Institutional MOOC strategies in Europe

**Status report based on a mapping survey
conducted in October - December 2014**

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Darco Jansen

Programme manager EADTU

Coordinator OpenupEd, HOME and SCORE2020

Robert Schuwer

Expert Open Education

Professor OER, Fontys University of Applied Sciences, Eindhoven, Netherlands

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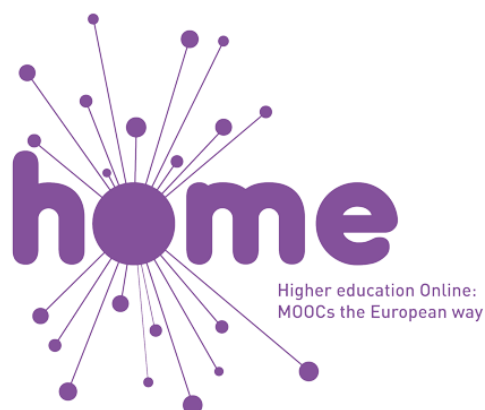# Contents

Acknowledgement / about HOME project

This report is published as part of the project HOME - Higher education Online: MOOCs the European way. HOME is partly funded by the European Commission's Lifelong Learning Programme. HOME started in January 2014 and is funded to June 2016.

The aim of the project is to develop and strengthen an open network for European cooperation on open education, in general, and Massive Open Online Courses (MOOCs), in particular. The partners will build an open institutional network on MOOCs based on European values like openness, equity, quality and diversity.

The HOME partners saw the need for this survey and produced this report to benchmark the strategy of European institutions to MOOCs. Not only benchmarking amongst European institutions but also to other surveys in, for example, the United States. Next, the partners will continue that commitment for the coming years, supporting an independent study, offering full privacy for all respondents, and providing free distribution of all report publications.

We like to thank the following partners for supporting and contributing to this research:

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Executive Summary

Massive Open Online Courses (MOOCs) have continued to attract considerable media coverage as governments and universities respond to the open and online education movement. Three years after the MOOCs began its rise, it is clear that the HE institutions in the EU are gaining speed in this movement.

This report on MOOCs intends to contribute to literature on MOOCs in Europe. Its specific aim is to present data on the perception and objectives of European higher education institutions on MOOCs and the main drivers behind the MOOC movement. In addition, the report makes a comparison with similar studies conducted in the United States in 2013 and 2014 and to data produced by the European University Association (EUA) between October and December 2013. The report made clear that involvement is still increasing, but also that arguments to get involved differ from those in the US.

The main source is a survey conducted by the project HOME - Higher education Online: MOOCs the European way, partly funded by the European Commission's Lifelong Learning Programme. The survey was conducted in October - December 2014. In total 67 institutions responded out of 22 European countries representing in total about 2.8 millions of students.

Institutional MOOC involvement
Out of participated institutions 71,7% of the institutions has a MOOC or is planning to develop one. While in the US the number of institutions having a MOOC or planning to introduce them has decreased from 14,3% to 13,6%, in Europe it has increased from about 58% in EUA study to 71,7% in this study. This confirms the EUA statement that 'interest in MOOCs has far from peaked in Europe'. The results of this survey are comparable with the survey from 2013 from EUA. This indicates a steady, but not revolutionary increase in MOOC involvement and opinions during this last year.

Throughout the report the results of the institutions already offering MOOC next to all respondents are discussed to counteract for possible bias. In general only small differences between both groups are observed.

Validating definitions of what's a MOOC
It is important to note that MOOCs remain relatively poorly defined. To be able to make assertions about MOOCs, it should also be clear what we mean by a MOOC. This survey is used to shed more light on the importance of each MOOC letter.

Massive
A MOOC differs to other open online courses by the number of participants. According to a large majority (71,6%) "MOOCs should provide a sustainable model for the mass". In addition 50,1% finds it (highly)relevant for their institution that "MOOCs must be designed for massive audience".

Open
MOOCs can be positioned in the broader development of open education. However, open has many dimensions and can have many interpretations. An essential characteristic of open education is the removal of barriers to education. As such the survey included questions related to several barriers to learning.
The institutions (70%) do not support the idea that MOOCs should be paid for except for getting a formal credit as part of an accredited curriculum. I.e., there is no strong support for a little fee in the MOOC definition. Next a large majority of institutions is supporting the openness in MOOCs regarding open accessibility, open licensing and the freedom to select for different kinds of

certificates. There seems no agreement on the importance of MOOCs having a fixed start date and/or that self-paced courses can also be called a MOOC. This implies that openness in context of freedom of place, pace and time of study should not be an explicit criteria in the definition of MOOCs. As such MOOCs may have fixed dates or not, depending on the institution's choice for a particular course.

Online
82,1% of all 67 institutions consider it (highly) relevant that a MOOC should be offered completely online. The majority even support the idea that an exam for a formal credit should be offered online. There is in general less support for the suggestion to support participants who have a weak internet connection.

Course
Also a large majority supports the concept that course content of a MOOC should be accessible anytime and that the courses should be of best quality using proven modern online learning pedagogies. As such a majority of institutions relates the course dimension of MOOCs to courses as in formal education.

MOOC definition
Various EU-funded MOOC projects together with OpenupEd are working with the following definition: MOOCs are "online courses designed for large numbers of participants, that can be accessed by anyone anywhere as long as they have an internet connection, are open to everyone without entry qualifications, and offer a full/complete course experience online for free". The results of this survey strongly support this definition.

Europe MOOC priorities differ from United States
Some parts of the survey encompasses identical questions as used in the US surveys of 2013 and 2014. The results show large differences between both continents. A large majority of European higher education institutions disagree with the statement that *credentials for MOOC completion will cause confusion about higher education degrees* while a majority in the US agrees. Next, more than 80% of European institutions agrees with the statement *MOOCs are important for institutions to learn about online pedagogy* while in the US it has decreased from 44% in 2013 to 28% in 2014. In the US the opinion is mostly neutral or disagree on the question if *MOOCs are a sustainable method for offering courses,* but in the EU more than half of the institutions agrees.

Institutional objectives on MOOCs
While in the US a large majority (66%) state that it is *too early to tell* if MOOCs are meeting the institution's objective, the majority in EU (58%) mention that MOOCs are already meeting some or most objectives. European institution are having a more positive attitude towards MOOCs and those offering MOOCs have positive experiences. Next it is observed that in the US using MOOCs for student recruitment is seen as the most important primary objective of institutions, while in Europe it is rather to reach new students and creating flexible learning opportunities (for those new students). The objectives related to finance (explore cost reduction, generate income) and scalability dimension of MOOCs are not seen as primary objective in both continents. The most dominant objective in this and several other studies is to increase institutional visibility and using MOOCs for reputation reasons. But also using MOOCs as innovation area (e.g., improve quality of on campus offering, contribute to the transition to more flexible and online education, improve teaching) and responding to the demands of learners and societies are indicated as important objectives.

Different drivers behind the MOOC movement

Based on literature we identified ten possible macro drivers behind the MOOC movement. A large majority (between 65% and 80%) indicates that many macro divers are relevant or highly relevant for their institution. Only the following three drivers are not seen as that important i) new method in big business ii) reduce the costs of HE and iii) increasing shared services and unbundling. Institutions were also asked to reflect on those macro drivers from the governmental perspective. They expect that their governmental involvement with MOOCs are mainly driven by a) need for (e-)skills and jobs, b) improving the quality of learning and c) globalization and internationalization.

Possible reasons explaining the differences between Europe and United States

Throughout this report we observe big differences between US and EU education institutions. Not only are European institution more involved in MOOCs than the US, and the number of European institutions with MOOC involvement is rising, but MOOCs are also perceived as a sustainable method for offering courses in Europe. It seems that in Europe the institution are increasingly developing a positive attitude to MOOCs and have positive experiences for the added values of MOOCs.

A possible explanation is the big differences in funding for higher education between US and the EU, the latter having more government and European funding. Also the additional funding on MOOC projects by the European commission and national governments might have contributed to this process. Next, Europe seem more experimenting with online pedagogy and with different types of MOOCs, each with a specific rationale. Also the presence of the ECTS framework in Europe, which provides a sound base for recognition of credentials across institutions and borders, can be seen as possible explanation. Institutions in Europe that already offer MOOCs are more confident in given credentials for MOOCs.

Europe must seize this moment to grab the opportunities offered by MOOCs

At this point, however, it is observed that the MOOC movement is (commercially) dominated by the United States through both the number of course offerings and leading service providers. But given the results of this report we feel that Europe must seize this moment to grab the opportunities offered by MOOCs. The open and online learning movement has great potential to educate the many in a flexible way that meets the needs of today's learners for an increasingly complex world. It is for those reasons that the Porto Declaration on European MOOCs[1] calls upon all to embrace the possibilities the open and online education movement offers the Knowledge Society and stresses the need for stronger collaboration in Europe, based in the principles of transparent cooperation, mutual benefit and collective incremental advantage.

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[1] http://home.eadtu.eu/images/News/Porto_Declaration_on_European_MOOCs_Final.pdf

Introduction

Massive Open Online Courses (MOOCs) have received considerable media coverage since the beginning of 2012. MOOCs started in Canada and the US, and their rise to prominence was to a large extent driven by service providers such as Udacity, Coursera and Edx. In 2013, MOOC activity began in earnest in Europe starting with the pan-European initiative OpenupEd and different (regional) MOOC platforms became available (e.g., FutureLearn, Iversity, FUN, UNEDcoma, Miríada X). In September 2013, the European Commission launched the initiative Opening Up Education to further enhance the uptake of Open Education in Europe (European Commission, 2013). Recently the European Commission funded a number of MOOC projects.

Higher education Online: MOOCs the European way (HOME, 2014) is one of those projects aiming to develop and strengthen an open network for European cooperation on open education and MOOCs. This project runs from 2014 to 2016 and starts with benchmarking the opportunities and characteristics for European cooperation on MOOCs. As part of this project we developed a survey to benchmark strategies on MOOCs of European institutions and governments.

It is observed from available data (Open Education Europa, 2014) that EU MOOC activities are mainly concentrated in Western Europe, serve a limited number of language communities, and have been mainly driven by individual ambitious players from the higher education (HE) sector. Although European higher education institutions (HEIs) are aware that MOOCs are an important global movement and an instrument for educational policy, many seem to be hesitant to adopt or engage with MOOCs. It is indicated (e.g., Yuan et al., 2014) that pedagogical issues, strategic and cost questions are among the concerns that have delayed European HEIs from entering into this movement.

However, the literature on MOOCs in Europe is still developing. This survey study was conducted to contribute to the literature. To be able to make assertions about MOOCs, it should also be clear what we mean by a MOOC. An often cited image declares "MOOC: every letter is negotiable"[2]. As such the survey also should shed more light on the importance of each MOOC letter. Next the survey aims to get a better understanding on the strategic reasons why an institution and a government is or isn't involved in MOOCs.

This report starts with methodology employed and a section discussing the institutional profiles. Next the results on the importance of the different MOOC dimensions are discussed followed by a comparison with an equivalent study conducted in US by Allen and Seaman (2014, 2015) on the importance of MOOCs for institutions. We conclude with results on the reasons why European institutions are involved in MOOCs and the importance of different macro divers to be involved.

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[2] http://www.flickr.com/photos/mathplourde/8620174342/

Methodology

This study was conducted during the fourth quarter of 2014. The survey was developed during the summer of 2014 and tested among HOME partners. A Google form was open from 20 October to 19 December 2014. European institutions were in general approached by personal contact and by the use of social media to complete the questionnaire.

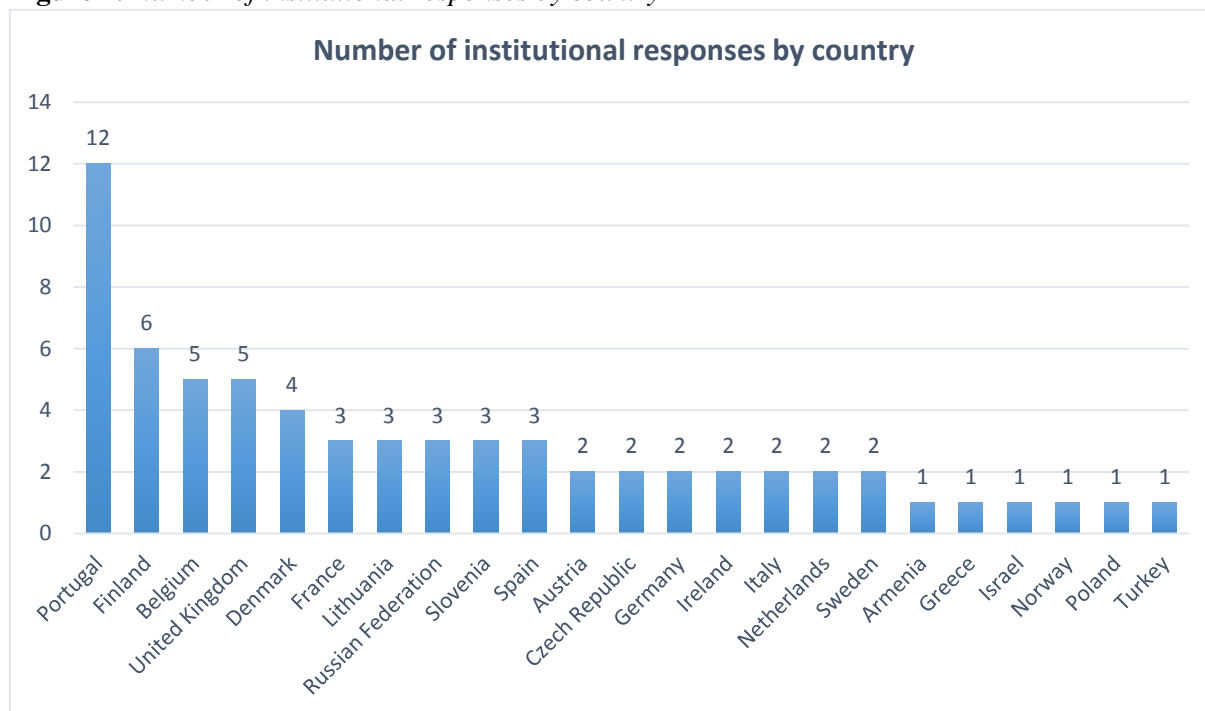The survey consists of the following 10 sections

1. Profile Information
   (7 open question)

2. How important are the following dimensions of a MOOC for the learners/participants?
   (16 closed question on 5 point Likert scale)

3. Status of MOOC offering at your institution
   (1 closed question identical to the US surveys by Allen & Seaman (2014, 2015))

4. Do you agree with the following statements?
   (4 identical questions as used in the US survey and an optional open question)

5. Primary objective for your institution's MOOCs
   (1 question with 9 options identical to US survey)

6. Relative importance of the following objectives for your institution's MOOCs
   (4 closed question on 5 point Likert scale plus an open question)

7. What are the primary reasons for your institution to collaborate with others on MOOCs?
   (3 open questions)

8. How important are the following macro drivers for your institutional MOOC offering?
   (10 closed question on 5 point Likert scale)

9. How important are the following macro drivers for an active governmental involvement on MOOCs?
   (10 closed question on 5 point Likert scale)

10. What are the primary reasons why your government is or isn't involved in MOOCs?
    (1 open question)

Each closed questions could be scored on a 5-point scale ranging from *Not at all relevant for my institution* to *Highly relevant for my institution*. Exceptions are those questions that were included from the US survey (Allen & Seaman 2014, 2015). These questions were kept identical with those in their survey so comparisons could be made. These surveys will be referenced to as US2013 and US2014 respectively.

Response and Institutional profiles

In total 67 institutions responded out of 22 European (EU and bordering) countries. We included Armenia and Russian Federation as they are part of the Bologna agreement. This approach is consistent with the area used in the European Universities Association (EUA) survey (Gaebel et al. 2014). Figure 1 shows the number of institutional responses by country. Those 67 institutions serve in total about 2.8 millions of students.

Figure 1: *Number of institutional responses by country*
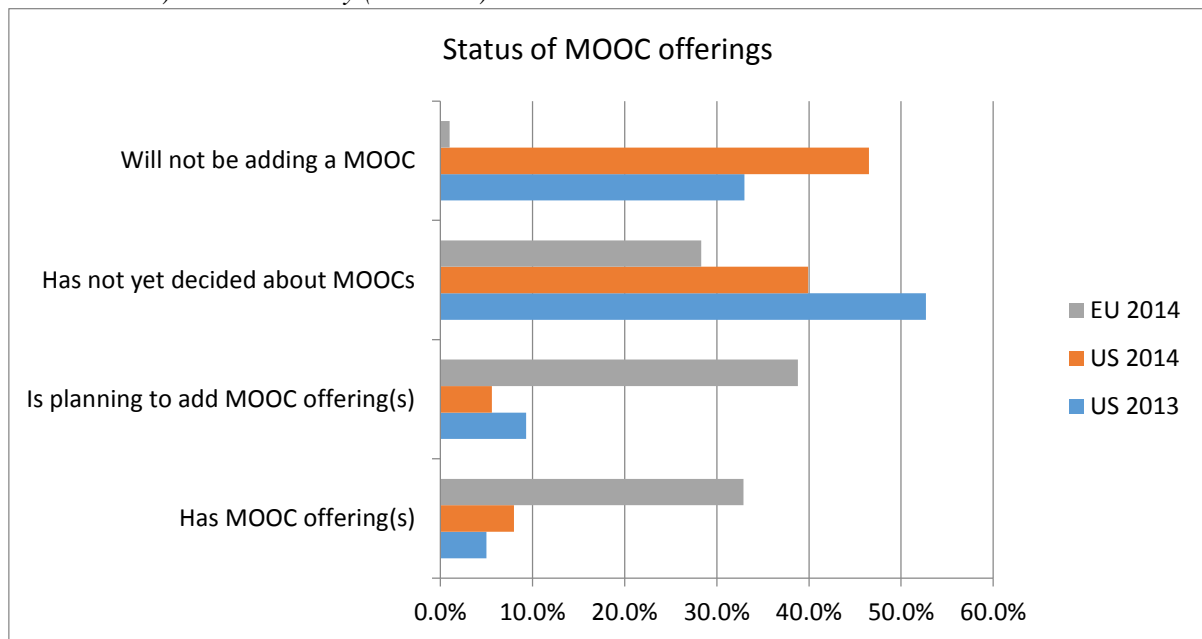

From the participating institutions 47,8% is offering a MOOC (17,9% offers five or more MOOCs). In total 71,7% of the institutions has a MOOC or is planning to develop one (see also figure 2). Compared to the EUA study (Gaebel et al, 2014, with a response of 249 institutions) this is somewhat higher. In the EUA study about 58% of the European institution is having a MOOC or planning to introduce them. The survey of EUA was conducted one year earlier (end 2013). As such we might conclude that the number of institutions offering / planning to offer MOOCs has increased between 2013 and 2014. However, the current results might also be biased to those European institutions that are interested to MOOCs compared.

In figure 2 the institutional profile in MOOC offering in this survey (EU 2014) is compared to that of the US survey one year earlier (US 2013) and in the same period (US 2014). We can conclude that European institutions are more involved in MOOCs compared to the US. This can already be concluded out of the EUA survey who was conducted in the same period as US 2013 survey. I.e. EUA reports that 58% of institutions offering / planning to offer MOOC against 14,3% in US 2013 survey.

This difference between US and Europe seems to be increased in 2014. While in the US the number of institutions having a MOOC or planning to introduce them has decreased from 14,3% to 13,6%, in Europe it has increased from about 58% in EUA study to 71,7% in this study. This confirms the EUA statement that 'interest in MOOCs has far from peaked in Europe' (Gaebel et al. 2014).

Figure 2: *Institutional profile in their MOOC offering compared between that of US survey (US 2013 and US 2014) and this survey (EU 2014).*

This difference is striking although both the EUA study and this study might be biased in favour of institutions involved in e-learning and MOOCs, respectively. To counteract for possible bias, we will report the results of the institutions already offering a MOOC next to all respondents. In this report, we will try to elaborate on possible reasons behind this difference between US and Europe focusing on the importance of different MOOC dimensions, the objective of institutions to be involved in MOOCS and the macro drivers behind involvement.

MOOCs and open, online education

MOOCs can be positioned in the broader development of open online education. The potential of Open Education was strongly marked by the Cape Town Open Education Declaration (Shuttleworth/OSF, 2008). Precisely what 'open' means in open education has been the subject of some debate (see for example Weller, 2014). An essential characteristic of open education is the removal of barriers to education (Bates, 2015), (Open Education Handbook, 2014). MOOCs are removing some barriers by making courses online available for free. But 'openness' is not only related to financial and online aspects. To that end, all barriers to learning should be taken away, and learners should receive incentives towards success. Mulder and Jansen (2015) identifies eleven barriers and conclude in their analyses that MOOCs are partly instrumental to open up education, but that much depends on the readiness of MOOC providers.

The broader concept *open education* is defined by Mulder and Janssen (2013) in their 5COE-model. In this model, they consider open education as consisting of five components. Three on the supply side (learning materials, learning services and teaching efforts) and two on the demand side (learner needs and needs of the society). Each of these components can be more or less open, to be decided by the institution. Open and online education is restricted only to the supply side. The meaning of the word "open" and the perception of institutions to different barriers in openness will be considered in the next section on MOOCs.

A description of "online" as in online education is given by (Allen & Seaman, 2015). They consider the proportion of content delivered online as determining whether education may be called online or not (see table 1).

Table 1: *Different types of online courses*

Proportion of Content Delivered Online	Type of Course	Typical Description
0%	Traditional	Course where no online technology used — content is delivered in writing or orally.
1 to 29%	Web Facilitated	Course that uses web-based technology to facilitate what is essentially a face-to-face course. May use a learning management system (LMS) or web pages to post the syllabus and assignments.
30 to 79%	Blended/Hybrid	Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has a reduced number of face-to-face meetings.
80+%	Online	A course where most or all of the content is delivered online. Typically have no face-to-face meetings.

In online education the learning is a result of mediated experiences that are not constrained by time and/or distance. The media support of a particular course can be applied to both course material delivery and to interaction between teachers and learners, and between learners. As such the definition in table 1 might be too simple, as courses are more than only content and face-to-face meetings (as is described in the 5COE model). Most ideally a course consist of a) educational content, b) facilitating interaction among peers, c) activities/tasks, tests, including feedback, d) exams

including recognition options and e) a study guide / syllabus (see table 2 on next page) All these aspects of a course could (partially) be offered online. Therefore, before going into detail on institutional strategy on MOOCs we first discuss the perceived importance of the different dimensions of MOOCs.

What is a MOOC?

It is important to note that MOOCs remain relatively poorly defined. MOOCs can be seen as a term or word related to the scalability of open and online education. Some even argue that it is a political instrument and as such a concept that should be broadly defined.

For example, the Norwegian Commission (MOOC Commission, 2014) has chosen to emphasise the overall common features of MOOC and similar provisions. By "Similar provisions" they mean other forms of web-based provisions or provisions that combine web-based and campus education. In their report, the MOOC term is used as a catch-all for courses that are (i) web-based, (ii) scalable as regards the number of participants and (iii) are open. However, it is already observed that every letter in MOOC is negotiable[1] and as such there are many different definitions of MOOCs. Many propositions for a definition of a MOOC are available in many sources. Consequently, MOOC programs and projects are potentially ill-defined as well.

The HOME project together with the ECO project (ECO: Elearning, Communication and Open-data: Massive Mobile, Ubiquitous and Open Learning) and OpenupEd developed a definition of MOOC shared by many European partners. They agreed to the following definition of MOOCs to prevent those projects to be potentially ill-defined.

> MOOCs are "**online courses designed for large numbers of participants, that can be accessed by anyone anywhere as long as they have an internet connection, are open to everyone without entry qualifications, and offer a full/complete course experience online for free**".

This definition approach a MOOC as having four dimensions (each dimension represented by a letter of the acronym). The importance of each dimension, related to the other three, is a question worth to investigate. E.g., European institutions in countries with less spoken languages could consider massiveness less important. For them, development of MOOCs or reuse of existing MOOCs could then become easier. It will go too far to make an extensive desk research into this matter. But to place the definition of a MOOC into context, we will present some alternatives and compare them to the one above. In more detail, table 2 presents the different dimensions of MOOCs related to this definition.

Table 2: *Criteria of different dimensions of proposed MOOC definition*

		Dimension definition of MOOC	*Criteria deciding for a MOOC*
M	**Massive**	An online course *designed* for large number of participants	- Number of participants is larger than can be taught in a 'normal' campus class room / college situation (>148 = Dunbar's number) - The (pedagogical model of the) course is such that the efforts of all services (including of academic staff on tutoring, tests, etc.) does not increase significantly as the number of participants increases.

		Dimension definition of MOOC	*Criteria deciding for a MOOC*
O	**Open**	Course can be accessed by (almost) anyone anywhere as long as they have an internet connection.	- Course accessible to (almost) all people without limitations. - At least the course content is always accessible - Course can be accessed anywhere as long as they have an internet connection
		Open as in freedom of place, pace and time.	Most MOOCs nowadays have a fixed start and end date and as such are not open in pace or in time. Next, a pre-defined pace and/or a fixed starting date and end date is not considered an explicit criteria to distinguish between MOOCs and other types of courses.
		Open to everyone without entry qualifications.	No qualifications / diplomas needed to participate in the online course.
		Course can be completed for free	Full course experience without any costs for participants
O	**Online**	Complete course online	All aspects of course are delivered online
C	**Course**	Unit of Study	The total study time of a MOOC is minimal 1 ECTS (typically between 1 and 4 ECTS)
		The course offers a *full* course experience including 1. educational content 2. facilitation interaction among peers (including some but limited interaction with academic staff) 3. activities/tasks, tests, including feedback 4. some kind of (non formal) recognition options 5. a study guide / syllabus	1. educational content may include Video – Audio - Text – Games (incl. simulation) – Social Media – Animation 2. offers possibilities for interaction, such as social media channels, forums, blogs or RSS readers to build a learning community 3. participants are provided with some feedback mechanism. Can be automatically generated (e.g., quizzes), only by peers (peer feedback) and/or general feedback from academic staff, etc. 4. Always includes some kind of recognition like badges or a certificate of completion. A formal certificate is optional and most likely has to be paid for. 5. study guide / syllabus includes instructions as to how you may learn from the presented materials and interactions.

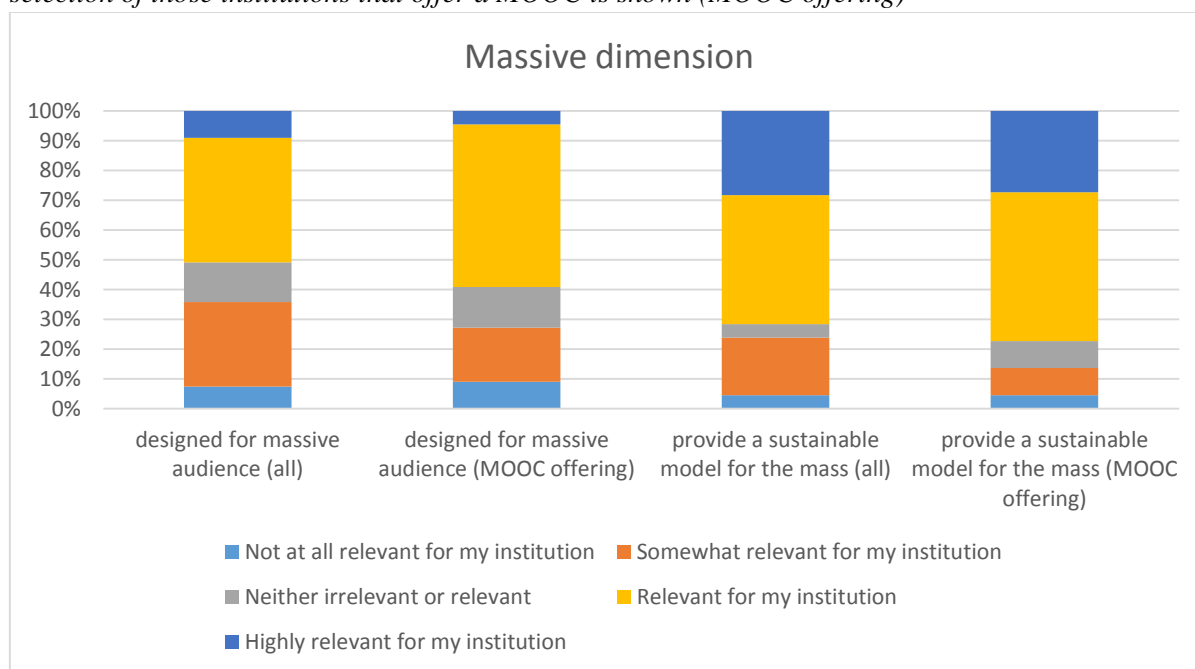## The importance of the massive dimension in MOOCs

A MOOC differs to other Open Online Courses by the number of participants. To determine the importance of the massive dimension we included two questions in the survey.

How important are the following dimensions of a MOOC for the learners/participants?

- • MOOCs must be designed for massive audience
- • In addition MOOCs should provide a sustainable model for the mass
  E.g. leverage massive participation or the (pedagogical model of the) course is such that the efforts of all services (including of academic staff) does not increase significantly as the number of participants increases.

The response is shown in figure 3. It shows that according to a large majority MOOCs should provide a sustainable model for the mass, supporting the definition of MOOC as proposed (table 2). Institutions already offering a MOOC are slightly more positive on both aspects of massive. 59,1% of the institutions offering a MOOC state that "MOOCs must be designed for massive audience" is (highly) relevant for their institution (against 50,8% for all responded institutions). And 77,3% finds it (highly)relevant for their institution that "MOOCs should provide a sustainable model for the mass" (against 71,6% for all responded institutions).

Figure 3: *Importance of the massive dimension of MOOCs. Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (MOOC offering)*

Wikipedia (2015) in their definition uses "aimed at unlimited number of participants" but the response somewhat indicates that we should be cautious about that. As such we propose that MOOC is an online course designed for large number of participants, next to the criteria that it should provide a sustainable model for the mass.

The importance of the open dimension in MOOCs

The next letter in MOOCs refers to open. However, open has many dimensions and can have many interpretations. One aspects of openness relates to financial aspects, i.e. the course should be for free / gratis for the participants.

Related to this we included the following three questions

How important are the following dimensions of a MOOC for the learners/participants?

- A MOOC should be for free, i.e. without any costs for participants
- MOOCs should NOT be offered for free by definition
  By designing for massive participation these courses could also have a low fee (and still be affordable)
- In addition MOOC offers the opportunity for participants to get (for a small fee) a formal credit as a component of an accredited curriculum

Figure 4: *Importance of the free/gratis in the open dimension of MOOCs. Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (MOOC offering)*
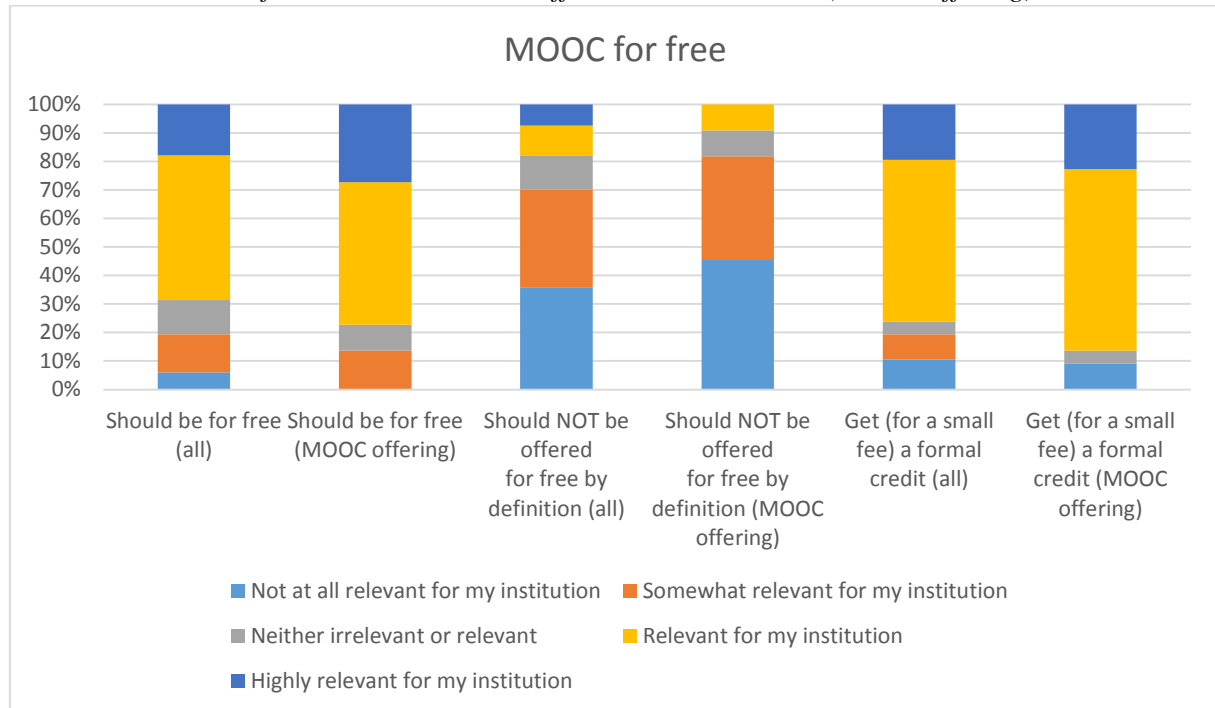

Figure 4 shows the results for those three questions. The institutions do not support the idea that MOOCs should be paid for except for getting a formal credit as part of an accredited curriculum. I.e., there is no strong support for a little fee in the MOOC definition. Therefore in our proposed definition we explicitly state that MOOC should offer a complete course for free. This includes some kind of (non formal) recognition options but a formal credit that counts to a formal degree might be excluded (see table 2). As such these results don't support the definition proposal by Selwyn, Bulfin & Pangrazio (2015) i.e. '...courses available to masses of online learners for little or no cost'.

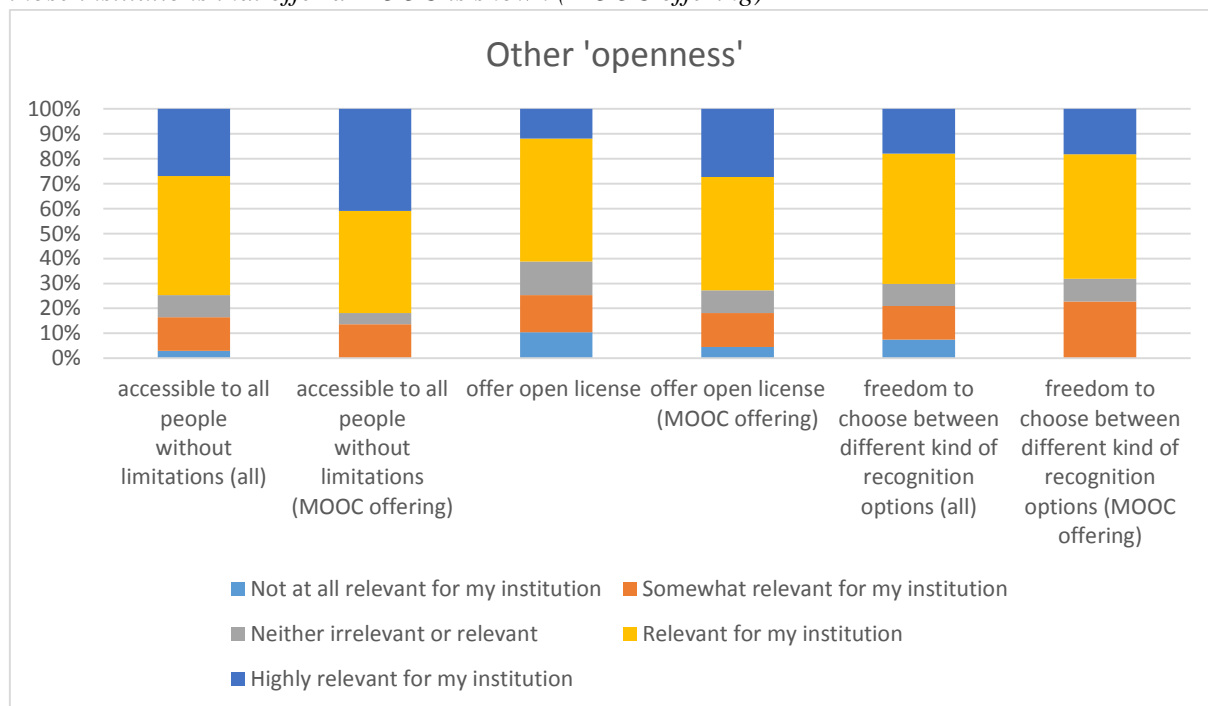Institutions that already offer a MOOC, support this somewhat stronger:

- 77,3% versus 68,7% responded (highly) relevant for my institution of the statement "Should be free";
- 81,8% versus 70,1% does not agree with the 2nd question ("should NOT be offered for free by definition")
- 86,4% versus 76,1% finds it (highly) relevant that a MOOC offers the opportunity for participants to get (for a small fee) a formal credit as a component of an accredited curriculum.

But 'openness' is not only related to financial aspects. To that end, all barriers to learning should be taken away. I.e. openness is also related to open accessibility, open licensing policy, freedom of place, pace and time of study andopen entry. To this end we included the following questions in the survey:

How important are the following dimensions of a MOOC for the learners/participants?

- Anybody can enter the course, i.e. course is accessible to all people without limitations. *This does not necessarily imply that the course can be taken without any learnt competencies or experience.*
- MOOCs should offer open license such that participants can retain – reuse – remix – rework – redistribute material of the MOOC
- Participants of a MOOC should have the freedom to choose between different kinds of recognition options.
  MOOC participants can choose between badges earned for completion of specific activities, a credential for completion of the majority of activities and a final online test, and full certificate with ECTS credit obtained after a proctored test.

Figure 5: *Importance of open dimensions of MOOCs. Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (MOOC offering)*

The response is shown in figure 5. It clearly shows that the majority of institutions is supporting the openness in MOOCs regarding open accessibility, open licensing and the freedom to select for different kind of recognition options. Institutions offering a MOOC are somewhat more positive towards open accessibility and open licensing. In our proposed definition we included these aspects of openness.

What is perhaps surprising is the strong support for open licensing as part of the MOOC 'open' dimension. Until now it is not included as part of the definition of MOOCs. Only OpenupEd and Open Education Consortium (OpenMOOC, 2014) are stimulating the uptake of open licensing as part of MOOC offering. We consider open license as an important business driver for promoting skills, enhancing knowledge transfer and increasing the pace of innovation (like open access journals are expected to do).

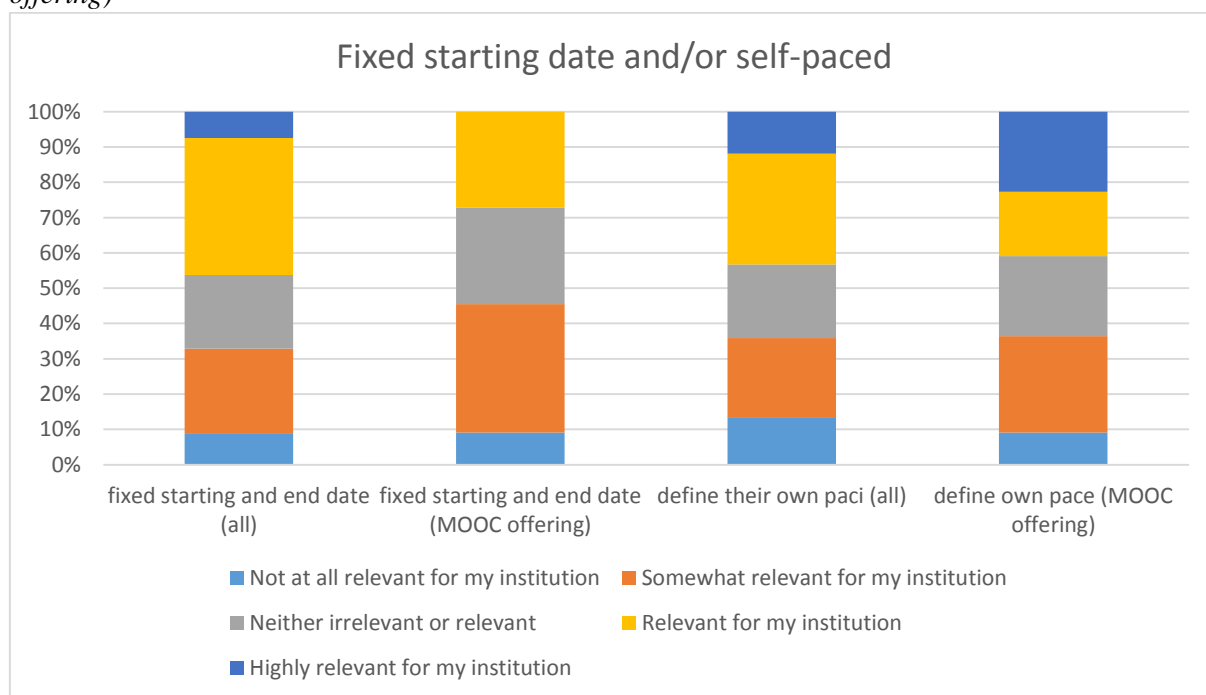## Fixed start date and/or self-paced courses

Regarding the issue of freedom of place, pace and time of study (as part of the open dimension), we included the following two questions.

How important are the following dimensions of a MOOC for the learners/participants?

- MOOCs should have a fixed start and end date with imposed pace for every participants
- MOOC participants should also have the freedom to define their own pacing and finish whenever they want

Figure 6 clearly demonstrates that there seems no agreement on the importance of MOOCs having a fixed start date and/or that self-paced courses can also be called a MOOC.

Figure 6: *Importance of courses with fixed starting date and of self-paced courses of MOOCs. Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (MOOC offering)*

In the proposed definition (ECO, 2014; OpenupEd 2014) we therefore excluded both from being a criteria for MOOC definition. It is open for contextual choices, i.e. MOOCs may have fixed dates or not, depending on the institution's choice for a particular course. We emphasise that self-paced MOOCs will need to comply to all other MOOC criteria as well (see table 2) and as such need to be finished with some kind of recognition and consequently have an end date (set by the participant). However, this is still subject of debate. For example Open Education Europa (2014) excludes self-paced courses in their European MOOC Scoreboard while recently Coursera and edX are offering self-paced MOOCs as well.

The importance of the online dimension in MOOCs

For the online dimension we included the following three questions.

How important are the following dimensions of a MOOC for the learners/participants?

- • MOOCs should offer the course completely online
- • The final exams of a MOOC for a formal credit should be offered online as well (with respect to quality procedures, authentication, etc.)
- • MOOCs should support off-line access for those with weak network connectivity

Figure 7: *Importance of the online dimension in MOOCs. Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (MOOC offering)*
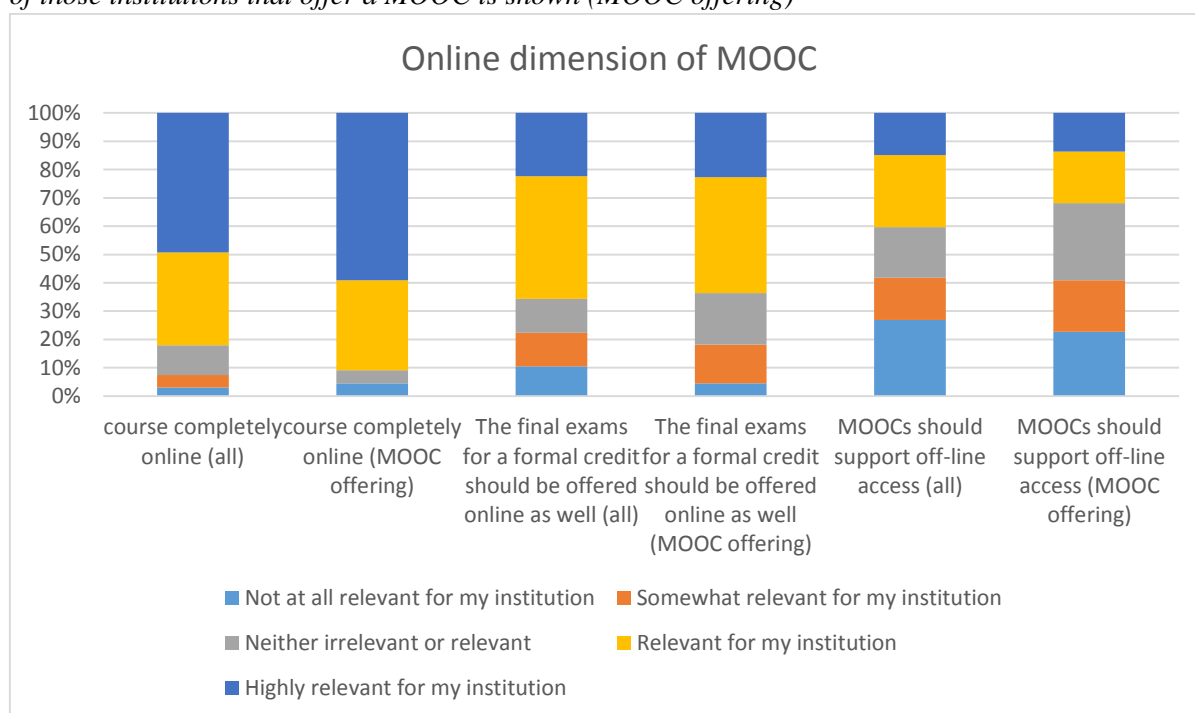

Figure 7 shows the results of these three questions related to the online dimension of MOOCs. Not surprisingly a large majority support that the course should be offered completely online (90,9% of those offering MOOCS and 82,1% of all 67 institutions finds this (highly) relevant). The majority even support the idea that an exam for a formal credit should be offered online. There is in general less support for the suggestion to support participants who have a weak internet connection (like for participants in the Southern hemisphere). In our proposed definition, we excluded the presence of offline components.

The importance of the course dimension in MOOCs

The last letter in MOOCs refer to the course level. A formal definition, as proposed, is that a MOOC should offers a <u>full</u> course experience (see table 2). I.e. the total study time of a MOOC should be minimal 1 ECTS and should include

- • educational content
- • facilitation interaction among peers (including some but limited interaction with academic staff)
- • activities/tasks, tests, including feedback
- • some kind of (non-formal) recognition options
- • a study guide / syllabus

However, the course dimension of MOOCs is also debatable. Some questions that MOOCs should not be compared to formal courses as they are part of non formal education. To further test this we included question related to quality and pedagogies. Here we included the following three questions.

How important are the following dimensions of a MOOC for the learners/participants?

- • At least the course content of a MOOC should be accessible anytime (i.e. not only between start and end date for a scheduled course)
- • MOOCs should offer courses of best quality
  And as such be part of quality assurance of the institution
- • MOOCs should be using proven modern online learning pedagogies

Figure 8: *Importance of the course dimension in MOOCs. Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (MOOC offering)*
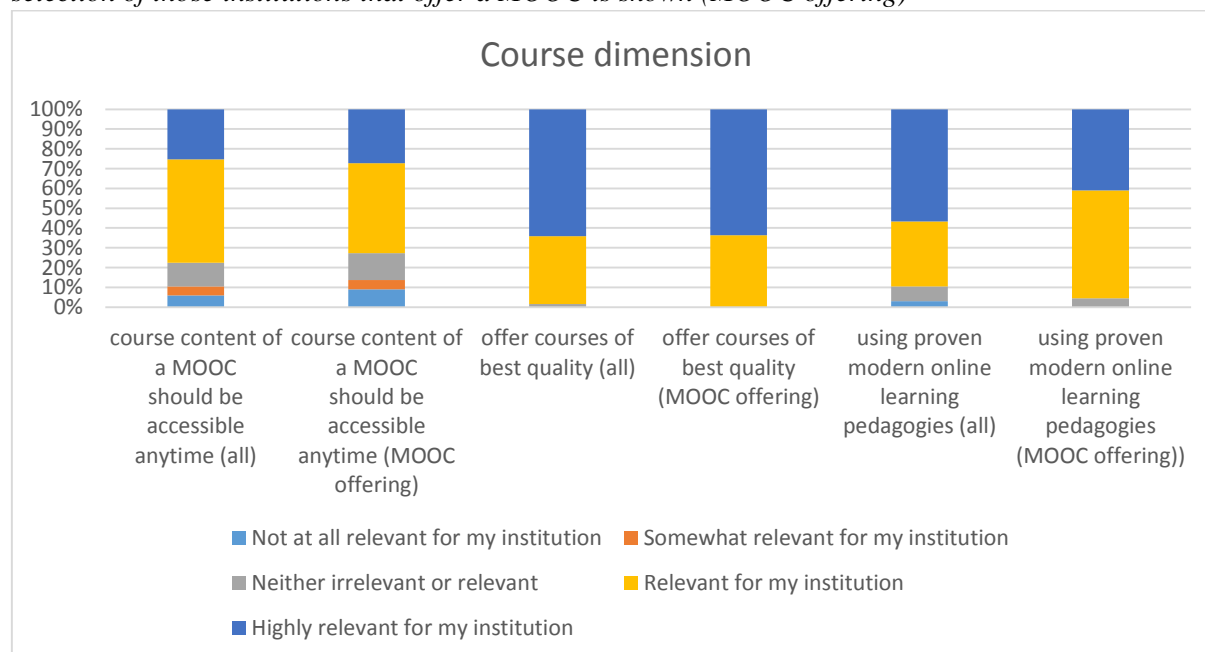

Figure 8 shows that large majority supports the concept that course content of a MOOC should be accessible anytime and that the courses should be of best quality using proven modern online learning pedagogies. And again we observe only small differences between those institutions offering a MOOC and those not. In our proposed definition we therefore stick to the description of courses as done in formal education.

Role of MOOCs compared to US

Here we discuss the results of section 4 of the survey that encompasses four identical questions as used in the US 2013 survey (Allen & Seaman, 2014). Only two of those four questions were repeated in their US 2014 survey (Allen & Seaman, 2015).

Figure 9: *Replies to the question "Credentials for MOOC completion will cause confusion about higher education degrees?" compared between that of US survey (US 2013) and this survey (EU 2014). Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (EU 2014 (MOOC offering))*
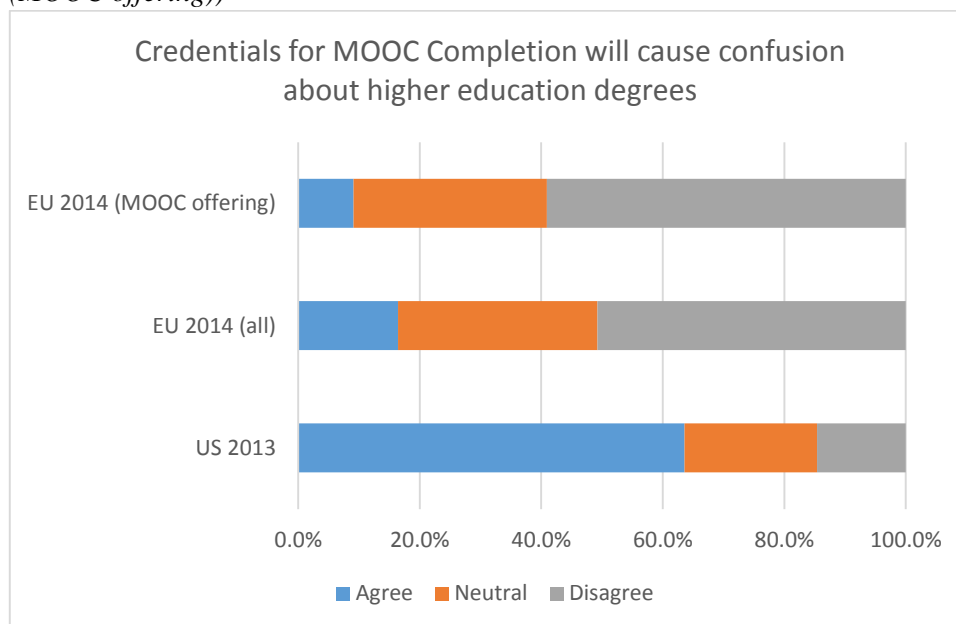

Figure 9 lists the results of the question if *credentials for MOOC completion will cause confusion about higher education degrees*. Note that this question is not repeated in the latest US survey (Allen & Seaman, 2015). The big difference between US and EU opinion can most likely explained by the presence of the ECTS framework in Europe, which provides a sound base for recognition of credentials across institutions and borders. Institutions in Europe that already offer MOOCs are more confident in giving credentials for MOOCs. In addition the EUA study indicate a growing pressure on European institutions to recognise learning outcomes and award credits both for their own MOOCs and those delivered by other institutions. In addition recognition of non-formal learning is also a declared EU strategy (Gaebel et al. 2014).

Figure 10 shows the response for the question *MOOCs are important for institutions to learn about online pedagogy*. The big difference here between EU and US can be explained by several factors. Especially in Europe, different types of MOOCs (with acronyms like Spitz MOOC, qMOOC and pMOOC), each with a specific rationale have most likely contributed to the high percentage of Agree in EU. But before the MOOC movement started, institutions in Europe had less experience with online pedagogy than in the US. Online teaching and learning in the EU (as in complete / full courses) was in most cases done by Open Universities and was rare in other institutions.

It should be noted that institutions who already offer MOOCs replied somewhat more positive than those who not (yet) have MOOC offering, probably indicating a positive experience (and/or a bias to early adopters in online pedagogy in this survey).

Figure 10: *Replies to the question "MOOCs are important for institutions to learn about online pedagogy?" compared between that of the US surveys (US 2013 and US 2014) and this survey (EU 2014). Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (EU 2014 (MOOC offering))*
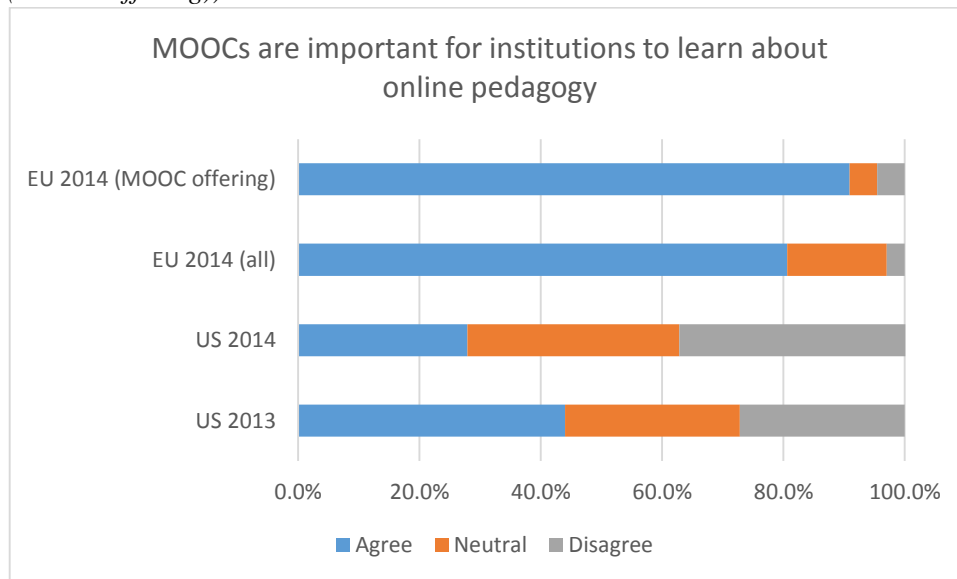

Figure 11 lists the results of the question if *MOOCs are a sustainable method for offering courses*. While in the US the opinion is mostly neutral or disagree, in the EU more than half of the population agrees. These results confirm the outcomes of the status of MOOC offering as shown in figure 2.

Figure 11: *Replies to the question "MOOCs are a sustainable method for offering courses?" compared between that of the US surveys (US 2013 and US 2014) and this survey (EU 2014). Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (EU 2014 (MOOC offering))*
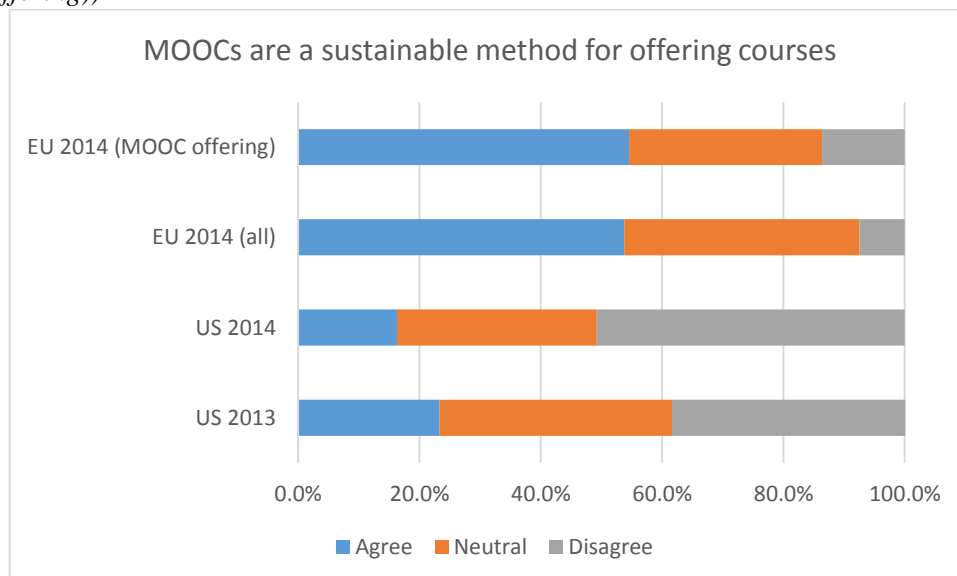
Not only are European institution more involved in MOOCs than the US, and the number of European institutions with MOOC involvement is increasing (figure 2), but also MOOCs are perceived as a sustainable method for offering courses in Europe. It seems that in Europe the institutions are increasingly developing a positive attitude to MOOCs and have positive experiences for the added values of MOOCs. All conditions indicating that MOOCs are becoming mainstream in Europe. To elaborate on this we included some questions about institutional objectives in the survey (section 5 and 6 of the questionnaire).
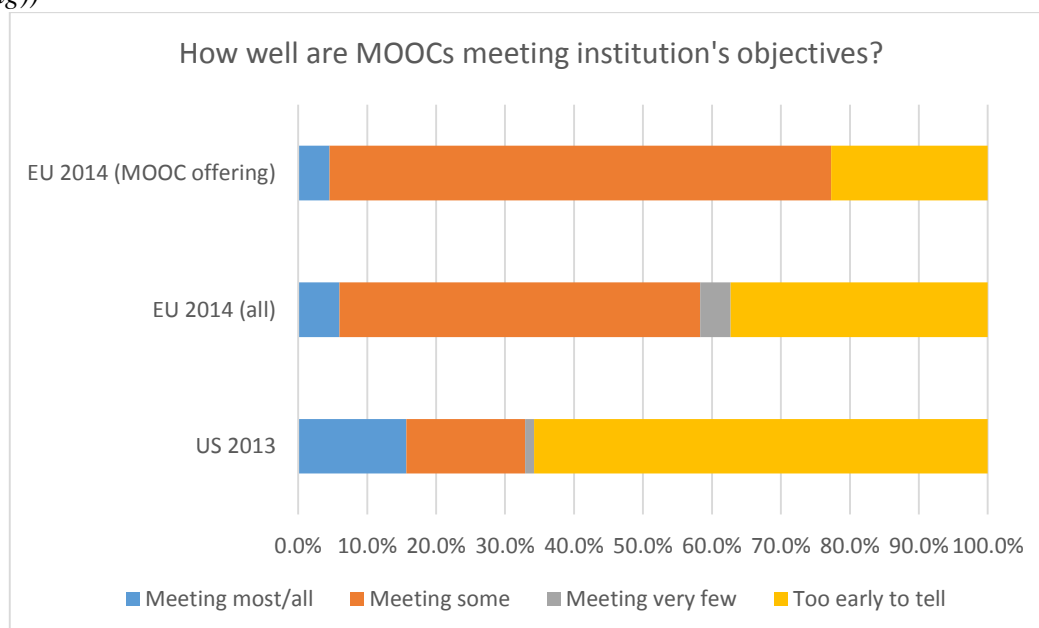
A possible explanation is the big differences in funding for higher education between US and the EU, the latter having more government and European funding. Another explanation is related to the previous question. In the EU, MOOCs seem more experimenting with online pedagogy, so it is not considered (yet) a part of regular course offerings.

Institutional objectives on MOOCs

Figure 12 shows the results of the question how well MOOCs are meeting institution's objectives. Again, this question is not repeated in the latest US survey (Allen & Seaman, 2015). Figure 12 also shows that the majority in EU mention MOOCs are already meeting some or most institution's objectives and as such confirms our earlier conclusion that MOOCs are becoming mainstream in Europe. This seems consistent with the EUA study (Gaebel et al, 2014) indicating in their survey that 33% of European institutions have adopted a position on MOOCs and 42% are considering the adoption of a formal position.
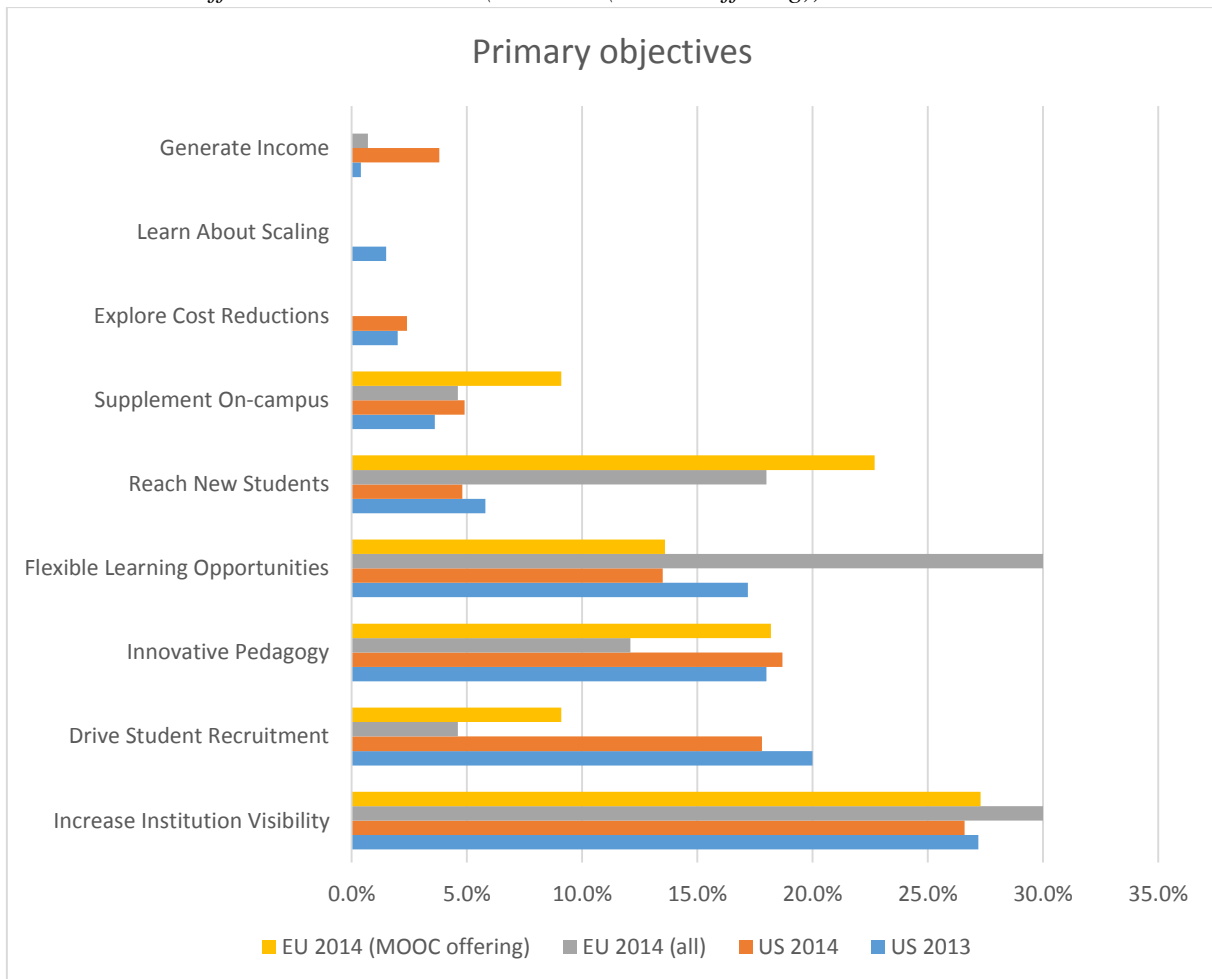
Again it is striking that the option *Too early to tell* is almost twice as big in US (end 2013) compared to EU (end 2014). This confirms our assumption that European institution are having a more positive attitude towards MOOCs and even have positive experiences at an institutional level (77,3% of European institutions with MOOC offering state that most or some institution's objectives are met, against 58,3% of all responded institutions). The differences between US and EU can most likely not be explained by the time difference between the two surveys. The results of the latest US survey even indicate a slightly lower confidence towards MOOC and a lower involvement in MOOCs in the US (e.g., figure 2 and 11).

Figure 12: *Replies to the question "How well are MOOCs meeting institution's objectives?" compared between that of the US survey (US 2013) and this survey (EU 2014). Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (EU 2014 (MOOC offering))*

This raises the question if the institutional objective between US and Europa are also different. Figure 13 shows the primary objectives to offer a MOOC, indicated by institutions.

Figure 13: *Primary objectives to offer a MOOC compared between that of the US surveys (US 2013 and US 2014) and this survey (EU 2014). Next to all respondents, also a sub-selection of those institutions that offer a MOOC is shown (EU 2014 (MOOC offering))*

This graph clearly shows the focus on *Drive Student Recruitment* in US compared to Europe. Also interesting is the relative low importance of *Flexible learning opportunities* with institutions who are offering MOOCs compared to those in Europe who are planning to do so. The difference between the US and Europe is for the most part divided among the objectives *Drive student recruitment* and *Reach new students*. We might also conclude that in Europe using MOOCs for student recruitment is not seen as the most important objective, but rather to reach new students and creating flexible learning opportunities (for those new students), the latter in line with the focus on MOOCs as a way of learning about online pedagogy in the EU.

In both surveys, the objectives related to finance (explore cost reduction, generate income) and scalability dimension of MOOCs are not seen as primary objective. This is somewhat striking as MOOCs are essentially for free and for massive audience.

In the comments some specifications of the primary objective are found. International visibility and experimenting with or showcasing of online and distance teaching are mentioned several times. One objective that is not so often mentioned in literature is giving the public access to research through MOOCs.

These results are consistent with the EUA study. They state that "International visibility is by far the most common motivation for developing MOOCs, followed by the wish to boost student recruitment" (Gaebel et al. 2014). They also conform that only very few European institutions select "income generation", "cost reduction", "funding opportunities" as top priority.

Recently Hollands & Tirthali (2014) reviewed literature and interviewed 83 individuals of 62 US institutions about MOOCs. They report a variety of institutional goals, which fell into one of six categories:

- extending the reach of the institution and access to education
- building and maintaining brand
- improving economics by lowering costs or increasing revenues
- improving educational outcomes for MOOC participants and on-campus students
- innovation in teaching and learning
- conducting research on teaching and learning

Yuan et al (2014) discusses possible strategic choices based on the purpose behind the development of a MOOC or other online programmes. They list the following choices:

I.   Defensive - to be ready if/when MOOCs (online learning) take off.
II.   Offensive - to become a leader in online learning.
III. Marketing - to market the university, e.g. to translate free access MOOC students into paying students, or to reach international students.
IV.   Enhance existing provision - to provide blended learning for existing students, e.g. to develop online components for existing courses.
V.   Change existing provision - to focus more teaching time on two-way learning conversations with students rather than one-way lecturing the so-called 'flipped classroom'
VI.   Financial - to reduce teaching costs and hence the price to students.
VII. Research - to explore MOOCs/online learning in practice and in greater depth and become a leader in MOOC research.
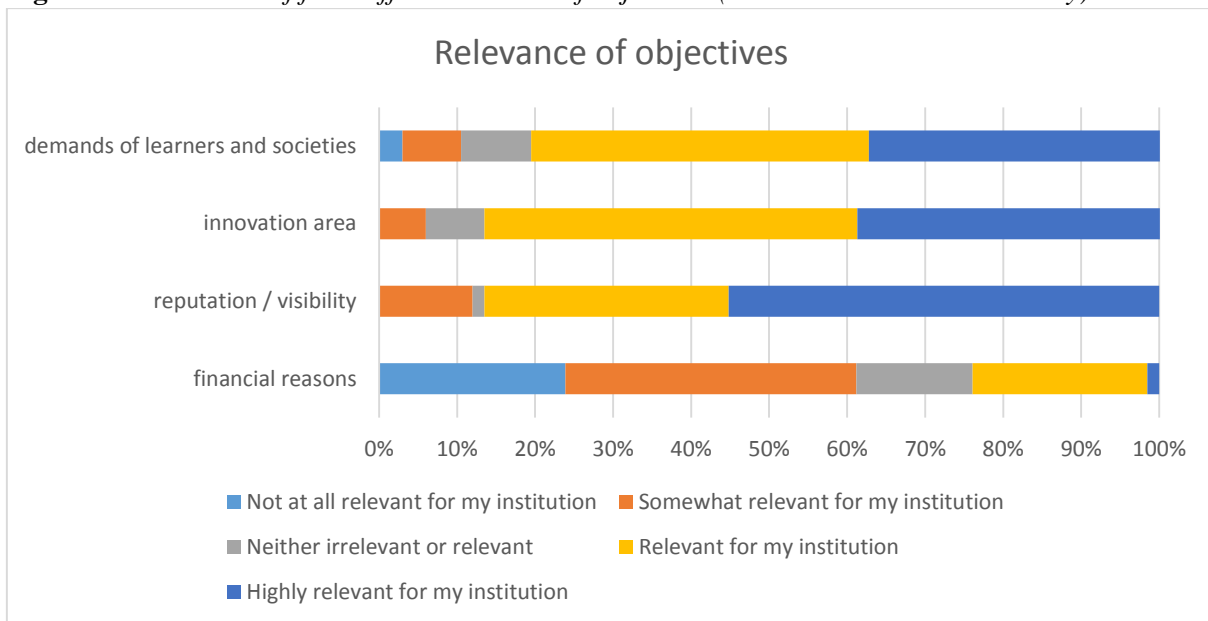
Other research indicate other clusters of reasons and institutional objectives. Based on Allen and Seaman (2014), Hollands & Tirthali (2014) and Yuan et al (2014) we made four main clusters. To further address the institutional objectives we used the following question in the survey:

Relative importance of the following objectives for your institution's MOOCs (or if you plan to offer a MOOC)

A. Using MOOCS for financial reasons
    (e.g., reduce costs, generate additional income)
B. Using MOOCs for reputation / visibility reasons
    (e.g., student recruitment, marketing potential / reach new student)
C. MOOCs as innovation area
    (e.g., improve quality of on campus offering, contribute to the transition to more flexible and online education, improve teaching)
D. Responding to the demands of learners and societies

Figure 14 shows the relevance per objective for institutions.

Figure 14: *Relevance of four different clusters of objectives (all institutions this EU-survey)*

In line with the conclusion of the previous question (figure 13), the figure shows that financial reasons are not the dominant objective. The other three objectives are almost equally indicated as relevant or highly relevant, with a tendency to reputation/visibility considered more relevant (55,2% considering this highly relevant). Also Hollands & Tirthali (2014) report that *Extending reach and access* and *Building and maintaining brand* as the two most mentioned goals is in line with the response considering *Reputation / visibility* (which is the comparable category for these two goals, and also the most mentioned in our survey).

Other objectives mentioned in the comments have both an internal and an external focus. MOOCs are considered a tool for teacher professionalization in development of new skills for online teaching and learning and creating awareness for the opportunities of online teaching. Besides that, MOOCs are a vehicle for research on online learning and can save costs for an institution. The external focused objectives are enhanced opportunities to offer more flexibility to learners, to cooperate with other institutions and share expertise. Attracting more students and new target groups is a goal that is mentioned several times.

Primary reasons to collaborate with other institutions on MOOCs
Three open questions investigated the reasons to collaborate with other institutions on MOOCs.

What are the primary reasons for your institution to collaborate with others on MOOCs?
The majority mentioned exchange of best practices and knowledge (e.g. on production, evaluation, pedagogy) as the primary reason to collaborate. Less mentioned were gaining opportunities for credit transfer, sharing content and division of costs and labor. This is in line with the previous mentioned focus on a MOOC as a means to innovate: research already has a long tradition of collaboration.

On what (MOOC related) topics will you collaborate with other institutions? For example on learning analytics, joint course development, credit transfer, evaluation of MOOCs, research, etc.
Because of the "For example" part in the question, this question can be considered a half-open question. The majority mentioned all the topics named. Production of course materials (e.g. video) was another topic, mentioned more than once.

What kind of services are you willing to outsource to (public and/or private) providers? For example MOOC platform, marketing, recruiting participants, learning analytics, translation services, exam centers, etc?

As in the previous question, this question can also be considered half-open. The majority mentioned the platform, marketing and translation services. Several mentioned "all of the above", but several also mentioned "None". The latter can possibly be explained by their state of developing MOOCs (just starting or even not involved with MOOCs at all).

Macro drivers behind MOOC offering

This section discusses the main drivers on higher education system level. We used this survey to identify the importance of the main drivers as indicated by others. For example Yuan et al (2014) already identified three major themes i) Openness, ii) Revenue models and iii) Service Disaggregation. Kalman (2014) focusses on technology-driven and free-based business models.

In general we identified the following ten drivers behind MOOCs. Respondents to the survey were asked "How important are the following macro drivers for your institutional MOOC offering". The text as used in the questionnaire in indicated by "". In this report we add some explanatory notes to those drivers.

1. "Need for education MOOCs are new educational methods in a 7 trillion dollar industry. MOOCs and Open Education as such is big business"

    Explanatory notes:
    Education is a 7 trillion dollar industry (570 x online advertisement and 7 x the mobile industry)[3]. It is a big industry for keeping the knowledge and skills of people up-to-date. On a personal level higher level of education yields to higher earnings.
    In Europe employees with tertiary level of education earned per hour almost twice as much as those with a low level of education (Eurostat, 2013). In the US those with master's degrees earned almost twice as much, and those with professional degrees earned over three times as much per year as high school graduates. On average the relative earnings for tertiary educated adults in an OECD country is over 1.5 x that for adults with upper secondary education (see earnings indicators in Education at a Glance, (OECD, 2014)).

2. "MOOCs are seen as a method to reduce the costs of higher education (both for institutions and government)"

3. "MOOCs are a new form to educate the many.
    MOOCs provide a solution to the increasing need for (access to affordable) higher education and to accommodate additional 98 million students the next 10 years."

    Explanatory notes:
    This is related to the increasing need for (access to affordable) higher education.
    On a national or global level another driver is access to higher education for all. Nearly one-third of the world's population (29.3%) is under 15. Today there are 165 million people enrolled in tertiary education. Projections suggest that that participation will increase significantly the coming years with a peak at 263 million in 2025. Accommodating the additional 98 million students would require more than four major universities (30,000 students) to open every week for the next fifteen years (Uvalić-Trumbić & Daniel, 2011). Moreover, the more we educate, a portion of those educated people will want to educate. As such online and open education are extremely relevant and beneficial for Developing Countries and Emerging Economies with (1) shortage of qualified teachers, (2) lack of high-quality learning materials and (3) evident need to really expand access to (formal) education.

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[3] http://www.ecampusnews.com/top-news/infographic-digital-education-653/2/

4. "Need for (e-)skills and jobs.
   MOOCs provide flexible, innovative learning approaches and delivery methods for improving the quality and relevance of higher education. Aiming at a right mix of skills: transversal competences, e-skills for the digital era, creativity and flexibility and a solid understanding of their chosen field."

   Explanatory notes:
   Youth unemployment is approaching 23% across Europe and at the same time we have over 2 million unfilled job vacancies (European Commission, 2012). The European knowledge economy needs people with the right mix of skills: transversal competences, e-skills for the digital era, creativity and flexibility and a solid understanding of their chosen field. But public and private employers increasingly report mismatches and difficulties in finding the right people for their evolving needs. The value of work-based learning – and notably of apprenticeships or "dual training" systems – in facilitating employment and increasing economic competitiveness is clearly recognised. There is a strong need for flexible, innovative learning approaches and delivery methods for improving the quality and relevance of higher education. Moreover, this is not just a matter of up-skilling individuals. Responsibility to deliver the right skills for the labour market must be shared between businesses, educational providers and other stakeholders, including students. In May 2014, the European Commission launched the "e-Skills for Jobs" campaign[4]. This multi-stakeholder initiative aims to supply Europeans with the required ICT skills and brings together representatives from the industry, education, and policy sectors.

5. "MOOCs are essential for the continuous technical innovation push.
   Using ICT for digitalizing education content, mass distribution and personalized learning and reducing costs."

   Explanatory notes:
   Innovation is often made possible due to the constant reduction in costs ("Moore's law"). This is the result of a rapid and continuous decline in the costs of the three key components of IT products: bandwidth, processing power and memory. Due to ICT both the variable costs and fixed costs can be reduced significantly. In some situations the variable costs are minimal and, thus, the difference between serving a small or a large number of customers is negligible. The result is the phenomenon of 'variable cost minimisation' (Kalman, 2014). For example, for a university that offers MOOCs to the public, the difference between offering the course to one hundred participants, or to ten thousand participants, is in these three components, and the difference is so small as to be negligible.

6. "Improving the quality of opportunities for learning".
   Quality is (increasingly becoming) an important driver in open and online education. With an increasing offer of MOOCs the quality dimension will increasingly will become important as well."

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[4] http://eskills-week.ec.europa.eu/

7. "MOOCs provide new business models based on 'free'
For example freemium business model, free as a tool to promote reputation, free product creates monetizable activity, etc."

<u>Explanatory notes:</u>
Kalman (2014) states that we should not be surprised that new business models based on 'free' are powerful and often disruptive. The ability to freely download music from the Internet disrupted the business model of the highly profitable record labels of the twentieth century. The business model of newspapers around the world was disrupted by the appearance of free daily newspapers, of free online news websites and of free or low-cost online alternatives to advertising in the classified ads section of the newspaper. These examples illustrate that new business models based on 'free' are only disruptive in combination with for example available technology (driver 5), unbundling of services (driver 10).

In the last decade, we are witnessing an abundance of innovative free online products. The last decades many companies provide something for free:
•   Free as a method to compete with a paid product of a competitor
•   Free product creates monetizable activity
•   Freemium
        o   Free high quality product, but limited
        o   Limitations are raised by paying customers
        o   Paying customers cover fixed and variable costs
•   Free as a tool to promote reputation
Kalman (2014) claims that the freemium business model is based on offering a satisfactory but limited basic product (e.g. limited in storage capacity, number of users and features), and charging customers for versions where some or all of the limitations are removed. While often a large percentage of the users are satisfied with the free product, the income from the limited number of paying users is sufficient to cover the fixed costs as well as the minimal variable costs created by all of the users. Other models leverage 'variable cost minimisation' (VCM) to promote the organisation's reputation, to compete with a paid product offered by a rival, to promote the sale of tied or complementary products, etc.
In online education free already is introduced by both OER (Open Educational Resources) and by MOOCs. Money is generated by additional services to be paid for such as include remedial courses, additional tutoring by academic staff and certification. It should be noted that the business model related to OER is focussing on reducing fixed costs (production of content) and that MOOCs are centred on VCM (full courses and reduce teaching efforts by scalability).

8. "The openness in MOOCs is seen as an important business driver
Open access in scientific output has already proven to be sustainable and profitable for society. OER from the world's top universities have been available to everyone, free of charge, for over a decade. And open education is considered as the next essential, integrated step enhancing the circulation of knowledge and increasing the pace of innovation."

<u>Explanatory notes:</u>
Related to education this goes beyond the 'online and free' drivers, and incorporates at least also the open license aspects. For course participants an open licensing policy itself might

look not that important. However, it is inherent part of open education, and especially important on meso and macro level. Open access in scientific output is already seen to be sustainable and profitable for society (Weller, 2014). OER from the world's top universities have been available to everyone, free of charge, for over a decade. And open education must be seen as the next essential, integrated step. Overall, there is increasing recognition that education is being transformed and that open education can play a significant role in this transformation.

9. "Globalization and increasing collaboration between institutions"

   Explanatory notes:
   University education becomes increasingly more international. The autonomy of universities is under pressure by regulations on macro-effectiveness of educational programmes. For online education this results in the bundling of expertise in the joint offering of courses with other educational institutions (networked curricula, research schools, etc.) and with other non-profit organisations (associations) and increasingly with the corporate sector (learning environment, MOOC platforms, world-wide marketing, etc.). In addition, open education is about collaborating and sharing, being part of a community.

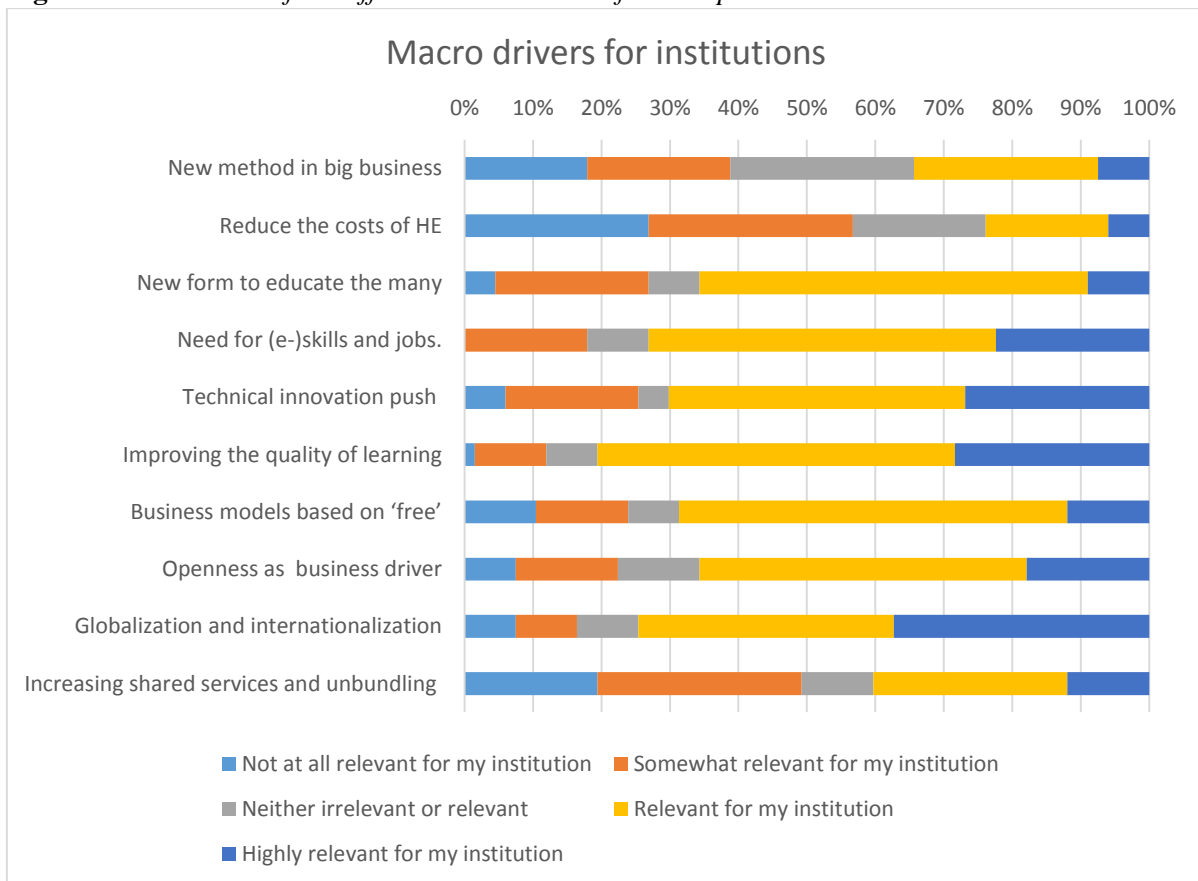10. "Increasing shared services and unbundling of education
    Unbundling means that parts of the process of education are not provided by the university but outsourced to specialised institutions and providers. MOOCs are accelerating the process by outsourcing marketing, branding, ict-platform, exams, learning analytics services, etc."

The importance of different macro drivers for institutional MOOC offering

Figure 15 shows the response from the 67 institutions in Europe. A large majority (between 65% and 80%) indicates that many macro divers are relevant or highly relevant for their institution. The following three drivers are not seen as that important

1. New method in big business (driver 1, only 34,3% consider this (highly) relevant)
   Apparently European institutions are not in the market with MOOC to generate big business. This relates to the strong social dimension of higher education where many universities in Europe are funded by Governments.
2. Reduce the costs of HE (driver 2, only 23,9% consider this (highly) relevant)
   This result is consistent with previous results in this survey (e.g., figure 4)
3. Increasing shared services and unbundling (driver 10, only 40,3% consider this (highly) relevant)

Figure 15: *Relevance of 10 different macro drivers for European institutions*

Macro drivers for institutions

The importance of different macro drivers for governmental involvement

Next the institutions were asked to reflect on those macro drivers from the governmental perspective. I.e., we asked "How important are the following macro drivers for an active governmental involvement on MOOCs". Figure 16 summarises the results.
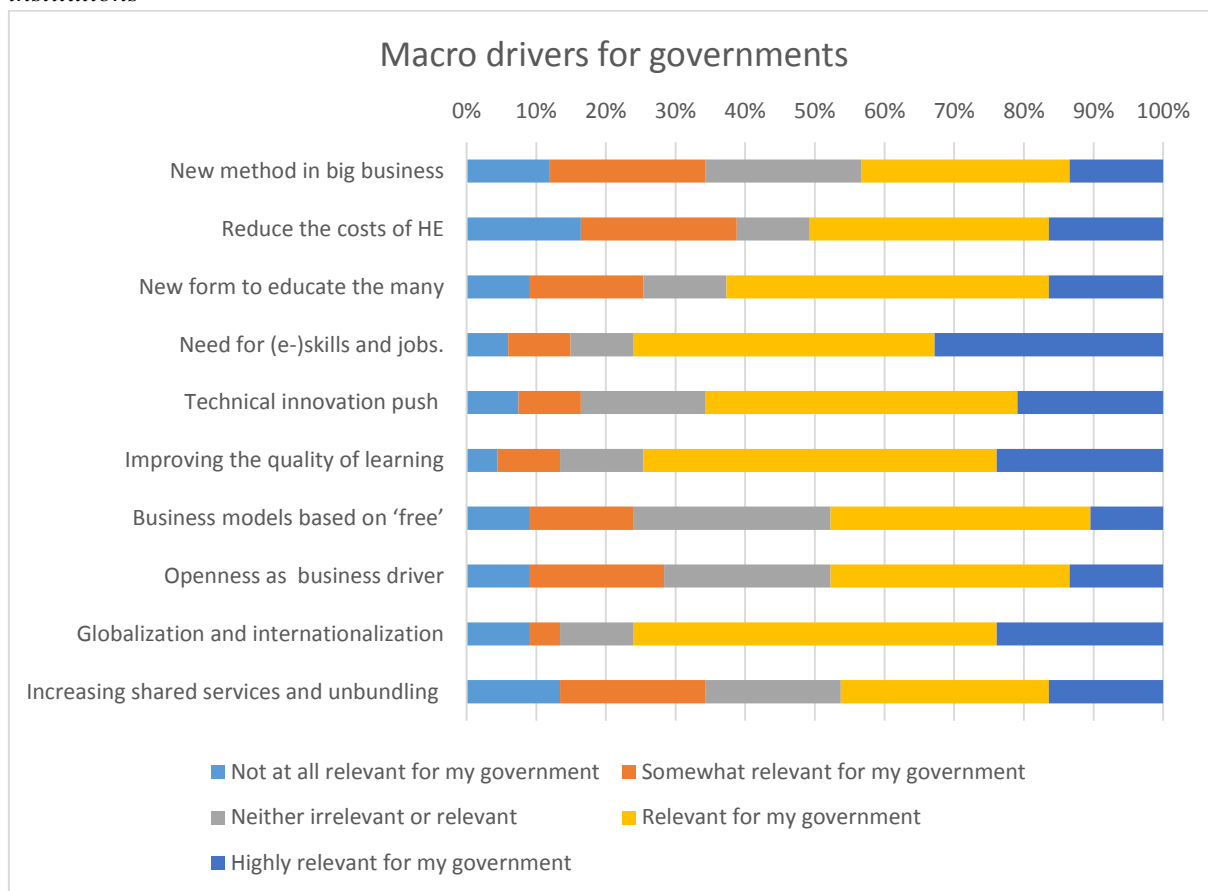
Institutions expect that their governmental involvement with MOOCs are mainly driven by
- Driver 4) Need for (e-)skills and jobs (76,1% finds this (highly) relevant for their governments)
- Driver 6) Improving the quality of learning (74,6% finds this (highly) relevant for their governments)
- Driver 9) Globalization and internationalization (76,1% finds this (highly) relevant for their governments)

In an open question, the participants were asked for more details about their government involvement in MOOCs:

What are the primary reasons why your government is or isn't involved in MOOCs?

The majority of the respondents declared no involvement of their government, due to several reasons: no clear vision, other priorities, financial problems and the primary responsibility for institutions to get involved with MOOCs. Those government who show involvement do this for improving quality of education, enhance and broaden access to HE.

Figure 16: *Relevance of 10 different macro drivers for European governments according to institutions*

Macro drivers for governments

Legend:
- Not at all relevant for my government
- Somewhat relevant for my government
- Neither irrelevant or relevant
- Relevant for my government
- Highly relevant for my government

Categories:
- New method in big business
- Reduce the costs of HE
- New form to educate the many
- Need for (e-)skills and jobs.
- Technical innovation push
- Improving the quality of learning
- Business models based on 'free'
- Openness as business driver
- Globalization and internationalization
- Increasing shared services and unbundling

Closing Remarks

The survey shows an increasing involvement in the MOOC movement by European institutions for higher education. But at the same time it is observed that the MOOC movement is (commercially) dominated by the United States through both the number of course offerings and leading service providers.

Given the results of this report we feel that Europe must seize this moment to grab the opportunities offered by MOOCs. The open and online learning movement has great potential to educate the many in a flexible way that meets the needs of today's learners for an increasingly complex world. It is for those reasons that the Porto Declaration on European MOOCs[5] calls upon all to embrace the possibilities the open and online education movement offers the Knowledge Society and stresses the need for stronger collaboration in Europe, based in the principles of transparent cooperation, mutual benefit and collective incremental advantage. In acting like this, we should watch however to not isolate developments in Europe from the rest of the world, but to also seek for collaboration with both the US and other parts of the world. Only then, learners all over the world will profit optimal from these promising developments.

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[5] http://home.eadtu.eu/images/News/Porto_Declaration_on_European_MOOCs_Final.pdf

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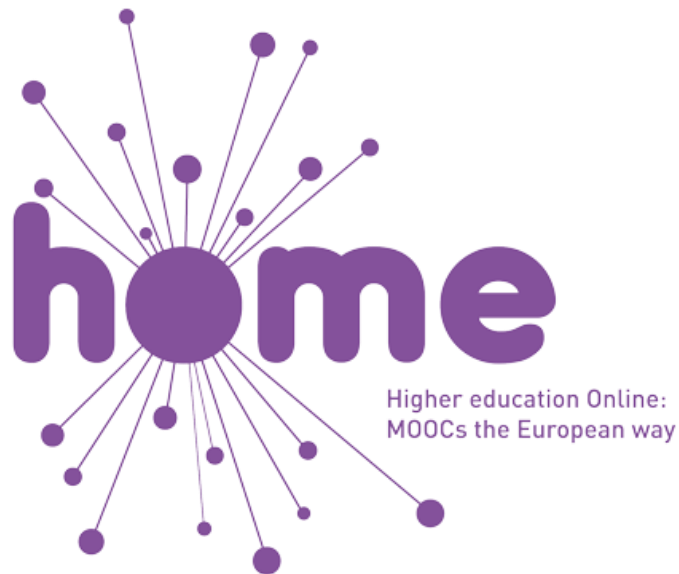
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home.eadtu.eu

EADTU
P.O. Box 2960
6401 DL Heerlen
The Netherlands
Tel: +31 45 576 22 14
E-mail: secretariat@eadtu.eu

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