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# Open Tools and Methods to Support the Development of MOOCs

## A Collection of How-tos, Monster Assignment and Kits

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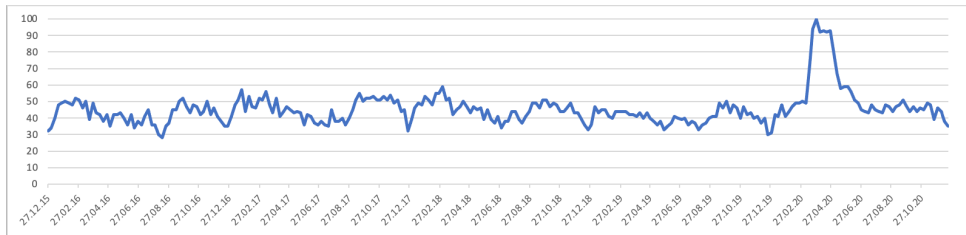
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There are a plethora of ways to guide and support people to learn about MOOC (massive open online course) development, from their first interest, sourcing supportive resources, methods and tools to better aid their understanding of the concepts and pedagogical approaches of MOOC design, to becoming a MOOC developer. This contribution highlights tools and methods that are openly available and re-usable under Creative Commons licenses. Our collection builds upon the experiences from three MOOC development and hosting teams with joint experiences of several hundred MOOCs (University of Applied Sciences in Lübeck, Graz University of Technology, University of Glasgow) in three European countries, which are Germany, Austria and the UK. The contribution recommends and shares experiences with short articles and poster for first information sharing a Monster MOOC assignment for beginners, a MOOC canvas for first sketches, the MOOC design kit for details of instructional design and a MOOC for MOOC makers and a MOOC map as introduction into a certain MOOC platform.

## 1 Introduction: MOOCs and Different Backgrounds for MOOC Development

Open online courses for “masses”, or “massive open online courses” [14] have been exponentially growing since 2012, becoming a strategic ambition for many institutions world-wide [10]. In March 2020, Google search data shows a sharp peak for MOOCs during the first COVID-19 pandemic wave (see Figure 1) and thus also shows the potential of open learning programmes, especially when access to

traditional formats is or becomes problematic (and this does not only apply during a pandemic).



**Figure 1:** Worldwide searches for the topic “Massive Open Online Course” at Google.com. Source: Own visualisation of data offered by “Google Insights for Search”, <https://trends.google.com/trends/explore?date=today%205-y&q=%2Fm%2F0gyvy46>, 27.12.2020. Note: The representation is shown in relation to the highest level (March 2020, 100 percent)

There is now a vast selection of MOOC platforms in existence, with the prominent suppliers being Coursera, edX, FutureLearn and Udacity. ClassCentral [2] reports that these platforms now service over 180 million learners, from 950 universities and offer 16,500 courses. In this paper we will describe the authors’ backgrounds, experiences and developments which are impacting on MOOC growth across several countries.

Since 2014, Graz University of Technology (TU Graz) has been hosting a MOOC platform called iMooX.at (<https://imoox.at/>). Since then, more than 100 courses have been held with over 60.000 registered users. A special feature of the platform is that all course materials *must* be published under Creative Commons licenses, so that complete courses and materials can be used and modified by others. iMooX.at is thus a platform for courses with open educational resources (OER, see [6]). Another platform enabler is that iMooX can be used for free for all Austrian universities co-financed by a ministry’s initiative (iMooX.at, 04/2020–03/2024).

The MOOC story of the University of Applied Sciences in Lübeck (Technische Hochschule Lübeck, TH Lübeck) starts with a first Moodle-based prototype, that was evolved into the MOOC platform “mooin” in 2015 (see [13]). Some years later, the relaunch of oncampus.de (<https://www.oncampus.de/>), a subsidiary of TH Lübeck responsible for postgraduate study programs, combines both MOOCs and further learning opportunities on the new platform. Next to MOOCs offered directly by TH Lübeck or the oncampus company, externals can offer their courses, too. Therefore, there is a great variety of open online courses: from academic subjects

to non-formal education topics like beekeeping, rock'n'roll or youth participation. Many of the open online courses are published under Creative Commons licenses, i.e. MOOCs produced by TH Lübeck.

The University of Glasgow has been developing MOOCs since 2014. To date, they have launched over 35 courses on FutureLearn and one on Coursera (with many more in development), and are regarded as a leader in this area. Furthermore, the University of Glasgow has increased its offerings on these platforms by launching seven micro-credentials and one fully online M. Sc. programme. With over 500,000 enrollments across the portfolio, Glasgow continues to develop MOOCs in key strategic areas to increase access to education. Glasgow has a strong connection in partnering with industry and other universities to co-develop and deliver courses. Examples of this include, working with The Data Lab to produce a course on Data Science for School Teachers, and collaborating with the University of the West Indies to develop a course on the History of Slavery in the British Caribbean.

Therefore, we can build upon the experiences of hosting and supporting the design and delivery of several hundred MOOCs via self-hosted platforms (TH Lübeck, TU Graz) or the University of Glasgow's approach with Coursera and FutureLearn, and courses licensed under Creative Commons (TU Graz, partly TH Lübeck) or not (University of Glasgow).

## **2 Development of MOOCs and Aim of This Contribution**

Collectively we offer diverse perspectives on how to develop MOOCs in different contexts. Our approaches have slightly different purposes, strategies, didactics and a broad variety in disciplines. However, we are united by the need to support the development of MOOCs – for our teachers, our clients and various institutions – in the best possible and professional way. Therefore, we often independently develop and implement resources, methods and tools for developing MOOCs. The challenge is, how can we enable others for MOOC development, provide targeted guidance and support in planning their MOOC projects? In the following, we would like to present resources, methods and tools that we have developed and consider to be fundamental to our approach to MOOC developments.

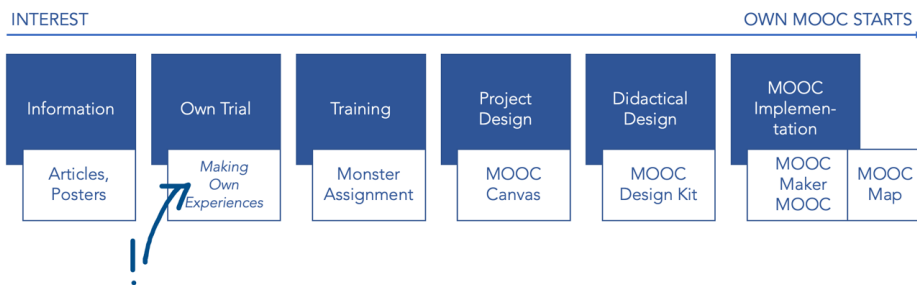
This paper aims to present a collection of methods to demonstrate the variants of methods and tools that have been created. We restrict ourselves to those examples that are explicitly available under Creative Commons licenses and in the best case under open licenses, so that their re-use is possible without the host institution. This includes translation of the mainly English (and partly German) materials.

Since all the creators who developed the materials agreed to contribute to this paper, we can also highlight experiences with the tools and backgrounds.

### 3 Selected Tools and Methods

#### 3.1 Overview

Figure 2 gives an overview about the resources, methods and tools that we describe within this contribution. They are ordered in a timeline fashion, from initial discovery to designing and building your first MOOC. A very prominent and often repeated measure is not described further as a tool, but needs to be highlighted: Everyone who is interested in developing a MOOC we highly recommend to take part at one. This serves two important purposes, 1) it allows the designer to become the learner and 2) also to be informed by best practice and generate new ideas for their own pedagogical approach.



**Figure 2:** Overview about the potential development from first interest to become a MOOC maker and supportive resources, methods and tools

#### 3.2 How to MOOC – First Insights

We skip introductory texts and information on what MOOCs actually are and directly propose texts and materials that deal with their development or different implementations. The texts are very practically focused.

As a first, we want to share “Ten simple rules for developing a MOOC” by Manalack and Yuriev who shortly emphasize the main steps (similar to our Figure 2). Concerning diverse didactical design many refer to the differentiation of cMOOX (c for connectivistic) as well xMOOX (x for extension). Whereas cMOOXs designs using principles of discussion and even co-design of the course, xMOOXs design are focused on content, especially videos and quizzes to support self-organised learning. Conole [3] emphasizes that there are even more possibilities to classify MOOCs and offers 10 criteria for different MOOC designs. Similarly to [3], Drake, O’Hara, and Seeman [5] share five principles of MOOC design and how it influenced decisions in a case study.

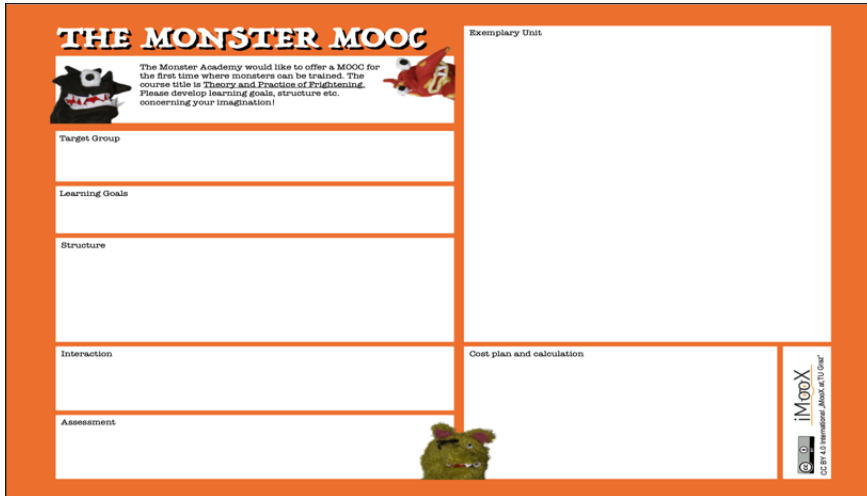
MOOCs are typically, but not always, developed by academics working at universities. Therefore, it might be of interest to see different possibilities to implement existing MOOCs into teaching or develop it as an integrative part. Educators use the affordances of MOOCs to provide their students with different insights into content and as a means to engage with external participants. This is a growing trend with the introduction of major platforms offering Campus-based used for free, resulting in learners being able to take a variety of courses for free, with continued access, without payment. In so-called “pre-MOOCs”, for example, the MOOC becomes a prerequisite for participation in a laboratory exercise [1]. In the case of the “Inverse Blended” MOOC, specific measures are taken to ensure that the MOOC is also “in attendance”, for example by printing workbooks or organizing meetings of learners [7]. We have identified seven such scenarios that are implemented more frequently [8].

### 3.3 Own Trial – You Have to MOOC

All agree that colleagues who wish to develop a MOOC should take full part in at least one especially on the platform they will be offering theirs in. There are several overviews and collections of MOOC providers and MOOCs.

- OERu.org (<https://oeru.org/>) is an offer of the OER foundation and presents online courses on the base of open licensed materials from partner universities (mostly outside of Europe).
- MOOChub.org (<https://moochub.org/>) is an aggregation service and common project of several MOOC providers from the German speaking landscape, who provides a well open licensed courses (amongst others: iMooX.at, openHPI, oncampus)
- Then there are other lists, which offer overviews and collections of online courses, e.g. Edukatico.org (<https://www.edukatico.org/>) and Classcentral.com (<https://www.classcentral.com/>), which includes different providers, but as well fee-based courses.

### 3.4 The Monster MOOC: A Workshop Design and Assignment for Beginners



**Figure 3:** Monster MOOC Assignment in a Workshop. A workshop design including an assignment which is engaging and very helpful to support a first MOOC design in a fun and creative way.

Reference (URL): Schön and Ebner [19]. The Monster MOOC (Template for Group Work). Version 1.0, Zenodo, 27.12.2020, <https://zenodo.org/record/4395154>

License: CC BY 4.0

Encouraging MOOC design teams to engage in a course and document areas they felt worked and areas they felt didn't work well can be a good way to share a common experience and engage in pedagogical discussion. In this way, at least the multitude of implementation variants with regard to communication, collaboration, action orientation or humor components becomes apparent. In addition to a few theoretical classifications and explanations, we then had the best experience with a very special work assignment: the development of a MOOC for monsters. Here we would like to emphasize: The monsters are very important: Nobody here is really an expert, even if she is a big fan of the Monster Family or has just seen Monster, Inc.: What monsters are exactly and how they could at best give you a fright is mainly up to our imagination.



The assignment for a group task in the MOOC further education is therefore (see [19]): “The Monster Academy would like to offer a MOOC for the first time where monsters can be trained. The course title is ‘Theory and Practice of Frightening’ Please develop learning goals, structure etc. concerning your imagination!” With the help of pre-structured posters, MOOCs are now sketched, accompanied by giggles and loud laughter, it’s just too weird what’s happening. And yet: Especially the free thinking and the exchange of ideas in a good atmosphere provides good first sketches and plans, which in turn show in the mutual presentation how different one can design a MOOC. Does the MOOC follow an approach that gradually releases testing into application? Does it concentrate only on theoretical aspects of the topic? Which form of assessment is planned?

Antidotally, positive experiences of staff using Monster assignment have been captured (see [17]).

### 3.5 Sketching a MOOC Project with the MOOC Canvas (TU Graz)

The image shows a hand-drawn MOOC Canvas template. It is a large rectangular sheet divided into several sections, numbered 1 through 8. The central part of the canvas features the logo 'iMOOCx MOOC-Maker Canvas'. The sections are as follows:

- Section 1:** Unit titles of the MOOC. A list of four boxes labeled 1, 2, 3, 4.
- Section 2:** Which existing materials could be used for the MOOC? A list of four boxes.
- Section 3:** Which did participants receive for a successful participation? A list of four boxes.
- Section 4:** What is the target group of the MOOC? A list of four boxes.
- Section 5:** What should learners know after completing the MOOC? A list of four boxes.
- Section 6:** What should learners be able to do after the MOOC? A list of four boxes.
- Section 7:** What should they use the knowledge for? A list of four boxes.
- Section 8:** A central area containing several sub-sections:
  - Assignment Design:** A list of four checkboxes: groupwork, group-oriented task, reflections, tasks which focus on exchanging and cooperating between learners.
  - Quiz design:** A list of four checkboxes: self-assessment, to check if core concepts have been understood, for theoretical repetition of core concepts.
  - Accompanying Offers:** A list of four checkboxes: forum, face-to-face meetings, such as a meet-for-warmers, etc., video conference or webinar, connection/link to lecture.
  - License of the MOOCs:** A list of three checkboxes: No license, CC BY, CC BY SA.
  - Potential Partners:** A list of seven checkboxes: Development, Production, Platform, Technical Support, Supervision, PR/Marketing, Funding.
  - iMOOCx MOOC-Maker Canvas:** A central area with three sub-sections:
    - Idea by:** A text box with a pencil icon.
    - MOOC Project:** A text box with a computer monitor icon, containing the question 'What's the name of the MOOC?'
    - Makers Objectives:** A list of four checkboxes: to open a course to the public, to reach as many people as possible, to spread knowledge, to increase visibility.

**Figure 4:** MOOC Canvas. A big print (DIN A3), the canvas can be folded as a booklet and used to sketch a first draft of a MOOC project.

Reference (URL): <http://dx.doi.org/10.13140/RG.2.2.28577.22887> ([21])

How-to fold the canvas: <https://www.youtube.com/watch?v=MIQO5uurSLc>

License: CC BY 4.0

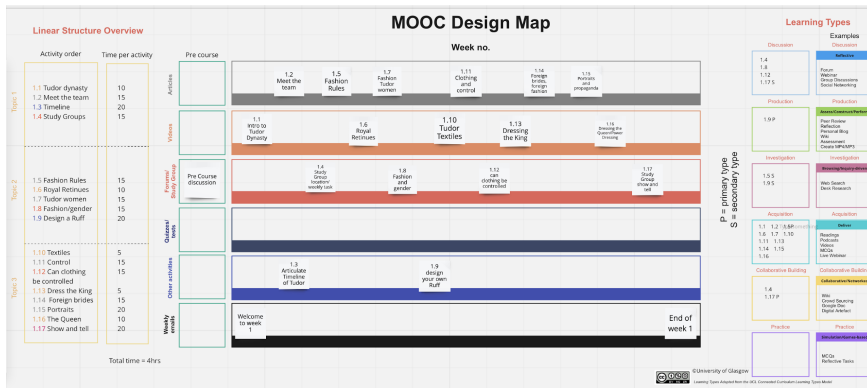
Originally, the term “canvas” was used for completely empty canvases, but especially the openly licensed and widely used business model canvas by Osterwalder and Pigneur [15] has changed this term. Thus, a canvas is often understood to be a template that can be printed and helps to structure developments or plans.

The MOOC Canvas, which the Educational Technology team at TU Graz uses for consultations on MOOC project conception, was first used in 2017 (see [16]). The MOOC Canvas is intended for the early phase of the MOOC project development and is oriented towards important planning activities around the overall MOOC project by considering production up to marketing, cooperation and topics (see [18]). The MOOC Canvas, printed on DIN A3, is first folded to a small booklet, page by page, which gives a big “picture” around the MOOC project. Folding instructions can be found online (<https://www.youtube.com/watch?v=MIQO5uurSLc>). It starts with a working title and the MOOC organizers’ objectives: Why a MOOC? Then target groups and learning goals, a sketch of the units and video, tasks and test design are discussed. A MOOC project, which is strategically implemented, must include good cooperation and partner selection as well as marketing ideas, embedding in other concepts and cooperation partners is also discussed. In the best case the first thoughts for the potential MOOC project are sorted after working through and unfolding the MOOC canvas and further connections visualized by arrows can be discovered. Thus, MOOC’s target group is closely connected to possible cooperation partners; existing material could be used etc. Whoever wants to use the canvas is invited to do so – the open license also allows own modifications [21, 20].

### **3.6 MOOC Design Mapping Framework – The University of Glasgow**

Due to the scale of courses Glasgow was producing, across a range of subject disciplines, there was a requirement to provide more focused support for academic staff and streamline learning design support with a framework that allows MOOC design to be a creative and collaborative process. Equally, in doing so allowed the central team to collate and share examples of previous course design best practices with colleagues. Thus, we now have a bank of exemplars to share with colleagues new to the process. What this achieves is a much stronger understanding of how MOOCs are designed and the importance of mapping the learner journey to learning types, ensuring Intended Learning Outcomes (ILOs) are being delivered on.

The MOOC Design Mapping Framework (MDMF) is centered on Laurillard’s [11] conversational framework which has been further adapted by the ABC learning design approach by [22]. Glasgow’s framework builds upon and expands this approach by using an online collaborative tool, Miro, that allows multiple contributors to design and map MOOC curriculum (central section). Post-it style notes



**Figure 5:** A collaborative approach to MOOC design mapping. Utilising an online tool (Miro) to create a framework which allows MOOC stakeholder to collaboratively build and map out, step by step, MOOC curricula.

Reference (URL): <https://www.gla.ac.uk/colleges/socialsciences/staff/learningandteaching/mooddesign/>

License: CC BY-NC-SA

are dragged into the desired activity type with enough information captured to explain the step. The activity types have been strongly aligned to the FutureLearn platform pedagogies and tools available to deploy. The completed curriculum map then allows content to be developed with the learner journey fully mapped and aligned to learning types (right hand column) and time to complete each step (left hand column). The framework has been granted a reusable license (CC-BY-NA-SA) allowing other institutions free use to adapt and remix the approach to suit local needs. Empirical research has been conducted into the evaluation of this tool, which explored academic experiences and also those of the learning technologists who supported the design and development of these MOOCs using the framework [9].

### 3.7 A MOOC for MOOC Makers

Since 2016, it has been possible for external participants to host their MOOCs on oncampus.de (cf. [12]). The platform is based on Moodle, but there are some specifics that MOOC makers need to be familiar with in order to set up a MOOC and implement content and activities. Providing (free) regular training or some other supervised format to empower external MOOC makers was not considered as an efficient practice: If people want to create their own MOOC, it would be rather unpleasant to wait until the next start of a guided tutorial. In addition,

Oncampus MOOC-Maker (#ocmoocmaker)

Kursaufzeit: Selbstlernangebot  
Dauer: 3 Stunden  
Niveau: Anfänger  
Dozent: oncampus  
Sprache: Deutsch

10 Bewertung(en)

kostenlos  
Zum Kurs

Was erwartest Dich in diesem Kurs?

Du würdest gerne einen MOOC erstellen, dir fehlt aber eine Plattform dafür? Komm zu [oncampus.de](https://www.oncampus.de)! Bei uns kannst du deinen eigenen Kurs kostenlos erstellen und anbieten. Wie das technisch funktioniert und was du mit [oncampus.de](https://www.oncampus.de) alles machen kannst, erfährst du in diesem kurzen Kurs.

Das ist eigentlich kein MOOC hier

... sondern ein Tutorial, eben im MOOC-Format. Wir versuchen stets mit allen Entwicklungen hier auf [oncampus.de](https://www.oncampus.de) Schritt zu halten, der Kurs wird daher "always beta" bleiben.

! Was kannst du in diesem Kurs lernen?

Wir haben für dich

- einen Überblick über [oncampus.de](https://www.oncampus.de) als MOOC-Plattform,
- eine Demonstration der Möglichkeiten, die dir [oncampus.de](https://www.oncampus.de) für MOOCs bietet,
- einige Anregungen, wie du [oncampus.de](https://www.oncampus.de) in einem Kurs einsetzen kannst,
- die Gelegenheit, ganz praktisch deinen ersten Mini-Kurs zu erstellen und
- ein paar Gestaltungshinweise, die sich als sehr nützlich erwiesen haben.

**Figure 6:** MOOC Maker. A MOOC on how to technically set up an open online course on the [oncampus.de](https://www.oncampus.de) platform.

Reference (URL): <https://www.oncampus.de/mooinmaker>

License: CC BY 4.0

the demand for these courses would vary quite a dramatically: In one term there would be hardly any people interested in an introduction to MOOC making, in another there might be a very high number of interested participants. MOOCs on the other hand are scalable and, if planned accordingly, can be launched at any time. Other platforms like Coursera likewise ended up with this approach (cf. [4]). Another benefit is that participants directly experience for themselves a possible implementation of an online course. In addition, there is of course the opportunity to ask for individual supervised training services.

The MOOC maker MOOC takes approximately 3 hours to complete, whereas it depends very much on whether participants want to create their own course in the meantime and need more time to experiment on their own. The course

- gives an overview of the MOOC platform [oncampus.de](https://www.oncampus.de),
- demonstrates the potential features for MOOCs provided by [oncampus.de](https://www.oncampus.de),
- includes some proposals on how to use [oncampus.de](https://www.oncampus.de) for a course,
- provides the practical opportunity to create a first mini-course, and
- shares some basic design instructions that have proven quite useful.

It starts with a brief introduction to the platform, demonstrates possible forms of content and activities, and then provides step-by-step instructions on how to set up and fill a blank course. Participants can ask questions and discuss ideas on implementation options with other MOOC makers in a forum. The MOOC maker MOOC is licensed under CC BY 4.0, so copying is allowed, so is adapting – and in this case it is even required.

To date (January 19th, 2021), 859 participants are enrolled in the course. However, not all of them actually produced a MOOC of their own. 105 externals have requested empty courses so far. Of these, some only did some experimenting, others actually launched multiple courses on the platform (i.e. there are four MOOCs on volleyball training launched by an external MOOC maker).

The tools and methods described in previous sections can be used regardless of which MOOC platform will be used. They are in fact not covered in the MOOC maker course and are therefore needed for the didactic and organisational planning of the course. However, this is no longer the case when it comes to the practical implementation of the MOOC. The functionalities, interfaces and configurations that will be used in the MOOC will need to follow those of the MOOC platform. Although oncampus.de is based on Moodle, it has been heavily customised, so that the MOOC maker MOOC cannot easily be used to explain the implementation of MOOCs on other Moodle-based platforms. Therefore, the MOOC should also be designed in order to enable easy integration or adjustment of new features and updates. Apparently, this is not always feasible in a MOOC that has to include a lot of screenshots and screencasts. Participants therefore also need some acceptance that the current state of the platform may differ slightly from what is shown in the images and videos.

### 3.8 A MOOC Map as Checklist

At TU Graz, an own MOOC for MOOC makers is under development modelled on the MOOC maker course at the TH Lübeck. At this point, we would like to point out another tool, the MOOC map: MOOC creators receive this map during their individual training and can tick off the central steps of MOOC implementation with a focus on the technical and practical needs. The current version is the third, as we do update the MOOC map according to the feedback of all involved people, so the iMooX support team as well the MOOC makers.

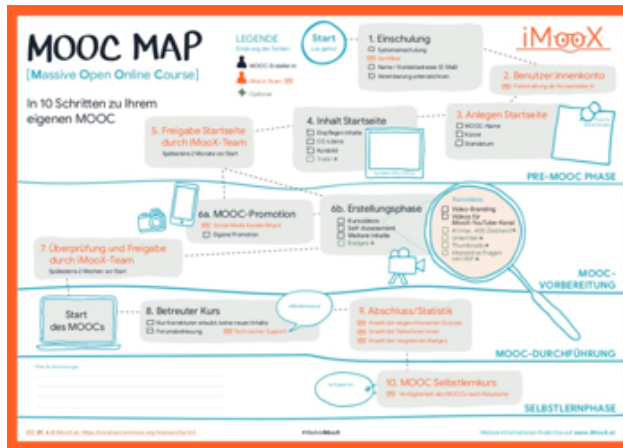


Figure 7: A MOOC map with a to-do list to tick off on the main steps of set-up a MOOC at iMooX platform.

Reference (URL): <https://imoox.at/page/creator>

License: CC BY 4.0 International

## 4 Outlook

The authors of this paper contacted one another and collaboratively wrote this contribution. They are aware that other open-source developments do exist but where not located in our searches. In this joint overview, we have tried to collect and present openly accessible and, if possible, openly licensed resources and materials for the development of MOOCs. Practically, we concluded our efforts on the design and development of MOOCs knowing that there are open issues such as marketing, implementation and evaluation that require exploration and consideration when undertaking a MOOC build and launch.

## 5 Acknowledgement

Contributions and development by authors of TU Graz was partly delivered within the Austrian project “iMooX” (2021–2024), co-financed by the Austrian Ministry (the Educational Technology team of Graz University of Technology develops MOOCs and related know-how) and within “Open Education Austria Advanced” (2021–2024), co-financed by the Austrian Ministry (the Educational Technology team of Graz University of Technology supports the development of OER and related knowledge).

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