29	0.76	0.29	4
	High	4.57	0.53	0.20	5
5. I feel that the self-learning situations are more suitable to me.	Low	3.29	1.50	0.57	3
	High	1.86	0.38	0.14	2
6. I feel that interaction with others has no effect on learning.	Low	2.00	1.15	0.44	2
	High	1.14	0.38	0.14	1
7. I do not feel comfortable while participating.	Low	2.29	0.76	0.29	2
	High	1.43	0.53	0.20	1
8. I hope, all the courses are presented into interactive way.	Low	4.14	0.90	0.34	4
	High	4.57	0.53	0.20	5
9. I feel satisfied via peers' interaction.	Low	3.71	0.95	0.36	4
	High	4.43	0.53	0.20	4
10. I feel that most students easily expressed themselves.	Low	3.71	0.76	0.29	4
	High	4.14	1.07	0.40	4
11. I feel that the course avoided Psychologically difficulties of hurt and frustrating.	Low	4.00	1.00	0.38	4
	High	4.29	0.95	0.36	5
12. I feel confident about updating and spreading my work.	Low	3.86	0.38	0.14	4
	High	4.86	0.38	0.14	5
13. I feel motivated towards the course.	Low	3.71	1.11	0.42	4
	High	4.71	0.49	0.18	5
14. I feel satisfied via teacher interaction.	Low	3.00	1.00	0.38	3
	High	4.86	0.38	0.14	5

15. I do not feel confident in the authenticity of learning via wiki.	Low	3.43	1.40	0.53	4
	High	2.43	1.61	0.61	2
16. I feel that the course undermines the social cohesion amongst us.	Low	2.14	1.35	0.51	2
	High	1.29	0.49	0.18	1
17. I felt panic to participate in any incoming wiki sessions.	Low	2.29	0.95	0.36	2
	High	1.14	0.38	0.14	1
18. I feel that there is an exaggeration in the assessment of learning interaction.	Low	2.43	1.13	0.43	2
	High	1.57	0.53	0.20	2
19. I felt happy while participating with the others.	Low	4.00	0.82	0.31	4
	High	4.86	0.38	0.14	5
20. I did not trust the other's viewpoints.	Low	2.29	0.95	0.36	2
	High	1.14	0.38	0.14	1

1=strongly Disagree; 2=Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree

8.19.Classroom Community Scale[1] characteristics

	Method	Avg.	SD	SE	Median
1. I felt that students in this course care about each	Low	3.29	0.95	0.36	3
other.	High	3.86	1.21	0.46	4
2. I felt that i am encouraged to ask questions.	Low	3.57	1.27	0.48	4
	High	4.57	0.53	0.20	5
3. I felt connected to others in this course.	Low	3.71	0.76	0.29	4
	High	4.43	0.53	0.20	4
4. I felt that it was hard to get help when i had a	Low	1.57	0.53	0.20	2
question.	High	1.29	0.49	0.18	1
5. I did not feel a spirit of community.	Low	2.86	1.21	0.46	3
	High	1.57	0.98	0.37	1
6. I felt that i received timely feedback.	Low	2.00	1.15	0.44	2
	High	4.57	0.53	0.20	5
7. I felt that this course is like a family.	Low	3.57	0.79	0.30	3
	High	4.00	1.15	0.44	4
8. I felt uneasy exposing gaps in my understanding.	Low	3.71	0.95	0.36	4
	High	1.14	0.38	0.14	1
9. I felt isolated in this course.	Low	2.57	0.79	0.30	3
	High	1.14	0.38	0.14	1
10. I felt reluctant to speak openly.	Low	2.14	1.07	0.40	2
	High	1.57	0.79	0.30	1
11. I trusted others in this course.	Low	4.14	0.69	0.26	4
	High	4.43	0.79	0.30	5
12. I felt that this course results in only modest	Low	3.14	0.69	0.26	3
learning.	High	2	0.58	0.22	2
13. I felt that i could rely on others in this course.	Low	2.57	1.13	0.43	3
	High	3.71	0.76	0.29	4

[1] Rovai, A. P. (2002). Development of an instrument to measure classroom community. Internet & Higher Education, 5(3), 197-211. (ERIC Document Reproduction Service No. EJ663068), **with permission of the owner of the tool 5. October 2010.**

14. I felt that other students did not help me learn.	Low	2.42	0.98	0.37	2
	High	1.86	0.69	0.26	2
15. I felt that members of this course depend on me.	Low	2.57	0.79	0.30	3
	High	3.29	1.49	0.57	3
16. I felt that i was given ample opportunities to	Low	4.14	0.38	0.14	4
learn.	High	4.43	0.79	0.30	5
17. I felt uncertain about others in this course.	Low	2.71	0.76	0.2	3
	High	1.86	0.90	0.34	2
18. I felt that my educational needs were not being	Low	2.86	1.21	0.46	2
met.	High	1.86	0.38	0.14	2
19. I felt confident that others will have supported	Low	3.71	0.76	0.29	4
me.	High	4.57	0.79	0.30	5
20. I felt that this course did not promote a desire to	Low	1.71	0.49	0.18	2
learn.	High	1.29	0.49	0.18	1

1=strongly Disagree; 2=Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree

8.20. Attitudes towards teacher-learner interaction (20 items)

	Method	Avg.	SD	SE	Median
1. I felt the tutor engaged me in communicated	Low	2.86	1.07	0.40	3
social situations.	High	4.57	0.79	0.30	5
2. I felt that the tutor treated the barriers resulting	Low	2.57	0.53	0.20	3
from the individual differences.	High	4.43	0.79	0.30	5
3. I did not get immediate feedback from the	Low	4.43	0.53	0.20	4
teacher.	High	1.14	0.38	0.14	1
4. I felt the tutor prepared productive course topics.	Low	4.00	0.58	0.22	4
	High	4.71	0.49	0.18	5
5. I felt that most students were panic about	Low	3.14	0.38	0.14	3
interacting with the other peers and/or teacher.	High	1.71	0.76	0.29	2
6. The tutor provided me the capability of	Low	2.86	1.46	0.55	2
interacting with others.	High	4.71	0.49	0.18	5
7. I felt noisy to receive learning posts or alerts.	Low	4.29	1.25	0.47	5
	High	3.00	1.53	0.58	3
8. The tutor guides and facilitates my learning.	Low	3.14	1.07	0.40	3
	High	4.71	0.49	0.18	5
9. I felt our final approach doesn’t cover the desired	Low	2.86	0.69	0.26	3
general goals of the course.	High	1.43	0.53	0.20	1
10. I asked for but i did not receive help from the	Low	1.57	0.53	0.20	2
group members and/or the teacher.	High	1.00	0.00	0.00	1
11. I felt i had been actively participated in real-life	Low	3.14	1.35	0.51	3
learning activities.	High	4.43	0.53	0.20	4
12. I did not have a real effective contact with the	Low	3.71	1.38	0.52	4
tutor and my colleagues.	High	1.71	1.50	0.57	1
13. The course was underestimated in terms of the	Low	2.57	1.13	0.43	2
expectations, deadline and ease of accessibility.	High	1.29	0.49	0.18	1
14. I felt our final achievements demonstrated a	Low	3.43	0.97	0.37	
deep understanding of the content concepts that we	High	4.57	0.53	0.20	3
have created.					5
15. The tutor dealt respectfully the problems	Low	4.00	0.58	0.22	4

encountered us.	High	4.71	0.76	0.29	5
16. I positively interacted with my colleagues and	Low	3.86	0.69	0.26	4
/or teacher.	High	4.86	0.38	0.14	5
17. The tutor interactively managed the course.	Low	3.86	1.07	0.40	4
	High	4.71	0.49	0.18	5
18. The tutor planned and organized tasks very	Low	3.00	0.82	0.31	3
similar to those in face to face.	High	4.57	0.79	0.30	5
19. I did not feel confidence that others read my	Low	2.57	0.98	0.37	3
posts and post their ideas freely.	High	1.71	0.76	0.29	2
20. I had the ability to interact positively and my	Low	4.14			
colleagues and/or the teacher responded to my	High	4.71	0.38	0.14	4
mistakes.			0.49	0.18	5

1=strongly Disagree; 2=Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree

8.21. Mann-Whitney test results (pretest results)

Factor*	Degree**	Mann-Whitney Test Test statistics
1	12	
1	7	
1	13	
1	15	
1	6	
1	11	
1	8	
2	13	
2	12	
2	9	
2	10	
2	7	
2	15	
2	12	

	Pretest degree
Mann-Whitney U	20,500
Wilcoxon W	48,500
Z	-,515
Asymp. Sig. (2-tailed)	,606
Exact Sig. [2*(1-tailed Sig.)]	,620

* Factor item refers to the group setting where the value 1 refers to the control group and the value 2 refers to the training group.

** Degree item refers to the degrees of both two groups on the pretest

8.22. Mann-Whitney test results (posttest results)

Factor	Degree	Mann-Whitney Test Test statistics
1	18	
1	21	
1	17	
1	18	
1	11	
1	13	
1	11	
2	20	
2	17	
2	24	
2	19	
2	27	
2	23	
2	25	

	Posttest degree
Mann-Whitney U	5,500
Wilcoxon W	33,500
Z	-2,436
Asymp. Sig. (2-tailed)	,015
Exact Sig. [2*(1-tailed Sig.)]	,011

8.23. Improvements and percentages table

Treatment	Pretest	Posttest	Improvement	Improvement percentages
1	12	18	6	50.00%
1	7	21	14	200.00%
1	13	17	4	30.80%
1	15	18	3	20.00%
1	6	11	5	83.30%
1	11	13	2	18.20%
1	8	11	3	37.50%
2	13	20	7	53.80%
2	12	17	5	41.70%
2	9	24	15	166.70%
2	10	19	9	90.00%
2	7	27	20	285.70%
2	15	23	8	53.30%
2	12	25	13	108.30%

8.24. Descriptive data about the pre and post-test and the improvement

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
pre_test	Control Group	7	10.29	3.352	1.267	7.19	13.39	6	15
	Training Group	7	11.14	2.673	1.010	8.67	13.61	7	15
	Total	14	10.71	2.946	.787	9.01	12.42	6	15
Post_test	Control Group	7	15.57	3.910	1.478	11.96	19.19	11	21
	Training Group	7	22.14	3.579	1.353	18.83	25.45	17	27
	Total	14	18.86	4.959	1.325	15.99	21.72	11	27
Improvement	Control Group	7	5.29	4.071	1.539	1.52	9.05	2	14
	Training Group	7	11.00	5.260	1.988	6.14	15.86	5	20
	Total	14	8.14	5.405	1.444	5.02	11.26	2	20
Imp_Perc	Control Group	7	62.8286	64.41146	24.34524	3.2579	122.3992	18.20	200.00
	Training Group	7	114.2143	86.98867	32.87863	33.7632	194.6654	41.70	285.70
	Total	14	88.5214	78.21907	20.90493	43.3591	133.6838	18.20	285.70

8.25. Differences within groups table

Control Pre-post	Training pre-post
12	13
7	12
13	9
15	10
6	7
11	15
8	12
18	20
21	17
17	24
18	19
11	27
13	23
11	25

8.26. One Way ANOVA test

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
pre_test	Between Groups	2.571	1	2.571	.280	.606
	Within Groups	110.286	12	9.190		
	Total	112.857	13			
Post_test	Between Groups	151.143	1	151.143	10.759	.007
	Within Groups	168.571	12	14.048		
	Total	319.714	13			
Improvement	Between Groups	114.286	1	114.286	5.167	.042
	Within Groups	265.429	12	22.119		
	Total	379.714	13			
Imp_Perc	Between Groups	9241.721	1	9241.721	1.578	.233
	Within Groups	70295.183	12	5857.932		
	Total	79536.904	13			

8.27. Final product scale results

	Statement	Method	Accomplished	Frequency	Percentage
1	Is the component organization consistent throughout the course?	Low	Yes	1	14.3%
			No	6	85.7%
		High	Yes	4	57.1%
			No	3	42.9%
2	Is the material displayed attractively?	Low	Yes	0	0%
			No	7	100.0%
		High	Yes	2	28.6%
			No	5	71.4%
3	Is there a brief description about the course?	Low	Yes	2	28.6%
			No	5	71.4%
		High	Yes	7	100.0%
			No	0	0%
4	Does each section of the course or topics begin with a summary?	Low	Yes	0	0%
			No	7	100.0%
		High	Yes	3	42.9%
			No	4	57.1%
5	Is there effective use of the Upcoming events, calendar block?	Low	Yes	2	28.6%
			No	5	71.4%
		High	Yes	4	57.1%
			No	3	42.9%
6	Does the participant edit his/her profile?	Low	Yes	4	57.1%
			No	3	42.9%
		High	Yes	5	71.4%
			No	2	28.6%
7	Are the photographs, animations and other forms of multimedia used in the course?	Low	Yes	4	57.1%
			No	3	42.9%
		High	Yes	7	100.0%
			No	0	0%
8	Is the courseware screen layout (screen elements- titles, text areas etc.) easy to	Low	Yes	1	14.3%
			No	6	85.7%

	understand?	High	Yes No	6 1	85.7% 14.3%
9	Are spelling and grammar used correctly?	Low	Yes No	3 4	42.9% 57.1%
		High	Yes No	6 1	85.7% 14.3%
10	Does the course name express the course main idea?	Low	Yes No	2 5	28.6% 71.4%
		High	Yes No	5 2	71.4% 28.6%
11	Is there a course start date?	Low	Yes No	0 7	0% 100.0%
		High	Yes No	1 6	14.3% 85.7%
12	Does the course weeks limited to 9 weeks?	Low	Yes No	1 6	14.3% 85.7%
		High	Yes No	2 5	28.6% 71.4%
13	Are there learners enrolled in the course?	Low	Yes No	0 7	0% 100.0%
		High	Yes No	5 2	71.4% 28.6%
14	Does the participant assign another teacher in the course?	Low	Yes No	0 7	0% 100.0%
		High	Yes No	4 3	57.1% 42.9%
15	Does the course format give an accurate indication of how the material is arranged?	Low	Yes No	3 4	42.9% 57.1%
		High	Yes No	7 0	100.0% 0%
16	Is there a question included in the	Low	Yes	0	0%

	course?		No	7	100.0%
			Yes	2	28.6%
		High	No	5	71.4%
17	Does the participant backup the course?	Low	Yes	4	57.1%
			No	3	42.9%
		High	Yes	5	71.4%
			No	2	28.6%
18	Is there synchronous communication tool in the course?	Low	Yes	1	14.3%
			No	6	85.7%
		High	Yes	5	71.4%
			No	2	28.6%
19	Is there asynchronous communication tool in the course?	Low	Yes	7	100.0%
			No	0	0%
		High	Yes	7	100.0%
			No	0	0%
20	Is there a Glossary defines unusual terms used in the course?	Low	Yes	1	14.3%
			No	6	85.7%
		High	Yes	4	57.1%
			No	3	42.9%
21	Is the choice activity included?	Low	Yes	0	0%
			No	7	100.0%
		High	Yes	6	85.7%
			No	1	14.3%
22	Does the participant add a database activity to the course?	Low	Yes	2	28.6%
			No	5	71.4%
		High	Yes	7	100.0%
			No	0	0%
23	Does the courseware Provide feedback to the learners?	Low	Yes	0	0%
			No	7	100.0%
		High	Yes	3	42.9%
			No	4	57.1%
24	Is there a Book with at least one chapter in the course?	Low	Yes	4	57.1%
			No	3	42.9%
		High	Yes	4	57.1%

			No	3	42.9%
25	Has the course a text or PDF, PPT or any external files?	Low	Yes	3	42.9%
			No	4	57.1%
		High	Yes	6	85.7%
			No	1	14.3%

8.28. Motivation scale

	Method	Avg.	SD	SE	Median
Classroom community scale items					
2. I felt that i am encouraged to ask questions.	Low	3.57	1.27	0.48	4
	High	4.57	0.53	0.20	5
3. I felt connected to others in this course.	Low	3.71	0.76	0.29	4
	High	4.43	0.53	0.20	4
5. I did not feel a spirit of community.	Low	2.86	1.21	0.46	3
	High	1.57	0.98	0.37	1
7. I felt that this course is like a family.	Low	3.57	0.79	0.30	3
	High	4.00	1.15	0.44	4
9. I felt isolated in this course.	Low	2.57	0.79	0.30	3
	High	1.14	0.38	0.14	1
10. I felt reluctant to speak openly.	Low	2.14	1.07	0.40	2
	High	1.57	0.79	0.30	1
12. I felt that this course results in only modest	Low	3.14	0.69	0.26	3
learning.	High	2	0.58	0.22	2
18. I felt that my educational needs were not being	Low	2.86	1.21	0.46	2
met.	High	1.86	0.38	0.14	2
19. I felt confident that others will have supported	Low	3.71	0.76	0.29	4
me.	High	4.57	0.79	0.30	5
20. I felt that this course did not promote a desire to	Low	1.71	0.49	0.18	2
learn.	High	1.29	0.49	0.18	1
Attitudes towards teacher learner interaction					
2. I felt that the tutor treated the barriers resulting	Low	2.57	0.53	0.20	3
from the individual differences.	High	4.43	0.79	0.30	5
6. The tutor provided me the capability of	Low	2.86	1.46	0.55	2
interacting with others.	High	4.71	0.49	0.18	5
7. I felt noisy to receive learning posts or alerts.	Low	4.29	1.25	0.47	5
	High	3.00	1.53	0.58	3
10. I asked for but i did not receive help from the	Low	1.57	0.53	0.20	2

group members and/or the teacher.	High	1.00	0.00	0.00	1
11. I felt i had been actively participated in real-life	Low	3.14	1.35	0.51	3
learning activities.	High	4.43	0.53	0.20	4
12. I did not have a real effective contact with the	Low	3.71	1.38	0.52	4
tutor and my colleagues.	High	1.71	1.50	0.57	1
13. The course was underestimated in terms of the	Low	2.57	1.13	0.43	2
expectations, deadline and ease of accessibility.	High	1.29	0.49	0.18	1
15. The tutor dealt respectfully the problems	Low	4.00	0.58	0.22	4
encountered us.	High	4.71	0.76	0.29	5
16. I positively interacted with my colleagues and	Low	3.86	0.69	0.26	4
/or teacher.	High	4.86	0.38	0.14	5
19. I did not feel confidence that others read my	Low	2.57	0.98	0.37	3
posts and post their ideas freely.	High	1.71	0.76	0.29	2

1=strongly Disagree; 2=Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree

8.29. The reliability of the using Cronbach alpha

Reliabilitätsstatistiken

Instrumnente	Cronbachs Alpha	Anzahl der Items
Satisfaction attitudinal survey scale	,934	20
Classroom community scale	,936	20
Teacher-learner interaction scale	,955	20
Final product scale	,883	25

8.30. The significant differences of the scales classroom community scale, satisfaction survey scale and teacher-learner interaction scale in positive and negative statements.

Statistik für Test[b]

	classroom_positiv	classroom_negative	satisfaction_positive	satisfaction_negativ	interaction_positiv	interaction_negativ	Motivation survey
Mann-Whitney-U	5,500	3,000	6,000	2,000	2,000	,000	4,000
Wilcoxon-W	33,500	31,000	34,000	30,000	30,000	28,000	32,000
Z	-2,444	-2,756	-2,388	-2,894	-2,881	-3,141	-2,658
Asymptotische Signifikanz (2-seitig)	,015	,006	,017	,004	,004	,002	,008
Exakte Signifikanz [2*(1-seitig Sig.)]	,011[a]	,004[a]	,017[a]	,002[a]	,002[a]	,001[a]	,007[a]

a. Nicht für Bindungen korrigiert.

b. Gruppenvariable: CG_IG

8.30. Statistics descriptive of the level of cooperative

Collaborative learning level	Number	Frequencies		
		Control group	Training group	Sum
L1- Sharing/ Comparing of Information	14	77	263	335
L2- The Discovery and Exploration of Dissonance or Inconsistency among Ideas, Concepts, or Statements.	14	10	43	53
L3- Negotiation of Meaning/Co-Construction of Knowledge	14	31	108	139
L4-Testing and Modification of Proposed Synthesis or Co-Construction	14	0	10	10
L5-Agreement Statement(s)/Applications of Newly-Constructed Meaning	14	2	22	24
Sum	14	115	446	561

8.31. Motivation scale the first question's responses

On a scale of 1 to 5, with 1 is ranked the highest, how much experience you got from the course affects your viewpoints? And how?

Low level setting: (notice that the number between practices refers to the learners' responses).

Participant 1: (2) Because i have not any experience before about the Moodle course.

Participant 2: (2) I think it was a good experience from this course by how to create a course participate with others and in space to explain my viewpoints.

Participant 3: (2) I gave a high rank because i think that e-learning is the future of learning and all the people must learn to study and learn with this type of course, so for me i gained a good amount of experience as it was the first time for me to work in a course with this type of learning. So i was happy and interested and wanted to learn more about this course and became expert using the Moodle.

Participant 4: (3) at first i did not have any experience with Moodle and now i have some needed experience to use like this software.

Participant 5: (4) because i did not find interaction with my group and i did not find enough data for learning.

Participant 6: (3)

Participant 7: (2) as I have learnt a lot of things.

High level setting:

Participant 8: (1) I gained a lot of experience from this course, it is the first time to know wiki and it is very good tool for learning.

Participant 9: (2) This course is very useful to me, i obtained a lot of information and new way about collaborative learning to apply (win-win) between members in my group.

Participant 10: (1) Before i study this course i did not have any background about wiki and Moodle, after participating this course, i have got a lot experience about them.

Participant 11: (1) This is very interactive work.

Participant 12: (1) During the interaction between the teacher and us and by applicate what we learned.

Participant 13: (3) Because i have faced some difficulties at the beginning.

Participant 14: (2) Because of the group interactions and the Moodle facilities.

8.33. The second motivation scale' responses

In the highlight of the main aspects of learning interaction as a powerful way to encourage participants to be able to progress successfully through their learning situations, to be social learners who have good co-operative learning skills and strategies and be able to interact effectively, how effectively do you believe the members of your small group interacted with each other or with the teacher on the assignments? (On a Scale of 1 to 5).

Low level setting:

Participant 1: (3) Because the interaction with my group was good.

Participant 2: (3)

Participant 3: (4) In our group the interaction with our colleagues and the teacher was low and not effective.

Participant 4: (4) I think the interaction between the students was quite low.

Participant 5: (3)

Participant 6: (4)

Participant 7: (2)

High level setting:

Participant 8: (1)

Participant 9: (1)

Participant 10: (1)

Participant 11: (2)

Participant 12: (1)

Participant 13: (3) some members were active others not.

Participant 14: (2)

8.34. The third motivation scale' responses

…With understanding the learning interaction that was described earlier, how effectively do you feel you interacted with the other peers and/or teacher in your group's assignments? (On a scale of 1 to 5).

Low level setting:

Participant 1: (2) Because the interaction with the teacher was very good.

Participant 2: (2)

Participant 3: (3) Yes, the interaction between me and my group and teacher was neutral and not very strong but not bad.

Participant 4: (3)

Participant 5: (3)

Participant 6: (3)

Participant 7: (1)

High level setting:

Participant 8: (1)

Participant 9: (2)

Participant 10: (1)

Participant 11: (1)

Participant 12: (1)

Participant 13: (2) Specially with teacher.

Participant 14: (1)

8.35. The fourth motivation scale's responses

Have you experienced any barriers or challenges using wiki to interact with the other peers or teachers? If yes, please specify and explain how did you deal with them using wiki?

Low level setting:

Participant 1: Yes, i had one problem in my Opera (web browser) when i was add a 'PowerPoint' in my course, but i resolved this problem by opening other explorer like 'Firefox'.

Participant 2: Yes, i thought it was online session or chat with teacher and students, and one of the big defects i received more than 20 mails every day and it is not possible to catch that.

Participant 3: Yes, i had some barriers as anyone make editing or make any changes in the wiki, a huge amount of emails came to me and this is very hard to read them and respond to their questions and comments, second barrier, the interaction between me and the teacher was very low and the amount of knowledge decreased with the lack of interaction.

Participant 4: Yes, sometimes i have a problem to save the edit, which i made, but the teacher respond to my questions and gave me the reasons and how to overcome these problems.

Participant 5: The interaction was not strong and i found difficulties in the learning, when i was asking the teacher, he was not answer immediately.

Participant 6: I think the interaction between me and my colleagues was not good, we were working together in my group with a weak support from the teacher, he just answered us if we asked him but we want a lot of support.

Participant 7: No.

High level setting:

Participant 8: No.

Participant 9: No.

Participant 10: No. but i think that the wiki has limited opportunities in font format, the plug in and so on.

Participant 11: No.

Participant 12: While i was working in skill x another group member was working in another skill y, and so i have received and alerted from him with his/her editing that i have. To go to the other skill to see what are/were editing, what i mean it take some time that we can see to learn other skills if all members were working in the same point.

Participant 13: At the beginning some tools were not clear for me, but then it became similar. Also some ideas to simplify in the wiki tool should be clearer like 'add Block' and some activities.

Participant 14: Yes, the main barriers that i have experienced was using page history in returning the page to the previous (latest) form that was before my editing which leads to the changing of my points

view but on the other side this facility allows the users to see every editing done to the page and the teacher could choose the best.

8.36. The content analysis results of the learners' satisfaction aspects

Content analysis categories	Low Level Teacher-learner Interaction	High Level Teacher-learner Interaction	sum	Low level percentages	High level percentages
Satisfaction					
Not satisfied\Why they were not satisfied?\Low interaction aspects	17	0	17	100%	0%
Not satisfied\Why they were not satisfied?\disadvantages	2	0	2	100%	0%
Not satisfied\Why they were not satisfied?\Problems	8	0	8	100%	0%
Satisfied\Why they were satisfied?\Expectations	0	5	5	0%	100%
Satisfied\Why they were satisfied?\Advantages\Wiki benefits	3	5	8	37.5%	62.5%
Satisfied\Why they were satisfied?\Advantages\Interaction	3	21	24	12.5%	87.5%
Satisfied\Why they were satisfied?\Advantages\Useful functions	4	9	13	30.8%	69.3%
Satisfied\Why they were satisfied?\Advantages\easy way	5	7	12	41.7%	58.3%
Satisfied\Why they were satisfied?\Advantages\Simple structure	2	2	4	50%	50%
Satisfied\Why they were satisfied?\Advantages\Express my ideas	0	4	4	0%	100%

8.37. The content analysis results of the learners' interaction aspects

Content analysis categories	Low level teacher-learner interaction	High level teacher-learner interaction	sum	Low level percentages	High level percentages
Attitudes					
Content-learner interaction\positive	13	13	26	50%	50%
Content-learner interaction\Negative	4	3	7	57.1%	42.9%
Teacher-learner interaction\Negative	16	0	16	100%	0%
Teacher-learner interaction\Positive	5	23	28	17.8%	82.2%
Learner-learner interaction	3	13	16	18.7%	81.3%

8.38. The content analysis results of online interaction

Content analysis categories		Low level teacher-learner Interaction	High Level teacher-learner Interaction	sum	Low level percentages	High level percentages
	Online interaction					
Sharing/ Comparing of Information	A statement or observation or opinion.	12	89	101	11.88%	88.12%
	A statement of agreement from one or more other participants.	0	28	28	0%	100%
	Corroborating examples provided by one or more participants.	1	13	14	7.1%	92.9%
	Asking and answering questions to clarify details of statements.	10	82	92	10.9%	89.1%
	Definition, description, or identification of a problem.	49	51	100	49%	51%
Discovery and Exploration of Dissonance or Inconsistency	Identifying and stating areas of disagreement	1	7	8	12.5%	87.5%
	Asking and answering questions to clarify the source and disagreement.	6	29	35	17.1%	82.9%
	Restating the participants' position.	3	7	10	30%	70%
Negotiation of Meaning/Co-Construction of Knowledge	Negotiation or clarification of the meaning of terms.	14	26	40	35%	65%
	Negotiation of the relative weight of types of arguments	0	0	0	0%	0%
	Identification of areas of agreement or overlap among concepts	11	22	33	33.3%	66.7%
	Proposal and negotiation of new statements	6	57	63	9.5%	90.5%
	Proposal of integrating or accommodating metaphors	0	3	3	0%	100%
Testing and Modification of Proposed Synthesis or Co-Constructi	Testing the proposed synthesis against "received fact".	0	1	1	0%	100%
	Testing against existing cognitive schema.	0	1	1	0%	100%
	Testing against personal experience.	0	1	1	0%	100%
	Testing against formal data collected.	0	7	7	0%	100%
	Testing against contradictory testimony in the literature.	0	0	0	0%	100%
ment Statement(s)/ Applications of Newly-Constructed Meani	Summarization of agreement.	0	7	7	0%	100%
	Applications of new knowledge.	2	13	15	13.3%	86.7%
	Metacognitive statements illustrating understanding	0	2	2	0%	100%
	Interaction					
	Interaction\Action					
	Interaction\Action\By Teacher	1	11	12	8.3%	91.7%
	Interaction\Action\By Teacher\create a Forum	0	2	2	0%	100%
	Interaction\Action\By Learner	14	89	103	13.6%	86.4%
	Interaction\Action\By Learner\New Forum	0	7	7	0%	100%
	Interaction\Action\By Learner\Wish	0	11	11	0%	100%
	Interaction\Action\By Learner\Concept	0	3	3	0%	100%
	Interaction\Action\By Learner\Question	11	70	81	13.6%	86.4%
	Interaction\Action\By Learner\Comment	5	34	39	12.8%	87.2%
	Interaction\Action\By Learner\Thanks	2	4	6	33.3%	66.7%
	Interaction\Action\By Learner\Respect	1	8	9	11.1%	88.9%
	Interaction\Reaction					
	Interaction\Reaction\No	3	2	5	60%	40%
	Interaction\Reaction\Yes	10	159	169	5.9%	94.1%
	Interaction\Reaction\Yes\Who					
	Interaction\Reaction\Yes\Who\Teacher	10	109	119	8.4%	91.6%
	Interaction\Reaction\Yes\Who\learner	0	51	51	0%	100%
	Interaction\Reaction\Yes\Reaction Type					
	Interaction\Reaction\Yes\Reaction Type\Editing the wiki page	1	9	10	10%	90%
	Interaction\Reaction\Yes\Reaction Type\Exchanging the other's view points	2	3	5	40%	60%
	Interaction\Reaction\Yes\Reaction Type\Reinforcement	0	39	39	0%	100%
	Interaction\Reaction\Yes\Reaction Type\Advice	2	31	33	4.1%	93.1%
	Interaction\Reaction\Yes\Reaction Type\Comment	2	12	14	14.3%	85.7%
	Interaction\Reaction\Yes\Reaction Type\Reply comment	11	148	159	6.9%	93.1%
	Interaction\Reaction\Yes\Reaction Type\Answer	9	107	116	7.8%	92.2%
	Interaction\Reaction\Yes\Reaction Type\Question	3	11	14	21.4%	78.6%
	Interaction\Reaction\Yes\Reaction Type\Online chatting sessions	0	8	8	0%	100%
	Interaction\Reaction\Yes\Reaction Type\Forum	0	15	15	0%	100%
	Interaction\Reaction\Yes\Reaction Type\Feedback	3	100	103	2.9%	97.1%
	Interaction\Reaction\Yes\Reaction Type\Agreement	0	28	28	0%	100%
	Interaction\Reaction\Yes\Reaction Type\Tribute	0	8	8	0%	100%
	Interaction\Reaction\Yes\Timing					
	Interaction\Reaction\Yes\Timing\Immediately	1	96	97	1.01%	98.99%
	Interaction\Reaction\Yes\Timing\late	7	26	33	21.2%	78.8%
	Interaction\Reaction\Yes\Sequenced Comments	0	27	27	0%	100%

8.39. Challenges that encounter participants through the wiki.

Challenges	Low Level Teacher learner Interaction	High Level Teacher learner Interaction	Sum	Low level percentages	High level percentages
Challenges\Pedagogical challenges	13	1	14	92.9%	7.1%
Online group work	0	1	1	0%	100%
Competitive work	0	1	1	0%	100%
More f2f meetings	4	0	4	100%	0%
Editing my posts	1	0	1	100%	0%
Synchronous chatting	10	0	10	100%	0%
Delay respond	7	0	7	100%	0%
Challenges\Technical challenges	4	15	19	20.1%	78.9%
Skype function	0	1	1	0%	100%
Access activation	0	2	2	0%	100%
Profile picture	0	1	1	0%	100%
Presenting images	1	1	2	50%	50%
Receiving a lot of mails	2	7	9	22.2%	77.8%
Formatting flexibility	0	1	1	0%	100%
History function	0	1	1	0%	100%

8.40. The qualitative analysis codes

- Code System
  - High/low level teacher-learner interaction
    - Low
    - High
  - Person Nr
    - 1
    - 2
    - 3
    - 4
    - 5
    - 6
    - 7
    - 8
    - 9
    - 10
    - 11
    - 12

- 13
- 14

- Online interaction
  - Sharing/ Comparing of Information
    - A statement or observation or opinion.
    - A statement of agreement from one or more other participants.
    - Corroborating examples provided by one or more participants.
    - Asking and answering questions to clarify details of statements.
    - Definition, description, or identification of a problem.
  - The Discovery and Exploration of Dissonance or Inconsistency among Ideas, Concepts, or Statements
    - Identifying and stating areas of disagreement.
    - Asking and answering questions to clarify the source and extent of disagreement.
    - Restating the participants' position, and possibly advancing arguments or considerations in its support by references to the participants' experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view.
  - Negotiation of Meaning/Co-Construction of Knowledge
    - Negotiation or clarification of the meaning of terms.
    - Negotiation of the relative weight to be assigned to types of arguments.
    - Identification of areas of agreement or overlap among conflicting concepts.
    - Proposal and negotiation of new statements embodying compromise, co construction.
    - Proposal of integrating or accommodating metaphors or analogies.
  - Testing and Modification of Proposed Synthesis or Co-Construction
    - Testing the proposed synthesis against "received fact" as shared by the participants and/or their culture.
    - Testing against existing cognitive schema.
    - Testing against personal experience.

- Testing against formal data collected.
- Testing against contradictory testimony in the literature.

▪ Agreement Statement(s)/Applications of Newly-Constructed Meaning

- Summarization of agreement.
- Applications of new knowledge.
- Metacognitive statements by the participants illustrating their understanding and that their knowledge or ways of thinking (cognitive schema) have changed as a result of the interaction.

o Interaction

▪ Action

- By teacher
  - Create a Forum
- By learner
  - New Forum
  - Wish
  - Concept
  - Question
  - Comment
  - Thanks
  - Respect

▪ Reaction

- No
- Yes
  - Who
    - Teacher
    - Learner
  - Reaction type
    - Editing the wiki page
    - Exchanging the other’s view points
    - Reinforcement
    - Advice
    - Comment
    - Reply comment
    - Answer

- Online chatting sessions
- Forum
- Feedback
- Agreement
- Attribute

- Timing
  - Immediately
  - Late

- Sequenced comments

- Prior knowledge
  - Yes
  - No
  - Unknown
- Attitudes
  - Content-learner interaction
    - Unknown
    - Posi.
    - Nega.
  - Teacher-learner interaction
    - Negative
    - Positive
  - Learner-learner interaction
- Motivation
  - Not motivated
  - Very motivated
  - Motivated
- Satisfaction
  - Not satisfied
    - Why they were not satisfied?
      - Low interaction
      - Disadvantages
      - Problems
  - Satisfied
    - Why they were satisfied?

- Expectations
- Advantages
  - Wiki benefits
  - Interaction
  - Useful functions
  - Easy way
  - Simple structure
  - Express my ideas

- Challenges
  - Pedagogical challenges
    - Online group work
    - Competitive work
    - More face to face meetings
    - Editing my posts
    - Synchronous chatting
    - Delay respond
  - Technical challenges
    - Skype function
    - Access activation
    - Profile picture
    - Presenting images
    - Receiving a lot of mails
    - Formatting flexibility
    - History function

8.41. The main page of the MAXDQA with the results of the qualitative analysis data.