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Integrating Community Teaching in MOOCs

Eva Ponce, Sindhu Srinath, and Laura Allegue

MITx MicroMasters in SCM
MIT CTL, Cambridge, MA 02142, United States

The MITx MicroMasters Program in Supply Chain Management (SCM) is a Massive Open Online Course (MOOC) based program that aims to impart quantitative and qualitative knowledge to SCM enthusiasts all around the world. The program that started in 2014 with just one course, now offers 5 courses and one final proctored exam, which allows a learner to gain a MicroMasters credential upon completion. While the courses are delivered in the form of pre-recorded videos by the faculty members of Massachusetts Institute of Technology (MIT), the questions and comments posted by learners in discussion forums are addressed by a group of Community Teaching Assistants (CTAs) who volunteer for this role. The MITx staff carefully selects CTAs for each run of the individual courses as they take on a co-facilitator's role in the program. This paper highlights the importance of community teaching, discusses the profile of CTAs involved with the program, their recruitment, training, tasks and responsibilities, engagement, and rewarding process. In the end we also share a few recommendations based on the lessons learned in community teaching during the last five years of running more than 45 MOOC courses, that could help other MOOC teams deliver a high-touch experience.

1 Introduction

The MITx MicroMasters in SCM is a global program having more than 400,000 unique learners from 190 countries. The program comprises of 5 supply chain courses, SC0x – Supply Chain Analytics, SC1x – Supply Chain Fundamentals, SC2x – Supply Chain Design, SC3x – Supply Chain Dynamics, SC4x – Supply Chain Technology and Systems, and a proctored CFx – Comprehensive Final Exam[1]. One of the main policies of the program is to educate the world, free of cost, by making the material available on edX platform for learners to audit the course. Students

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[1] https://micromasters.mit.edu/scm/

can enroll in a course as per schedule and either take it up at their own pace (SC0x), or follow the instructor, by going through weekly released materials (SC1x to SC4x). This program also allows students to gain a certificate for the individual courses by paying a nominal fee. These students, called the verified learners, can move ahead by completing all 5 courses to take up the CFx. The students who successfully pass all the courses and the CFx (score $\geq$ 60%), earn a MicroMasters in SCM credential. The MITx MicroMasters in SCM team has awarded more than 40,000 verified certificates and currently has 2,640 credential holders as a part of its community. The course materials are delivered in the form of short videos, quick questions, and practice problems. These are open to all learners. The graded assignments, mid-term and final exam are the ones exclusively available to the verified learners along with supplemental course materials, and access to live events conducted during each run.

While the Course Lead and Teaching Assistant (referred to as the course staff from this point onwards) of each of the courses are responsible for managing the learners enrolled in that particular run, they are assisted by a group of CTAs. The course staff invites verified learners to volunteer for this role, and then carefully selects potential candidates based on certain criteria from the pool of applications. With an average number of 16,300 enrolled learners in each course run, the course staff comprising a maximum of 2 people face what Wiley and Edwards [8] described as a "teacher bandwidth" issue, when analyzing the scalability of the traditional model of teachers supporting learners in an online environment. As the one-on-one interaction becomes almost infeasible under this scenario, CTAs are a key to connect learners and staff, guaranteeing that all learners receive the support and answers they request. The edX platform provides discussion forums, which are open to all, to foster interactions among learners. Learners requiring clarification on topics discussed in the videos or practice problems, post their questions in the forums. The CTAs play a crucial role in clearing the doubts of the learners by providing additional explanations or examples or debugging their approach to quick questions/practice problems. They also engage in discussions with the learners on topics that are complementary to the course materials to keep learners motivated and interested in the course.

Garrison [1] created a Community of Inquiry framework, defining the Social Presence, Cognitive Presence and Teaching presence as prerequisites of higher and successful educational experience. The CTAs enhance a teacher's presence when they contribute to the community teaching activity along with the course staff. Being from diverse backgrounds, the CTAs bring fresh perspective from their own experience either while engaging with learners or while suggesting improvements in the course material, which is lauded and encouraged by the MITx staff. The CTAs are trained to support the learners not only by means of direct instruction when required, but also to guide learners by building on their understanding of

the lecture topics, stimulating the discussion, and challenging their assumptions, to enrich and improve the learners' knowledge construction throughout the course.

2 Methodology

Over 95% of the CTAs recruited for a particular run, have taken the course before as learners. As such, their basic demographic details, such as nationality, age, and education background are available as a part of a sign-up survey conducted by edX. We used the survey results to create general insights on the profile of CTAs. To dive deeper into assessing their motivation behind volunteering for this role, the challenges they face, the benefits they seek, and other details, we conducted an anonymous experience survey among our CTAs. It included multiple choices, ranking options, and open-ended questions. Finally, the course leads' insights in CTA recruitment, training, engagement, tasks, and responsibilities were considered to put our analysis together.

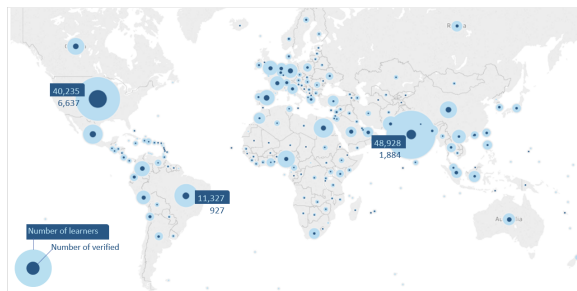## 3 Profile of Community Teaching Assistants

Figure 1: Representation of global community of learners (self-declaration by learners)

The global reach of the MITx MicroMasters in SCM calls for a global set of CTAs as well. From the year 2016 to January 2021, the program has worked with 179 CTAs from 49 countries across 6 continents. As shown in Figure 2 in comparison to Figure 1, the countries from where CTAs volunteered/were recruited is

proportional to the countries from where learners originated. At any point in the year, there are more than 60 CTAs engaged in total across the courses.
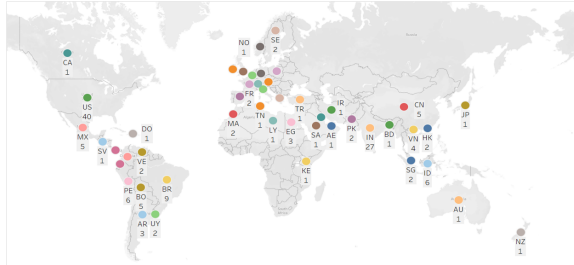

Figure 2: Representation of global community of CTAs (as reported by 176 CTAs)

A higher percentage of CTAs have a bachelor's degree with the next higher set having an additional master's degree. A small portion of this group also had just a high school degree when they on-boarded the community teaching journey as shown in Figure 3. The ones with a degree and job experience, add value to the course by using examples from their career and learning journey when they assist learners in the course. For the ones who are in the process of obtaining a degree or have just completed school, the CTA experience adds value to them as they get to learn from varied students enrolled in the course, while assisting the same learners with the knowledge they gained from the course material.
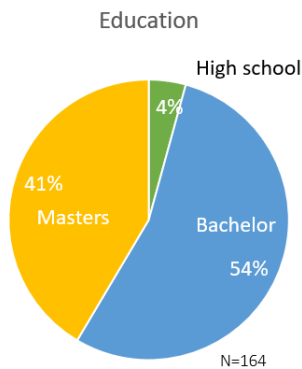

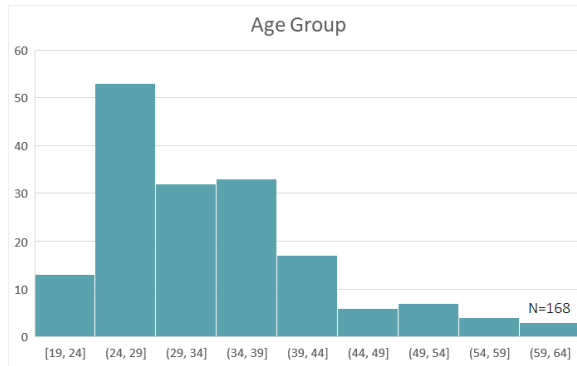**Figure 3:** Educational background of CTAs

Figure 4: Age group of CTAs

A big part of the CTA group belongs to the age group of > 24 and ≤ 29 years with a close following by those belonging to the 29–39 age group as shown in Figure 4. It was not surprising to note that this trend followed that of the learners as observed by us over the years.

4 Motivation, Benefits and Challenges behind CTA'ing

From the short experience survey that we circulated among our CTA group, it was heartening to see that the first and the foremost reason why CTAs were motivated to volunteer for this role was to give back to the community. This outcome connects with previous research studies done by Northrup [3], and by Sadera [5], who reported a strong correlation between interaction and engagement among learners, and a sense of community belonging to being successful in online learning. Being former learners, CTAs have seen the value in community learning and the positive impact that a teaching role creates in furthering the understanding of concepts. Smith [7], found through their research that peer discussion boosts the entire group's understanding of any concept, even in cases where none of the learners discussing the topic know the right answer. The added advantage in this program's structure is that almost all the CTAs hired for a course run know the content already and having a strong backing from the staff, as such, they are confident to jump into the discussion forums to do their bit for the community.

Other important reasons which motivated CTAs to volunteer, was to stay connected to the staff and thus the program, and also to learn from others' (learners and CTAs) perspective as shown in Figure 5.
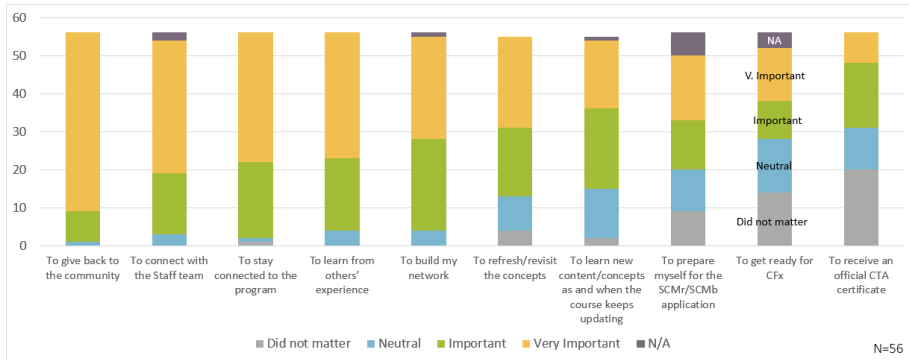
Figure 5: Motivation behind taking up a CTA's role

Building a network with like-minded individuals was the biggest benefit observed by CTAs followed by staying connected with the course content, and learning new concepts as introduced time to time in the courses. For some of them, the CTA role boosted their resume while for others it helped them prepare for the CFx exam, as visualized in Figure 6 below.

A single challenge which was almost agreed upon by all CTAs was finding a balance between their regular job, volunteering for this role, and spending time with their family as shown in Figure 7.

Some of the memorable moments/best experiences shared by CTAs revolved around them being appreciated by the staff, thanked by the learners for their contributions to the program, and the weekly interactions with the course staff and other CTAs where they learned from each other's work experience and shared their views on different topics related to the course.

5 CTA Recruitment Process

The CTA recruitment and onboarding process started in the year 2016 with just 21 CTAs. This family has grown to a total of 179 (as of January 2021) over the years, as indicated in Figure 8. The growth in recruitment was relatively steep in the initial few years to cater to the increasing volume of learners enrolling in the program, which was expanding to include more Supply Chain (SCx) courses. Before the year 2016, only two SCx courses were active. By 2017, a full-fledged MicroMasters program was in place with over 212,000 learners enrolled in one or more courses. Community teaching assistants thus became necessary to assist the existing two-member team of Course Lead and Teaching Assistant.
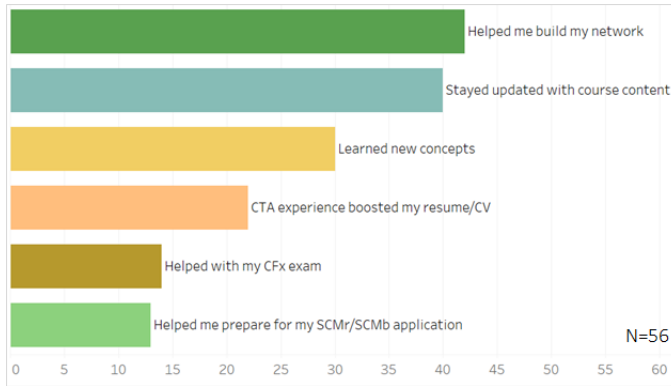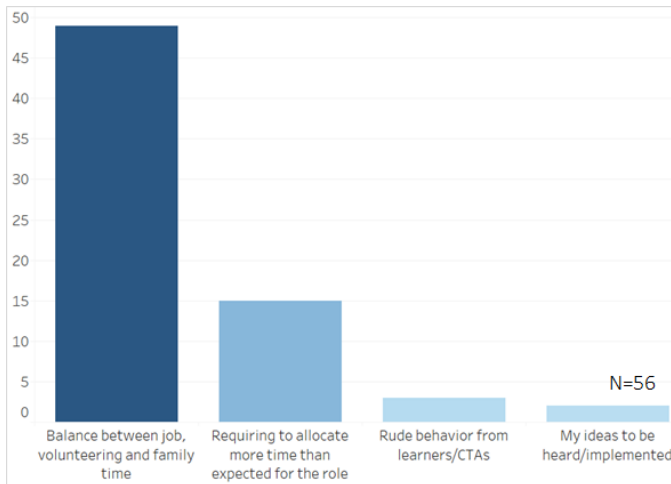
Figure 6: Benefits in a CTA role

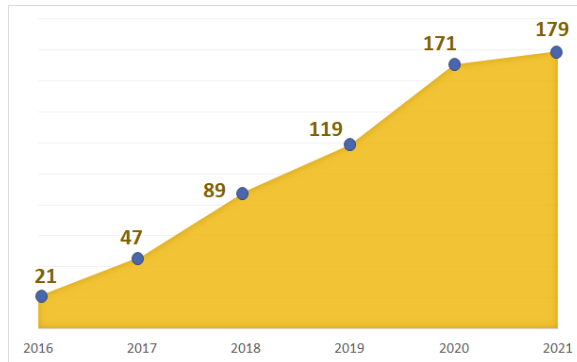**Figure 7:** Challenges faced in a CTA role

Figure 8: Cumulative growth in the number of CTAs

There are two routes by which a CTA group is created for every run of a course – recruiting fresh candidates and/or inviting existing CTAs. A digital form which asks for the candidate's name, edX username, number of courses taken, their respective scores, and motivation statement to become a CTA is circulated at the end of each course run. After keeping the form open for a short period of time and two weeks before the release of a course run, the course staff evaluates each application and short lists potential candidates. The selection is done based on their performance in the courses, their motivation to be a CTA, and their overall behavior, language and tone of communication with other learners and staff by checking the discussion forums (in which the candidates were learners) and the emails sent to respective courses' help email IDs. An invitation email is sent to all potential candidates seeking confirmation on acceptance of role. Occasionally, if the Course Lead identifies a verified learner, enrolled in a run of a course, has an outstanding performance in previous courses, the learner is invited to join the CTA group while taking the course. This allows for the course team to fix minor bugs in the regular material which could be identified by such CTAs taking the course. However, these CTAs will not be allowed to view any assessment material in advance to be fair to all learners.

Among the existing group of CTAs, an invitation is extended to those who have been performing well in terms of engagement with learners, staff, and suggesting ideas actively to improve the course. Also, those CTAs who express their interest to volunteer, are invited as well based on the capacity of CTA roles available. For every run, at least a ratio of 1 CTA per 100 verified learners is tried to be maintained by observing the initial enrollment trend.

There is no restriction placed on the number of courses a CTA needs to complete in order to apply. As such, in the experience survey result as shown in Figure 9,

we noticed that most of them had completed at least 2 courses before they applied. Figure 10 indicates that the maximum number of times a particular CTA has volunteered for this role is between 1 to 3 times while 28 of them volunteered for 4 to 6 course runs.
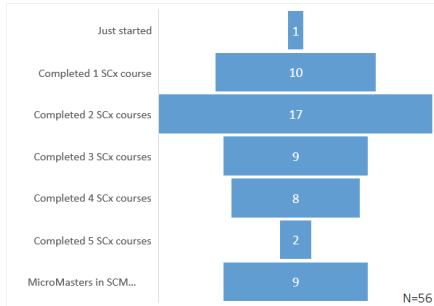
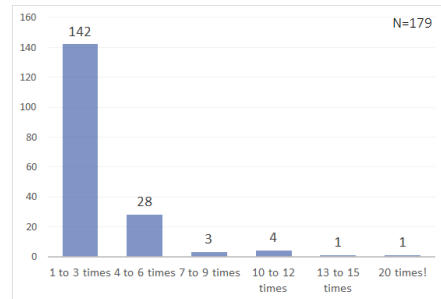

Figure 9: SCx status during application

Figure 10: Number of times each CTA has volunteered for the role

6 CTA Training Process

Knowing that the CTAs are selected considering their performance in SCx courses and their motivation (among other factors as detailed in section 5), the course team does not focus on technical training on the course content, but on the principles and values that should guide them through the journey of assisting in the course. The staff employs CTAs who have completed the course with an average grade above 80%, and only 1 learner is occasionally allowed to be a CTA while taking the course if the learner scored well beyond average in other courses. This shows that the CTAs are well-versed with the material and would rarely require guidance from the course staff on course content.

Existing literature indicates that TAs should encourage collaboration and promote the creation of collective knowledge, trying to avoid direct replies. Additionally, it highlights the importance of a single instructional approach between the Course Lead and the TAs when interacting with the community of learners. This is especially considered just as fundamental as having the technical knowledge to answer the learner's questions [4]. This is one of the main aspects in our CTA training process.

The CTA training is performed during the initial kick-off meeting and reinforced every week. The training includes:

1. The MITx MicroMasters in SCM mission: To educate all learners equally without differentiating between verified or audit learners, and to be polite and respectful towards all learners. The CTA are also made aware of the expected level of commitment and the purpose of their volunteering effort. The CTAs' alignment to the team mission is reflected in their posts in the forums, on how they address the questions, feedback, and comments they receive from the learners. This is observed by the staff regularly during initial weeks after a course run opens.

2. Criteria to differentiate the Learning and Assessment processes: Understanding the difference between which posts aim to enhance the learning experience, opening the doors of engagement and collaboration with other learners, and which posts are about rigorous assessments that should be reported to the course staff immediately for honor code violation.

3. Details on their tasks: Tasks expected to be deployed by a CTA are communicated during the kickoff meeting. Subsequent weekly meetings are conducted to ensure the duties are being carried out as expected.

4. Communication paths: The Course Leads create a common group with CTAs on a social-media platform to stay connected during the run of a course. This group is used for sharing urgent issues seeking attention of the staff. The staff also uses this medium to share updates with the CTA group.

7 CTA Tasks & Responsibilities

The main role of a CTA is to address the concerns and issues of all learners – audit or verified through the discussion forums on edX platform. In the forums, the CTAs are asked to:

1. Look for unanswered "questions" related to the practice material and answer them to the point of not giving away the solutions, but to suggest an approach for the learners to arrive at the right answer. The CTAs are also expected to clarify content related questions to the best of their ability. The staff steps in to assist CTAs as and when necessary, and also to keep a watch on the forums to ensure discussions are civil.

2. Foster conversations by answering the "discussions" post, to encourage learners to think of application of course materials or to discuss on topics related to the given material.

3. Redirect learners to similar posts that have been answered before, mark questions/discussions as "answered" once done so that the other CTAs do not spend time in resolving the same doubt, and actively up-vote the right answers that could either be posted by another learner or a CTA.

4. Report inappropriate/honor-code violating posts (related to graded assignments, mid-term and final exam) to the staff immediately.

5. Improve the learner's experience in the platform by supporting and encouraging them with positive feedback and sharing their knowledge from the industry besides strictly academic content. The relevance of this task was highlighted by Nicol and Macfarlane-Dick [2] whose findings show that supportive and encouraging feedback (which they define as "anything that might strengthen the student's capacity to self-regulate their own performance") improves the results of learners in higher education. Similar conclusions were achieved in online environments by Northrup [3] who found that conversation and collaboration in online learning, including peer interaction and receiving feedback, are highly rated by learners as important to their success.

In addition to the tasks related to the discussion forum, a CTA is also expected to:

1. Report high-impact bugs that could affect learners' capability in taking the course in the predefined structure.

2. Report low to medium impacting bugs in a debug sheet for the course staff to fix before releasing the next run.

3. Participate in weekly meetings hosted by the Course Lead to share feedback on the course material released so far, report any concerns seen by learners, and update the course staff on mini-projects related to course improvement.

A subset of the CTA group is also given an opportunity to beta-test new graded assignments, mid-terms, and final exams before they are released. They are made to sign a Non-Disclosure Agreement (NDA) before they are involved in this process. The beta testing process helps in ensuring that the problem statements are precise as they are being checked by CTAs with diverse backgrounds, the platform settings are working properly, the questions have no ambiguities, and that the assessment is fair. It is important to highlight that the beta tester is a completely different role from that of a CTA. CTAs are set in the platform as Community TA/discussion moderators, while beta testers are included in the platform as Beta Testers.

8 CTA Engagement Process

The SCx courses are designed with the mission of raising the knowledge of SCM professionals across the globe, educating the world for free, and providing a credential to qualified students at a minimum cost. Being a program available globally, the feeling of belonging to such a diverse community of learners is reinforced regularly in lectures, live events, podcasts, presentations, practice problems that are created for the course, and in weekly communications. Interaction is encouraged not only for academic learning purposes but also for networking, and even for personal growth through cultural exchanges. The sense of creating an impact on such a dynamic community, having received support themselves from others, cultivates a need for CTAs to give back to it. This feature, that was highlighted in our findings in section 4 (Figure 5), is the greatest source of engagement driving our CTAs.

On the staff side, the team is responsible for keeping the CTA group motivated and engaged throughout the 12–13 weeks of each course run to count on their continued support in assisting the learners in the forums. Building motivation in online courses, as described by Salmon [6], implies giving the learners, and in this case, the CTAs, activities that make being part of the team worth their time and effort, including short-term goals so that they are able to see the impact of their participation materializing.

A weekly meeting of 30–45 minutes is conducted by the course staff where the CTAs are updated on the learner enrollment statistics, upcoming materials, and any new content/problems to watch out for, live events they could be a part of, and so on. Every Course Lead has used either a formal or an informal method of discussion with the CTAs and both methods have proven to work just as well as the other. The common factor between both is to provide an opportunity for CTAs to share their feedback on the progress of the course so far, any new ideas they wish to share towards course improvement in the form of additional recitations, practice problems, clarification notes, correction of errors, etc. It is important for the staff to acknowledge their points and work in the direction of their recommendations when possible. If infeasible, the staff provides them clarifications to show that their feedback is valued, and their ideas are heard and considered. It is always necessary to respect and appreciate the hard work they put in this volunteering work. Engagement is observed here through a 2-way communication system that helps to build trust in each other, in which both parties, the course staff and the CTAs share information that is not necessarily privileged about the course, but the one that is usually not shared at a learner's level.

In addition to the engagement activities mentioned above, the CTAs are welcomed to help in researching on new content that would be added to the course

before it is opened to learners at large. To let them know how special and valued they are for the staff, they are invited to conferences and seminars hosted by MIT CTL and other external events that Course Leads take part in.

As learning from others' experience and building their own network is highly valued by our CTAs when they volunteer, they are also encouraged to share their SCM work experiences in short sessions of 15–20 mins during the weekly meetings. Another engagement method used by the course staff is to share challenges observed in the industry or the application of new techniques in the field to discuss together. This could eventually lead to its addition as a post in the discussion forums due to its relevance, expanding the discussion to more learners and newer perspectives.

CTAs find it rewarding to engage with the staff on mini projects which are outside their scope to improve the course hands-on. Some of the mini-projects have been Virtual Machine preparation, documentation, and implementation to help learners avoid issues with new software installation, creating downloadable solutions for practice problems in various formats, formula sheet in the form of a "cheat sheet" or "one-pager" for easy access to equations and formulae across courses, guiding documents on how to post in the discussion forums, and a post describing methods to debug a spreadsheet solver. These projects along with many more have received appreciation from learners, who are made aware of the CTAs' participation as the course staff acknowledges them by name when publishing the project outputs in the course platform.

9 CTA Rewarding Process

At the end of a course run, which is after the completion of final exam and declaration of overall course grades, an evaluation of CTA performance is done by the course staff. The number of responses given by CTAs in the discussion forums, their level of engagement with the staff, and their interest in improving the course by providing new ideas and suggestions, are some of the factors taken into account during this evaluation. Based on the results, a "Certificate of Excellence" is awarded digitally to each deserving CTA. The staff also highlights the name of active CTAs by acknowledging them at the end of the course newsletter to thank them for the efforts they put in voluntarily.

Due to the importance of this role, and the kind of value add it brings, a "CTA appreciation event" is conducted twice a year to bring the entire community together, to thank them for their continued support, to hear out their ideas in enhancing a CTA's experience, and to update them on the improvements planned for the courses while also taking their suggestions for the same.

10 Conclusion

Through the research we conducted and after running a community teaching inclusive program for more than five years in massive, open and online courses, we conclude that CTAs play an instrumental role in delivering a high-touch experience in these courses. They are the vigilant eyes in the discussion forums, clarifying learners' doubts almost the very same day, and ever ready to report any wrongdoings or issues to the staff.

The CTA is a volunteer position (unpaid), thus their commitment to the program is one of the key features we make note of during recruitment. This was well reflected in the results of the experience survey we conducted. The top motivation behind CTAs taking up this role was found to be to give back to the community. This sense of belonging to a community and the fact that the CTAs are thankful for what they get through the program, is the main driver for them to sign-up for a CTA role.

We recommend course teams to invest time in managing and engaging with their group of CTAs. It is important to listen to them and take actions based on their feedback. Most of them are full-time working professionals trying to find balance between their regular job and CTA'ing, and that is why it is important not to push them beyond their availability, allow them to be flexible in their CTA timings, and always hear them out. Actively take feedback and provide a response either by working on their recommendation or giving an explanation to CTAs if it is an infeasible action. The CTAs and the course staff trust in each other's work, so as and when necessary, it is crucial to support CTAs in the discussion forums in unpleasant circumstances where learners could be frustrated with the course material or with the way an answer is given by a CTA. Having weekly meetings and open channels of communication with CTAs allows regular connect to clarify doubts or concerns that they may have. This should be one of the course team's utmost priorities when managing a team of CTAs.

Finally, reward and appreciation is another key aspect for the program to be successful. The MITx MicroMasters in SCM team has seen the importance of community teaching through years of engaging with enthusiastic volunteers and observing the quality of their support in the forums. The response from learners either in the forums or in the end of course survey is a testimony to the fact that community teaching does add value beyond the course material.

For future work, we consider including CTA interviews and further expand on staff's and learner's feedback regarding the impact CTAs create in the learning journey. We strongly believe that this additional information will reinforce the positive influence of community teaching in online learning environments.

11 Acknowledgement

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