Delft University of Technology

TU Delft Online Learning Research Working Paper #3

DelftX MOOC Course Report AE1110x Introduction to Aeronautical Engineering

TUDelft

The report is to give more of an insight in the background, the implementation of the course and the results. The purpose is to provide useful information (and clean data) to the team of developers and teachers and to others to support their aspiration for the improvement of online education. A comparative analysis of the first five DelftX MOOCs can be found in the 'Working Paper #6 DelftX MOOCs, the first year (2013-2014)'.

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Course report AE1110x Introduction to Aeronautical Engineering

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Summary

Name course	AE1110x Introduction to Aeronautical Engineering
Date	March 3th - May 19th 2014, a period of 10 weeks
Faculty	Aerospace Engineering Faculty
Teachers	Prof Jacco Hoekstra, Prof. Sinke, Prof. Timmer and Prof. Voskujil
# of students	15.820 registered and 578 certified completers (which is 3,7%)
Level and prerequisite	BSc program in Aerospace Engineering High school level Mathematics & Physics
Course resources	Video Lectures, convergent exercises, demonstrations, real-life challenges
Special features	Higher teacher control, high level of individualized feedback, cumulative assessment design, real life content-related challenges, occasionally filmed in authentic locations
Course on edX	https://www.edx.org/course-search?search_query=ae1110x

The course is highly structured and teacher-controlled with frequent asynchronous student-teacher interaction. It followed a conventional format of several short video segment sandwiched with tasks comprising homework assignments. A separate communication space was dedicated for each task and lecture segment, providing easy structural access to ask a question or make a comment related to particular content. The assignments focused on engaging the students steadily and early on. Individual differences of the students are accommodated through materials that help student organize learning offline.

From the completers (578 students) 89% were male and 50% 21-35 years old. Most had a background in Aerospace (70%) and 64% hoped to enhance their career with this course. The intention for enrolment was rather diverse: a majority wanted to increase their knowledge and skills or found it an interesting topic or wanted to challenge oneself. Most of the students were opting out during the first two weeks. The highest educated tend to get the highest grades. From the use of the forum it was interesting to see how completers used the forum, what their perception was of the usefulness and who dominated the forum. Both students and teachers were quite satisfied with the MOOC and qualified their experiences as really useful.

1. Introduction

The course AE1110x Introduction to Aeronautical Engineering from the Aerospace Engineering Faculty of the Delft University of Technology was the first MOOC of the faculty. The course ran for a period of 10 weeks from March 3 till May 19th 2014. The material for this course was based on the BSc program in Aerospace Engineering, but did not offer any exemptions for the campus course. In total 15.820 enrolled for the course with ultimately 578 students who passed the course and received a certificate.

This report is about the background, the execution of the course and the results. The data have been collected from different sources like edX subscription data, edX student data, including the use of the forum. Using a pre- and a post-course survey made it possible to collect qualitative information on issues like expectations, motivation, prior knowledge level, relevance and experiences and correlate the outcome with other data. In addition the teachers and development team was interviewed to acquire more insight in their experiences and perceptions.

The main objective of the evaluation was to provide useful information (and clean data) to the team of developers and teachers to improve the design and facilitation of subsequent online courses. The evaluation was organized by the O2E research team (Open and Online Education) from the TU Delft in close collaboration with researchers from the University of Southern Australia.

This report covers relevant issues on course design and pedagogy; student demographics, retention and formal performance; the use of the edX course forum and student interactions; and the outcome of the post-survey reactions of the students looking back at their experiences as well as the teachers in a post-course interview.

2. Course Design and Pedagogy

The AERO MOOC was delivered as a highly structured and teacher-controlled course with frequent asynchronous student-teacher interaction. This section evaluates course activities in relation to pedagogy: analyses the balance of resources used, explains assessment design, forum moderation strategy, supporting materials, and other aspects illustrating how this MOOC was taught. Analysis was conducted using various approaches to MOOC pedagogy in its foundation (Margaryan, Bianco, & Littlejohn, 2014; Swan, Bogle, Day, Prooyen, & Richardson, 2014; Toven-Lindsey, Rhoades, & Berdan Lozano, 2014; Weller, 2014).

2.1 Design, Learning Resources and Workload

The AERO MOOC was designed as a highly structured course in the area of applied non-life hard sciences. It provided an introduction to the fundamentals of aeronautics, around three modules: introduction to concepts, aerodynamics and flight mechanics. Weekly course structure followed a conventional format of several short video segment sandwiched with tasks comprising homework assignments.

In the post-course survey, students reported 10,2 hours weekly as average time spent on watching the lectures and doing the practical tasks. Total video content was approximately 14,5 hours, i.e. almost 2 hours weekly. The average number of tasks to complete weekly was about 33, as there were 299 homework tasks, and 64 tasks as a part of module tests.

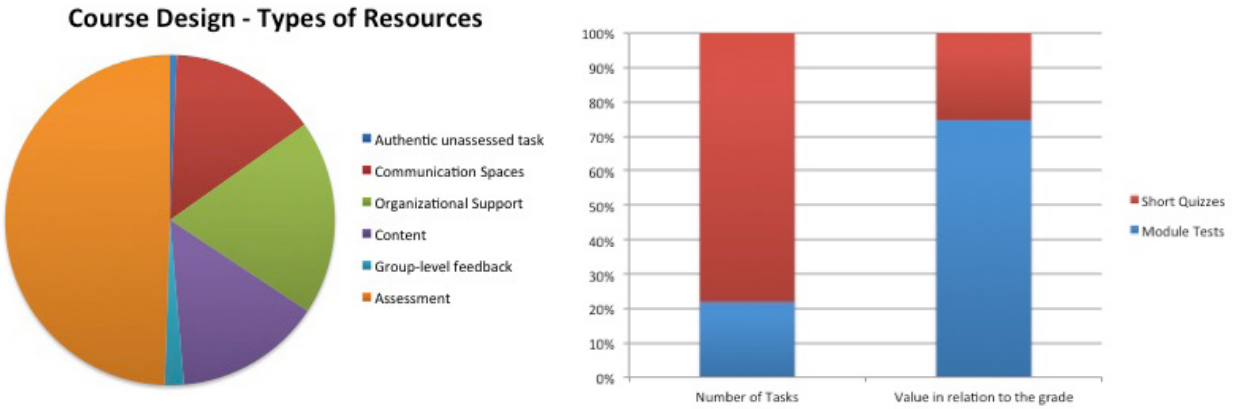
Graph 1a shows various types of learning resources in the course. It can be seen that half of all the items offered to the students were related to assessment; there was also sufficient amount of organizational support through news and downloadable supporting materials, sometimes designed by staff on request when the course was in progress. A separate communication space was dedicated for each task and lecture segment, providing easy structural access to ask a question or make a comment related to a particular content. Pedagogical decisions related to the use of resources are presented in more detail in Sub-section 2.3.

2.2 Assessment

Final grade for the course that qualified a student to receive a certificate of completion was 5.5 (55%) or higher, and it was aggregated from the grades on three module tests. Module A grade comprised 40% of the final grade, Module B grade - 30%, and Module C grade - 30%.
Each Module grade was aggregated from all homework grades for the module (25% of the module grade) and the module test (75% of the module grade).

Graph 1b shows the value carried by various tasks assessing the students. It is shown that the bulk of smaller homework assignments - weekly homework has about 28 tasks with the overall number of 229 tasks in the entire course - carry only 1,39 out of the 5,5 final grade. Contrastingly, 64 tasks in all three module tests carry a value of 4,1 out of the 5,5 of the final grade.

Even though the homework assignments are not as important for the final grade, they provide students who intend to receive certification of completion to engage with the course steadily and early on.



Graph 1a Course design types of resources and 1b Assessment design

2.3 Pedagogical Decisions

AERO MOOC was taught as a teacher-controlled course with frequent asynchronous student-teacher interaction. Lectures and tests were released on a weekly basis, and obtaining course's certificate of completion required early and stable participation. Objectives of the course were not indicated as clearly measurable in the beginning of the course.

Assignments testing declarative knowledge, e.g. formulas and rules, prevailed over authentic examples requiring solving real-world problems. Tasks had a cnoventional format, e.g. multiple-choice, drag and drop, provide a short answer. While in form the comprehension of declarative knowledge was tested, the content of the tasks was often fun and creative. The tasks did not clearly specify their rationale or objectives, were often theretical and required a single answer. The course had a few real world assignments that were not formally assessed. Also, a number of video segments were filmed in authentic locations of interest for the students.

No emphasis was placed on collaborative learning, and activities did not require interachtion. The course twitter account was used mainly for course news. No highly visible Facebook-based student stydy groups were identified. Most course-related interaction occurred via specially designed edX forum communication spaces placed after each task and a video segment.

Individual-level feedback was very frequent and contstructive, and equaled to 2616 forum posts. Although teaching staff did not initiate course discussions, they have provided an exceptional amount of individualized feedback and monitored student forum behavior regularly. Group-level feedback was given through a short course video weekly.

Individual differences of the students are accommodated through materials that help student organize learning offline. All video content is captioned. Downloadable supporting materials and formula sheets accompany all video segments as well as homework and test assignment. No special activities address student diversity.

3. Student Demographics

This sub-section presents an overview of two learner groups: registrants for the course, and those who received a certificate of completion. The section contains information about learners' age, gender, geography, culture, motivation for enrolment, and professional background. Appendix 1 contains additional information related to the student demographics.

3.1 Registered Students

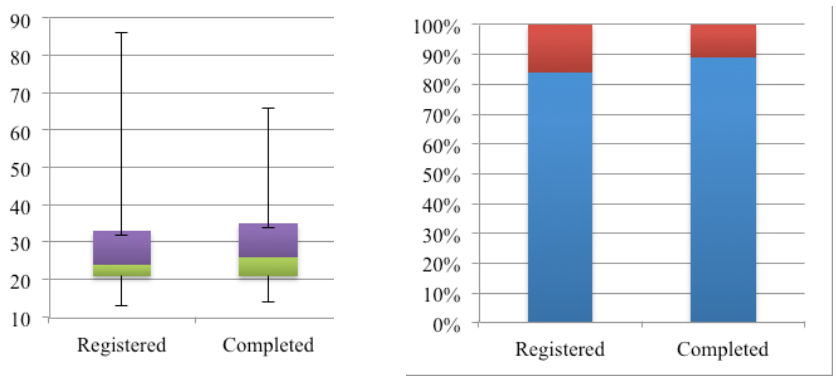
The AERO MOOC has attracted 15820 students. 84% of the registered students were male. 50% of the students were 21 to 33 years old. Enrolled students were predominantly from South East Asian countries (India being the country with most registered students), from English-speaking countries (US being the second largest represented country, Canada and the UK among top ten countries), from Latin European countries (Spain being fourth most represented country) and Latin American region (Brazil – 3rd most represented country, Colombia and Mexico among top ten countries). Half of the enrolled reported having no background in the topic in the pre-course survey, 12% of the group. About 50% of the enrolled describe themselves as employed, and over 70% indicate that their occupation is not related to the course, and 60% of them are taking this course to enhance their career.

3.2 Students with Certificate of Completion

578 students were granted a certificate of completion. 89% of these students were male, and 50% of them were from 21 to 35 years old. Participants who obtained certificate of completion were predominantly from South East Asian area, English-speaking countries, Latin Europe and Latin America. These four cultural groups comprise over 70% of the students with the certificate of completion. Over 70% of the learners who completed with certificates reported having prior background in Aero Engineering. Around 60% of completers report in the pre-course survey that their occupation is not related to the course and 64% of them would like to enhance their career by taking this course.

3.3 Intentions for Enrollment

Student intention for enrolling in the course is diverse. It can be best understood from the pre-course survey 11% of the enrolled students). Students were asked to select all the reasons that apply to their motivation. They reported that they took the class to a) increase their knowledge and skills (88%); b) because they found the topic interesting and fun (65%), c) to challenge themselves (64%). 47% of the respondents enrolled to receive a certificate, 16% wanted to review some selected topics, 15% registered hoping to improve their employability and get a better job and 8% needed the course for their current job. 15% followed the course as a part of their current studies. 19% enrolled due to their interest in studying at Delft and/or because Delft is renowned for the expertise in the field of Aero-engineering (19%), as well as is reputed for being a good university (22%). Qualitative responses also indicate that enrolment is driven by diverse reasons: from curiosity and passion in the topic (e.g. pilots enrolling to sample theoretical content) to employment-oriented. Enrolled students include teachers of the topic and high school students who are interested to engage with the content at the university level.



Graph 2. Age and Gender of AERO learners.

a) Learners' age b) Learners' gender (Blue – male, Red – female)

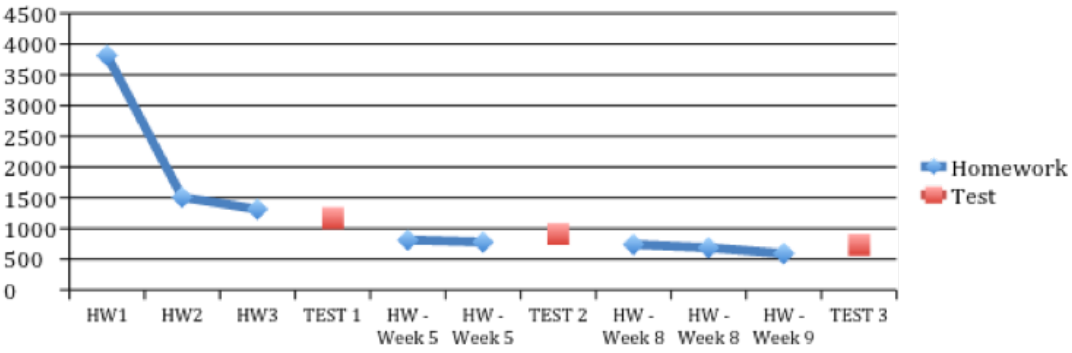
4. Retention and Formal Performance

This sub-section analyses formal performance in the course, focusing on students' choices to opt out of formal assessment activities. Only 24% of registered students engaged in activities required for a certificate of completion. We observe two distinct phases of opting-out of formal assessment (Graph 3): a fast decline early on in the course within the first weeks, followed by a gradual decrease over the course progression. The first wave of decrease in students attempting assessment dropped from 24% to 9% from the first homework to the second. After the first dive, the number of students engaging with formal assessment gradually decreased overtime, going down when the results of the module tests would come out. This section explicates these phases, analyses possible reasons and suggests indicators of students' intention in relation to formal performance.

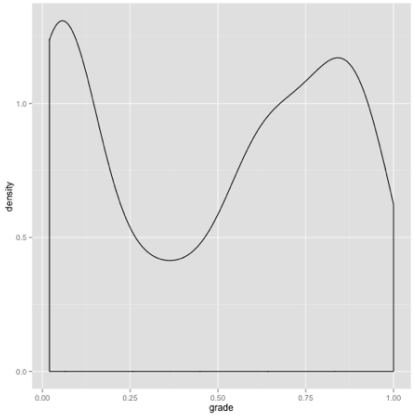
4.1 First decisions to opt-out

Enrolled students decided whether to pursue their intention in formal credentialing and/or sampling the content or disengaging, in the first several weeks of the course. Specifically, 15820 students enrolled in the course. However, only 24% of the enrolled (3815 students) attempted the first homework, and only 9,5% of the enrolled (n=1508) attempted the second homework, and only 8,2% of the enrolled (N=1313) attempted the third homework. All three homework assignments were given out during the first week of the AERO MOOC, and due within the first month of the course.

The first wave of decrease in students attempting assessment dropped from 24% to 9% within a very short period of time. Analysis of students' grades shows that those who did not score high on the first homework assignment were much more likely not to continue with formal assessment, as shown in appendix 2. Reasons could include the difficulty level higher/lower than the learner expected and was willing to spend time on; the lack of time required to finish the tasks (if the learner attempted all homework tasks at the last minute); some dissatisfaction with the way assessment was designed; or simple frustration with getting the answer right (not typing the formula correctly or getting stuck with conversion of measurements). Through the post-course survey, some students reported the lack of time and other commitments as main reasons for their disengagement.



Graph 3. Students' opting-out of formal assessment activities over the course progression



When we look at the 'grade distribution', we see that only a relatively small number of people tried but did not complete the course. The graph below shows that 80% of the students who performed better than 20% of the grade, eventually had a grade higher or equal to 55%. It is not (yet) known if this statistic holds when a larger group is supported/facilitated to get beyond the 20% threshold.

4.2 Progressive opting out of formal assessment

Graph 3 also illustrates gradual decline in the number of students attempting formal assessment. It shows a slight drop around the times when the results of the module tests would

come out, possibly indicating that the students did not score enough to receiving a grade. Specifically, cumulative final grade assigns 30%-40% to each of the test results, while only 58% of students who took Module test 1 scored over 50% (0,5); only 61% of those who took Module test 2 scored over 50% (0,5); and only 63% of students taking Module test 3 scored over 50% (0,5).

4.3 Indicators of Students Intention

Students opting out of formal assessment early on in the course can be observed through the first homework grades. Students who received a certificate of completion with final grades anywhere from pass to excellent were more likely to score almost 100% on their first homework assignments. On the other hand, the majority of 2346 people who attempted the first homework, and did not continue with the next homework received a homework score lower than 50%. These numbers do not indicate that all completers were high performers, because they scored high on homework tasks. Rather, these indicators are directly related with the way assessment was designed in the course, where a student was required to engage in a bulk of simpler and regular tasks as a part of the final grade.

The role of homework assignments seems crucial to indicate student intention to complete in this course. The number of people trying module tests was always higher than the number of people regularly doing homework. For example, the number of students completing the last homework before the final test is 593 people, while 738 people attempted the final test. However, 98% of those receiving the final certificate (568 students) completed the very first homework, and have been selectively completing the majority of the entirety of homework tasks. This engagement in small tasks also served as a foundation for engagement in forum discussions, and as will be shown further in the report, a relationship can be identified between forum activity (measured in number of posts) and student final grade.

The combination of cumulative assessment and monitoring student grades early on may enable identifying the group of students within the course, who are closest in their intentions and behavior to the conventional university online course. Thus, evidence-based best practices in conventional online learning will apply to serve this group of students effectively. Additional analyses needs to be done to better understand whether the retention of students who actually attempted at least one test but did not persevere can be enhanced through the adjustments within the course delivery or other supports accommodating learners external circumstances.

4.4 Grades and Performance

The number of students receiving a pass grade of 0,55 (55%) is 578 people. 50% of the students scored between 0,64 and 0,89, with 0,75 being a mean. Around a quarter of the students scored just over the pass value, and a quarter of the students scored 90% and more.

4.5 Level of education

There seems to be a correlation between the level of education and the grade received by the students. When we look at just the group of completers, we see a correlation of .22 with a p-value of .003 (education level ~ grade). The table below shows the numbers of enrolled and completing students per education level, and the average grade for the group of completers per education level.

Table 1. Level of education and formal perfomance

	Dr	Msc	Bsc	Associate degree	Secondary	Junior	Elementary	None
Enrolled 1641)	38	353	599	98	480	52	10	11
Certificate (172)	5	51	58	7	42	6	0	1
Diff. (perc.)	0.6%	8.1%	2.8%	-1.9%	-4.8%	0.3%	0.0%	0.5%
Grade (cert.)	.90	.80	.77	.77	.73	.73	-	.71

4.6 Forum activity

Students who performed well, were also more active on the forum. Using different samples (all enrolled students, all students who actually did one or more assignments, all students with grade>.54), we see a similar pattern, which is that students who perform better, are also more actively engaged on the forum. The most conservative correlation estimate of .16 (p=.06, students with grade >.54, n = 173)). Further research must show what the role of the forum is, and can be, in relation to student performance.

5. Course forum and student interaction

This section highlights the use of forum to shed light on peer-to-peer and teacher-to-learner interactions that occurred in the course. It analyses the number of posts made by the students to show overall forum activity, brings in the feedback from post-course surveys by the students who obtained the certificate of completion, and provides some characteristics of the network of learners derived from social network analysis of student interactions to describe the structure and nature of the community of learners.

5.1 The Use of Forum

Most AERO MOOC students were not active on the edX forum. The frequency of posts made on edX forum is a typical long-tail distribution. In particular, 85% of people registered for the course (13450 students) showed no activity on the forum. The remaining 15% of registered learners used the forum, their activity ranging from 1 to 700 posts. If a student who made from 0 to 3 posts on the forum is characterized as passive, then 96% of all registered learners were passive on the forum (Table 2).

A similar long-tail distribution is observed if we compare how often those students who received certificate of completion used the forum. Here, however, only 58% of the sample were passive, i.e. made 0 -3 posts.

	Registered Students	Completing Students
Superposters (50-700 posts per person)	0.18%	4,32%
Very active (30-49 posts per person)	0.17%	4,32%
Active (15-29 posts per person)	0.37%	7,43%
Moderately active (7-14 posts per person)	1.15%	15,37%
Inactive (4-6 posts per person)	1.47%	10,36%
Passive (0-3 posts per person)	96,62%	58,13%

Table 2. Use of edX Forum by registered and completing students.

5.2 Student Feedback on the Use of Forum

Relatively low activity on the forum does not indicate the usefulness of the forum in relation to student learning. The post-survey filled in by about 50% of all the students who received the certificate of completion give an overall positive evaluation to activities related to the forum.

- 83% of the completing students agreed or strongly agreed that the course forum was helpful, and 82% of the respondents reported course forum to be important for them.
- 41% of completing students indicate that they have contacted the instructor or teaching assistant about something they did not understand in the course.
- 24% of the respondents looked at the forum and read discussions daily, and 46% weekly. 68% of the respondent indicated that they have posted a comment or a question on the course discussion board.
- Only 4% of the respondent never looked at the forum, mostly explaining it by being able to do homework on their own, or having little time.
- 51% reported interacting with other student once or only a few times, while 14% did it weekly or 6% - daily. 35% indicate that they shared their expertise with other students. 17% indicated that they have made friends with other learners in the course.
- Students who did not interact with others on the forum explained it as having no need as all was already specified in previous discussions, feeling an age gap between active students and herself, being too time consuming, either already being familiar with the content or having little math background to ask good questions (!), because the interaction was not obligatory.
- 61% of the students found the forum to be designed in a way that made it easy to learn with others.
- 3% of the students reported having negative interactions with others on the forum, and specified it as being mostly rude, impolite, being provided wrong feedback or being stereotyped (1 person).

5.3 Student Community

Social network analysis of the structure of the student network was conducted to provide insights into how student participation occurred in the AERO MOOC.

Organizing and participating in the edX forum within AERO MOOC can be characterized as a lightweight form of organizing and participation (Budhathoki & Haythornthwaite, 2012), i.e. the demand on participant commitment and engagement is light. The development of such a model for peer production evolved as follows: contributors did not know each other and an authority organizing the activity in the initial stages provided a system for participants to contribute to common efforts. Contributions were not a requirement, thus allowing some people to drop in and out as they wish, while others enjoyed regular interactions. Lightweight peer production is not designed to maintain relationships between the learners (Haythornthwaite, 2009). The contributions were independent and rule-based, the rules were defined by authority rather than negotiated, and the history of contributions was often unnecessary. Lightweight collaborative activity was accompanied by the quantitative recognition mechanisms, such as voting on the posts.

In order to characterize the most vocal users of the forum, we have partitioned the network of learners, focusing on the learners who produced more than 50% of all the forum content. Such sub-network consisted of 40 participants, 2 of them have not completed the course, and 3 of them are staff members.

The dominant group on edX forum can be described as follows:

- Two most prominent participants are two student assistants, therefore holding most power and influence in the information flow within the network.
- Participants from the following cultures dominated the forum: English speaking (14,7%), Germanic culture (14,7%), Latin Europe (12,2%) and Eastern Europe (9,76%). South East Asian participants that form the largest group of both registered and completing students comprise only 7,3% in the network of most vocal forum users. Latin American learners are also under-represented in comparison to their overall participating in the course (4,88%). Nordic and African participation is low among most vocal forum users, but in line with overall course registration.
- The forum was mostly male-dominated (only 3 female participants), but so was the entire MOOC cohort. Among special observations was that of an active female high school student from the Middle East.
- Although age barrier is reported in the surveys as an obstacle for interaction, dominant forum users range from 15 to 73 years old. There is an equal distribution of age groups, from high school students (=12), to university students (=12), professional students (=11) and mature learners (=6).
- No preferential attachment or a particular demographic trend was observed. Student intentions varied.
- The only unifying characteristic of all the participants in the sub-network of most vocal forum users was that they all have completed the majority of homework assignments, with a relatively high grade. Most likely that indicates that the need to discuss those assignments was what brought these learners on the forum in the first place.
- Overall majority of the members of the most vocal sub-network had high grades: 2.4% had a perfect score of 1; 41.4% scored anywhere from 0.9 to 0.99, 21,9% scored anywhere from 0.8 to 0.89. Two students who were members of this sub-network did not complete the course, as they dropped out after the first module.

6. Looking back

A post-course survey for students and a post-interview with the teachers and developers of the course allowed us to collect some qualitative information on the experiences of the participants. The postsurvey was answered by 309 students, and 63 of these students did not get a grade above .55. Hence, 80% of the post-survey respondents completed the course, which represents 46% of the total number of students passed. From a research perspective it was interesting to see what these students were doing and what their perception was looking back after successfully finishing the course. Therefor the post-survey zoomed in on issues like confidence in handling the course, how determined they were to finish the course, the use of the online forum, social interaction, the relevance of the course, the challenges, their expectations and experiences, course quality and if such a course inspired them to continue learning.

So the first issue in the post-survey was on self-confidence of the students regarding their competences and what they experienced during the course. The completers obviously were very confident (84%) that they could handle the requirements. At the same time this group was rather determined to finish the course (87%) and pass the examination (84%). They also showed a firm belief in the statement that you can achieve more when you work harder (65% agree and strongly agree, 36% mostly agree). When it comes to social interaction 59% indicated that they would have wanted to connect with other students more than they did. This would than include experience sharing, giving or receiving help and the use of the course forum. The participation in the course forum shows a pattern that is more or less equally spread from no participation (22%), rarely (29%), sometimes (29%), often (12%), to all the time (6%). So it seems that there is something to gain when it comes to social interaction and this is confirmed by the reactions on the questions concerning online participation. Only a small percentage (11%) joined a study group or made friends. A larger group (42%) contacted the instructor or teaching assistant for support and 86% looked for extra materials.

How did the student feel like as participant in this course? Apparently rather well, because 84% indicated that they had a feeling of belonging and believed that the course instructors cared about their learning experience (84%). So, no wonder that 95% of the students said that they really enjoyed the course.

Quite some students reacted on the question about the experience in the first few weeks. Apart from some positive reactions, it is clear that students face all kinds of challenges to continue with the course of which lack of time seems to be the most important reason, but also health and the political environment played a role in the decision to stop. Some mentioned that they were bothered by a slow internet or electricity problems, but the majority had no such complications. As time is an important issue, students felt during the course a little (31%) or somewhat stressful (34%), but felt quite in control of things (88%) and perceived that things turned out well (89%).

Important for the justification of participation are the expectations. 78% of the students said that their expectations about the course were realistic. This is also shown in the fact that 60% believed that the course exceeded their expectations and 36% found that the course was exactly what they expected. The overall quality of the course was rated good to very good (97%). Also the overall quality of assignments and exams, the balance between lectures and exercises and the feedback were rated good to very good (90%).

Of course we wanted to know if the students would like to do another course by this team of teachers. Clearly 76% absolutely wanted to do another course and 19% indicated probably. Apparently this also spurred the appreciation for the TU Delft (absolutely 82%, probably 12%) which did not mean that everybody considered applying for an online graduate program (absolutely 26%, probably 17% and maybe 26%). Nonetheless the course inspired most of the students (absolutely 63%, probably 21%, maybe 10%) to continue studying in this field. If these numbers are inherent to completing students, it does show the merits of reducing dropouts in MOOCs: an increased interest and demand for TUD/DelftX education.

The experiences of the teachers and developers

The AERO Space faculty was already quite familiar with Collegerama (Lectures taped and made available online) and open courseware. The MOOC development was a next step and required some adaptation. It is not easy to talk to a camera in a studio while thinking that you address a diversity of learners out there, who you

cannot see. So you have to guess if they understand or not, therefor one of the issues is to try to give these lectures a more authentic flavor by recording the lectures in a classroom or in another authentic setting.

The objectives for the MOOC were quite diverse, but clearly connected: 1. Making our education accessible for everybody, 2. Public relations for the faculty and 3. Update of learning materials and content. The experience is that we managed to achieve these goals. We started off with thousands of students, lost a majority in the first two weeks, but the remaining group was quite dedicated. We received nice responses, also on the design of the course and the course materials. Important was the team of student assistants, which was crucial for the exchange and communication in the course.

We would like to improve the possibilities for feedback. This concerns not only the learning process, but more in general the setting of the learner. What works well and what can you do to improve for example the number of completers. For that we need better and smarter analyses, but also the possibilities to compare online with on site. Our online future certainly will be a 'luxurious Collegerama' combined with MOOCs and regular online and onsite courses.

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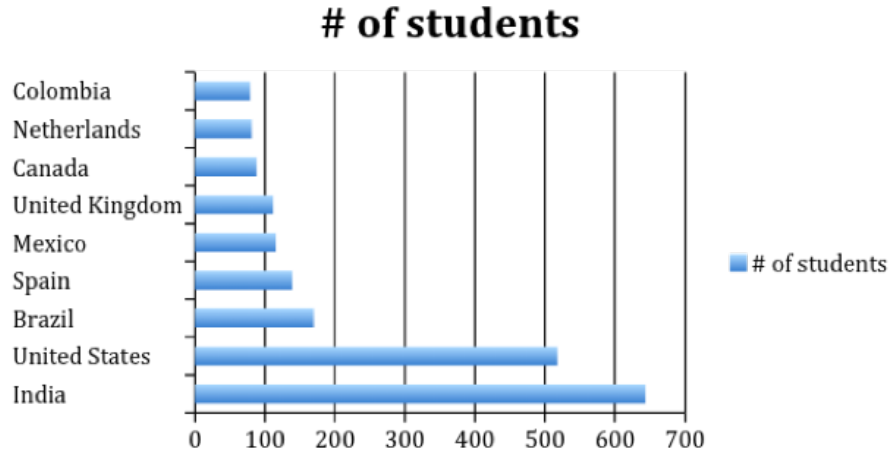
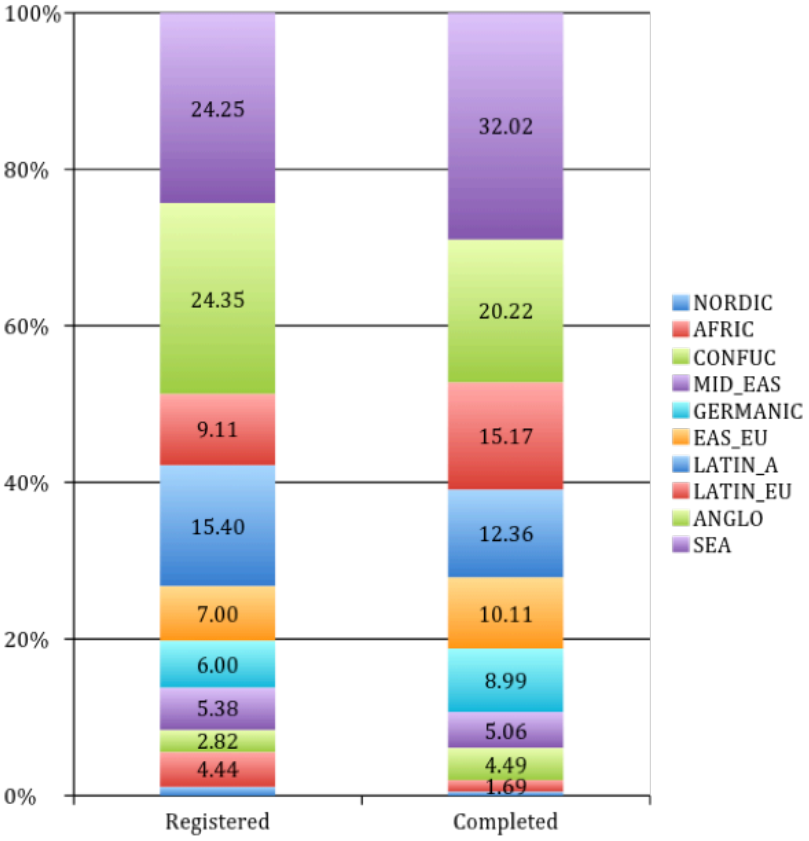
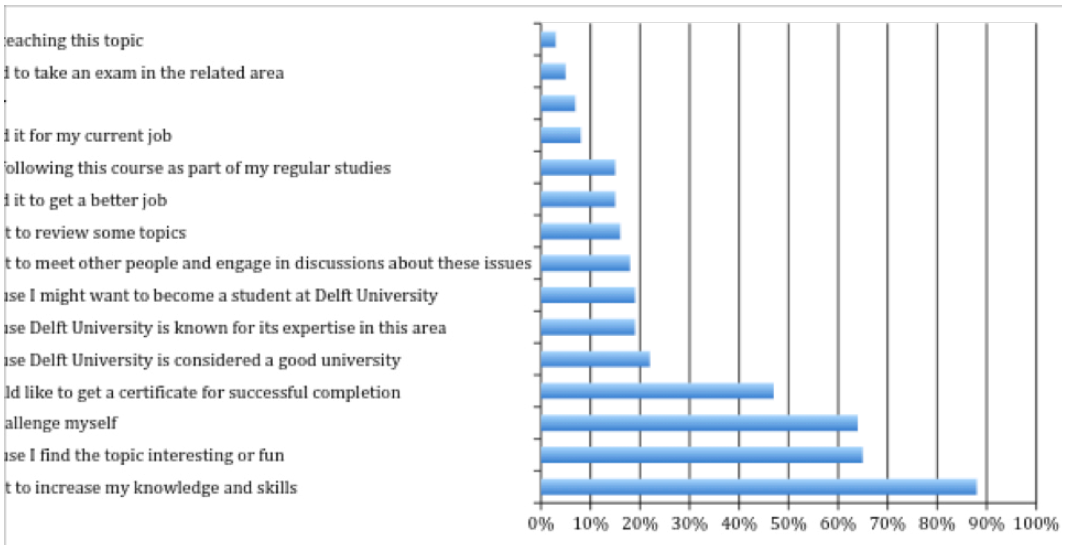
Appendix 1. Student Demographics



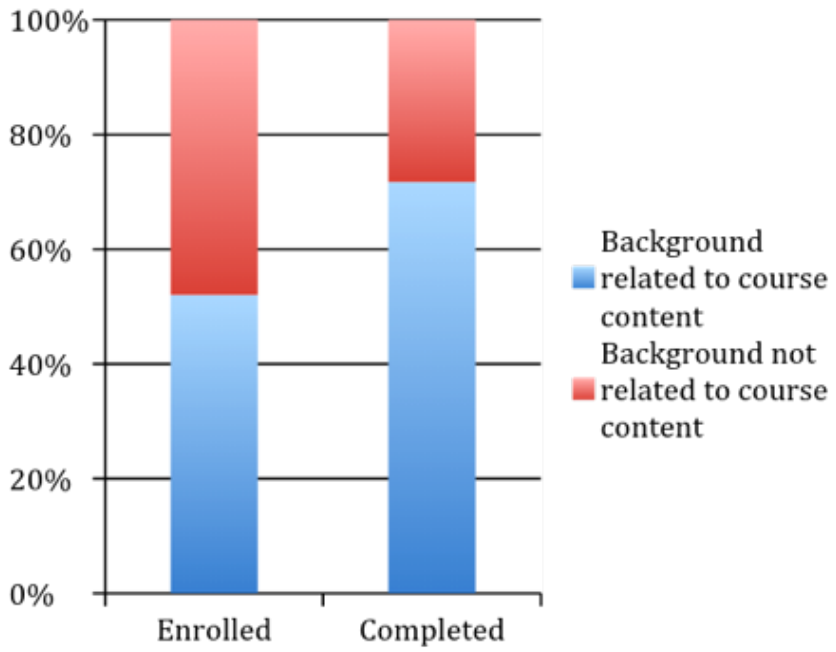
A) Geographical representation of enrolled students



B) Cultural representation of enrolled and completing students



C) Student motivation for enrollment



D) Background related to the course content, based on the appr.10% response rate for both samples, i.e. enrolled leaners (n=1775) and completing learners (n=58)

It is noteworthy based on the available information, the majority of completing learners without background related to the course indicated in the pre-course questionnaire that they intend to get a certificate of completion, that Delft is known for its expertise in the area, and that they are taking this class because they think the topic is fun.

Appendix 2. Some statistical tests

T-test on average grade on first homework assignment (HWA.01) and subsequent homework assignment HWA.02 and the first formal assessment (TestA) in Table 3.1 and 3.2 respectively

Mean grade first homework assignment (HWA.01) who did NOT make the second homework assignment (HWA.02)	**Mean grade first homework assignment (HWA.01) who DID make the second homework assignment (HWA.02)**
0.358 (out of 1)	0.889 (out of 1)
A t-test on whether the group means are significantly different from each other yields a significance level of .000 and hence, indeed, we can conclude that those who had a lower grade on the first homework assignment did not continue to make the second homework assignment	

Table 3.1: T-test on equality of mean grade of first homework assignment (HWA.01) and the second homework assignment (HWA.02).

Mean grade first homework assignment (HWA.01) who did NOT make the first formal assessment (Test A)	**Mean grade first homework assignment (HWA.01) who DID make the first formal assessment (TestA)**
0.485 (out of 1)	0.925 (out of 1)
A t-test on whether the group means are significantly different from each other yields a significance level of .000 and hence, indeed, we can conclude that those who had a lower grade on the first homework assignment did not continue to make the first formal assessment	

Table 3.1: T-test on equality of mean grade of first homework assignment (HWA.01) and the first formal assessment (TestA).

NOTE: the grades on the first homework assignment are grades > 0. That means that we looked at those people that really attempted the first homework assignment. Those who didn't make the assignment, e.g. have a score of 0 out of 1, are not taken into account into this test.

The test is performed on a set of 960 students.

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