2014 OPEN EDUCATION TREND REPORT

A PUBLICATION BY THE OPEN EDUCATION SPECIAL INTEREST GROUP

SURF

2014 OPEN EDUCATION TREND REPORT

A PUBLICATION BY THE OPEN EDUCATION SPECIAL INTEREST GROUP

SURF

FOREWORD

This third edition of the SURF Open Education Trend Report was compiled by the Open Education Special Interest Group, and features contributions by experts from the Dutch higher education sector.

The global development towards open education dates back more than ten years. In 2006, several Dutch universities followed suit with the publication of OpenCourseWare. Although several institutions had already embraced the concept of open education for some time, the issue seems to have truly taken hold in the Dutch higher education sector since 2013, largely due to the growing popularity of Massive Open Online Courses (MOOCs).

The Trend Report supports this conclusion. The report accurately describes the latest developments and challenges facing the Dutch higher education sector in relation to open and online education. The articles also outline a concrete vision on future developments, such as the effects of recognising MOOC results, the impact of digitisation on postgraduate education and other forms of disruptive innovation. A contribution from the Dutch National Student Union (LSVb) explores matters from the students' perspective. Minister Bussemaker's January 2014 letter to the Dutch Lower House on open and online higher education underlines the impact of open education while boosting the Netherlands' profile in this key area.

The emergence of MOOCs set the tone for the 2013 Trend Report. The same applies this year. Despite the intensive focus on MOOCs, it is important to keep in mind that open and online education extends beyond such courses. Production and the reuse of Open Educational Resources (OER) and OpenCourseWare also make up an essential part of open education. Sharing and collaboration are key concepts in this regard.

The Dutch higher education sector can take pride in this Trend Report, and not just in this year's edition. For the past three years, the report has offered an accurate reflection of open education developments in the Dutch higher education sector, a fact recognised and appreciated at both national and international level. I hope you enjoy the read. Take in the latest information, get inspired, and find out how your university of applied sciences, university, university medical centre or other organisation can apply open and online education in a way that reflects your objectives and ambitions.

Anka Mulder
Vice-President of Education & Operations, Delft University of Technology

TABLE OF CONTENTS

INTRODUCTION

This 2014 Open Education Trend Report describes the latest trends in the area of open education in the Netherlands and abroad, from the perspective of Dutch higher education. This description is based on eight articles by Dutch experts in the area of open and online education. It also contains eight short intermezzos featuring interesting and relevant examples.

This report is published by the Open Education Special Interest Group. This Special Interest Group facilitates and promotes community building, knowledge development, knowledge sharing, cooperation and the development of a coherent vision on open educational resources and open education within the Dutch higher education sector. Its activities are coordinated by a core team of experts from the various institutions. The Open Education Special Interest Group is thus an initiative by and for the higher education sector, and is supported by SURF.

The Trend Report can be downloaded from www.surf.nl/trendreportopeneducation2014. This web page also features a link to the Dutch-language version. For more information on the Open Education Special Interest Group, see www.surfspace.nl/sig/5-open-education, for more information on SURF's Open Education Innovation Programme, see www.surf.nl/openeducation.

The following authors contributed to this Trend Report:
Tim van den Brink - Dutch National Student Union (LSVb)
Sofia Dopper - Delft University of Technology
Jop Esmeijer - Netherlands Organisation for Applied Scientific Research (TNO)
Jody Hoekstra - Netherlands Board for Training and Education (NRTO)
Esther Hoorn - University of Groningen
Ria Jacobi - Amsterdam University of Applied Sciences/Hogeschool van Amsterdam
Hester Jelgerhuis - SURF
Marianne Kaufman - Dutch National Student Union (LSVb)
Meta Keijzer-de Ruijter - Delft University of Technology
Ria van 't Klooster - Netherlands Board for Training and Education (NRTO)
Sander Latour - University of Amsterdam
Matthijs Leendertse - ELMconcepts / Erasmus University Rotterdam
Martijn Ouwehand - Delft University of Technology
Marije Schreuder - Leiden University
Robert Schuwer - Open University of the Netherlands
Marja Verstelle - Leiden University
Mark Visser - Studytube
Nicolai van der Woert - Radboud University Nijmegen Medical Centre

The 2014 Open Education Trend Report was compiled under the editorship of Nicolai van der Woert (Radboud University Nijmegen Medical Centre), Ria Jacobi (AUAS/HvA) and Hester Jelgerhuis (SURF).

OPEN AND ONLINE EDUCATION AS A DRIVING FORCE TOWARDS MORE FLEXIBLE AND QUALITATIVE EDUCATION

The emerging shift identified in the 2013 Trend Report has become fact in 2014: open and online education now features on the Dutch higher education agenda. Various Dutch higher education institutions are currently experimenting with open education and its application in formal education. The number of applications in postgraduate education is also increasing. The issue is now the focus of intensive media interest, while the 'why', 'how' and 'what' of open and online education has become the subject of debate in many forums. This is reflected in the growing demand for the strategic workshops on open education offered by SURF in close collaboration with the Open Education Special Interest Group. The SURF study trip for executive officers in the autumn of 2013 was also themed around the issue of online and open education. The participants concluded that open and online education, be it in the form of MOOCs or other variants, is an inevitable development. Making available knowledge in open education does not pose a threat, but in fact provides added value and spurs breakthroughs. However, last year's undisputed milestone came in the form of a letter from Minister Bussemaker to the Dutch Lower House, describing the trend towards more open and online education as promising in several ways and as an inspiring development which she is keen to promote and facilitate.

In short, open and online education now feature prominently on the educational and political agenda. It is important to emphasise that we are referring to the broader context of open and online education - extending to open educational resources, OpenCourseWare and MOOCs in the form of online education - rather than MOOCs alone. The development and reuse of open learning materials is important in this regard, as is the issue of target groups: from school pupils to professionals in the postgraduate domain. There should also be an increasing focus on open and online education's potential to improve the quality of traditional campus-based education, and the various ways in which these three can strengthen one another.

The articles in this Trend Report describe recent developments and trends in the area of open education at home and abroad, within the context of Dutch higher education. This includes trends identified in one of the previous (2012 and 2013) reports that have since undergone an interesting development or further solidified. Alternatively, the focus could be on new developments or experiments. This introduction describes the common thread running throughout the articles.

Open education as a driver for improving educational quality

Open education is driving the current debate on online education in the 'formal' education domain, which centres around issues such as the restructuring of formal education at course and curricular level. According to executive officers participating in the SURF study trip (October 2013), the Dutch higher education sector boasts an excellent infrastructure for open and online education. They also view open and online education as an opportunity to improve the quality of traditional higher education 'on campus' and to initiate educational innovation.

The further development of blended learning – a mix between face-to-face and online learning – would be a first step in this direction and could be achieved in a relatively short space of time. Online lectures (centred around instruction, preparation, refreshing prior knowledge or the presentation of issues) can be alternated with interaction in face-to-face working groups. The Trend Report describes this development in an article by LSVB students on the potential and pitfalls of MOOCs. In the article, the students advocate balance above all else: 'and' rather than 'either/or'. Despite their conviction that MOOCs can help improve traditional education in terms of flexibility, accessibility and quality, they stress the importance of human interaction. This effort to strike the right balance is currently gripping the higher education sector. However, we are also working to find an appropriate format. How, after all, do we define MOOCs and online education? (see the intermezzo on the various forms of open online education on page 67). Two other articles touching upon the relationship between open education, online education and campus-based education explore the accreditation of MOOC certificates in formal education (Verstelle, Schreuder & Jelgerhuis) and the integration and reuse of open education (Ouwehand & Jacobi).

Open education as a driver for educational flexibilisation

The issue of educational flexibilisation has regained priority in the Dutch higher education sector. The theme is also discussed in the recent letter from the Minister of Education, Culture and Science: "open and online education offers great potential for the facilitation of lifelong learning, due to its inherent flexibility." However, flexibilisation is a means to an end rather than an end in itself. A means that will allow the education sector to cater more effectively to its various target groups. All too often, strategies are based around a – non-existent – ideal student. We tend to offer our highly diverse student intake relatively homogeneous education. Surely such an approach no longer reflects the realities of our time. What if the increasing number of special learning tracks – such as honours tracks developed for excellent students or education programmes for secondary school pupils – were to become the new standard? After all, we aim to offer everyone the best possible education. The application of open and online education can help us offer more flexible education in terms of study pace, course scheduling and level. These aspects are extremely important, especially to working students (Van der Woert, van 't Klooster, Visser & Hoekstra). Several appealing examples of flexibilisation are described in the article on MOOC examinations and assessment (Keijzer-de Ruijter & Dopper) and the article on integration and reuse of open education in the formal curriculum (Ouwehand & Jacobi). Finally, the application of learning analytics can also help us shape a more tailored range of education programmes (Latour & Schuwer).

Open education as a driver for lifelong learning

'Educational diversity' basically comprises (a) tailor-made education, (b) flexible education and (c) demand-driven education. These three elements are all the more prominent in postgraduate education. Although it may seem like an obvious idea, we might do well to apply open and online education's potential to a greater extent in order to steer the working population towards higher education. Here in the Netherlands, we seem to beat around the bush on this matter, putting off meaningful investment. As the article on postgraduate open and online higher education (Van

der Woert et al.) describes, current developments in the area of MOOC have laid bare the scale of demand. It would also be interesting to find out whether – and if so, when – the Dutch continued education and refresher training market aims to embrace open online education, and to determine what would lead to this development (Verstelle, Schreuder & Jelgerhuis). Alternatively, employers may eventually come to accept badges and an online MOOC portfolio as adequate proof of their (potential) employees' training. The corporate learning domain is also extremely interested in the developments surrounding MOOCs, open learning pathways and their potential applications in the corporate sector. Open education offers great potential for lifelong learners. Open and online education will change the learning process at many levels, helping to make lifelong learning more accessible and effective. This may eventually yield spin-offs that benefit the traditional education sector.

Open education as a driver for collaboration

Open and online education requires collaboration and the co-creation of education. In addition to other educational institutions, this collaboration should also – or especially? – extend to other non-profit organisations or the corporate sector. Open education is all about working TOGETHER and SHARING. This pattern is also emerging in the United States, where a large number of parties are currently joining forces. In the US, the main focus seems to be on co-creation. For example, parties work together in order to help improve the knowledge level of a specific city or region. In one example, a municipality organised free meetings on MOOCs for local residents under the supervision of a lecturer/coach, in collaboration with the public library. The article by Ouwehand and Jacobi makes reference to The State University of New York (SUNY), which has formulated the ambition of training more students in the New York region, and applies open education to achieve this goal. SUNY also regards its collaboration with Coursera as an opportunity to develop MOOCs through collaboration between the various campuses, thus encouraging its lecturers to exchange knowledge and experiences.

The use of open licences also helps facilitate more effective collaboration (Hoorn & Schuwer). Amongst other applications, this will allow the Dutch higher education sector to co-create open online introductory courses in the area of statistics, mathematics or language, subjects with a high failure rate, or MOOCs themed around the top sectors. Open licences also facilitate the co-creation of postgraduate open and online education by higher education institutions, employers and private training institutions (Van der Woert et al.).

Open education as a driver for unbundling

In one common form of unbundling, multiple parties – rather than a single supplier – offer components of the education process. Alternatively, individual components may be outsourced to specialised organisations. Examples include assistance during the study choice process, study advice and supervision, content development and content curation, exam training, the administration of examinations and proctoring, the provision of MOOC platforms, learning analytics services, etc. This creates new opportunities for students. For example, Coursera offers courses from ten different universities, based on course materials available through a wide range of online sources. The growing availability of open and online educational resources and courses in combination with individual services can serve as a valuable supplement to specific student groups. Such solutions could even become an alternative to traditional face-to-face education and other university services.

This development is partly driven by the changing needs of students at both undergraduate and postgraduate level. Demand is shifting towards a more tailor-made, flexible and demand-driven form of education. Various experiments are currently being conducted in this area. According to a January 2014 Cetis report

entitled '<u>Beyond MOOCs: Sustainable Online Learning in Institutions</u>', MOOCs can even be applied to experiment with new didactic and organisational innovations in the education sector.

In order for the current unbundling process to truly blossom, the growing range of open and online courses must evolve to the point where students can independently create their own learning pathways. Students can then purchase modules from various providers at substantially lower rates than those charged for traditional study programmes or even sign up for modules at no charge. The selected modules can be combined to form a comprehensive programme which culminates in the attainment of a certificate.

The unbundling process thus involves a form of re-bundling. Various universities are already collaborating in this area, bundling their MOOCs to form a joint programme (Verstelle, Schreuder & Jelgerhuis). The postgraduate segment is currently seeing a rise in the number of education packages tailored specifically to working practice. These packages may be compiled from multiple sources.

This growing trend towards unbundling is causing a shift in the value network (Leendertse & Esmeijer). The developments have already sparked a debate on the restructuring of traditional education (at course and curriculum/programme level). The traditional methods applied by (corporate) training departments also seem to be gradually making way for a more open approach (Van der Woert et al.). As a result, we are seeing the emergence of certified learning tracks developed by employers rather than higher education institutions.

Open education as a driver for the debate on online education recognition
In the wake of Minister Bussemaker's letter to the Dutch Lower House, the media latched on to the fact that universities and universities of applied sciences are now offering credits for online lectures and MOOCs. The recognition of MOOC certificates by universities and universities of applied sciences is an extremely topical issue, and is explored in further detail in the article 'Recognition of MOOCs in the education sector'. Interestingly enough, the Accreditation Organisation of the Netherlands and Flanders (NVAO) has also taken up the issue and will be publishing a position paper on the subject in the spring of 2014. Finally, the issue also affects continued education providers and refresher training institutes: a growing number of (prospective) students want to know whether MOOCs will count towards professional education credits. Examination within the framework of MOOC programmes and the authentication of students represents a related development (Keijzer-de Ruijter & Dopper).

The next steps
Open online education has clearly manifested itself on the Dutch higher education agenda. With the issue now firmly on the agenda, policy development and implementation would seem the next logical step. However, the field of open education tends to develop at an extremely rapid pace. In fact, most experts feel unable to predict the shape of things to come. Open education remains an unpredictable and disruptive form of innovation, in which global developments tend to cause unexpected ripple effects. The process is thus difficult to enshrine in policy documents. Despite the inevitable need for a clear policy framework, a growing number of parties feel this innovative force should also be granted space to develop. It is time to forge ahead, while keeping sight of factors that can promote further development and innovations. Further quality improvement and flexibilisation will be key in this regard.

The developments outlined in this Trend Report raise a number of fundamental questions:

1. How can the quality of current 'on-campus' education and corporate training be improved through the application of open and online education?
2. How can the Dutch higher education sector apply open and online education in order to benefit optimally from the trend towards flexibilisation?
3. How can Dutch education institutions and private training institutes work together to co-create and share education?
4. How can we apply the potential of online and open education to truly strengthen lifelong education?
5. How can we apply the potential of online and open education to shift the focus to students, offering them ownership of their own learning process and the potential to shape their own learning pathway?
6. If we truly think through the potential offered by open and online education, is it still realistic to think in terms of curricula and four-year programmes?
7. What sort of changes can we expect over the coming period in terms of testing, examinations and certification?
8. How do we create optimal open learning products for working professionals on the basis of appraisal interviews, career planning, employability and employer or job requirements?
9. Will the current education system structure allow us to continue offering optimal education for all?

These questions are largely or entirely outside the scope of this Trend Report, and will require further dialogue and debate. We hope the input from this Trend Report can be applied in support of this process, starting with the Open Education Week 2014.

POSTGRADUATE OPEN AND ONLINE HIGHER EDUCATION FROM THE PERSPECTIVE OF PARTICIPANTS, EMPLOYERS, TRAINING INSTITUTES AND EDUCATION PROFESSIONALS

by **Nicolai van der Woert, Ria van 't Klooster, Mark Visser** and **Jody Hoekstra**

Postgraduate higher education is key to the Netherlands' ambition of becoming one of the world's leading knowledge economies. The great majority of adult participants are enrolled on a part-time basis. This article opens with an overview of facts and figures on postgraduate education in the Netherlands and on open higher education. The subsequent section explores trends and opportunities for open and online education in the postgraduate higher education market, from the perspective of participants, employers, training institutes and the education professionals they employ. The focus is on exploring open and online education's potential to cater to the wishes and needs of adults, and increasing the appeal of lifelong learning. This will require an emphasis on flexibility, specially tailored products and a demand-driven approach.

Postgraduate education in the Netherlands: facts and figures

Postgraduate education takes place after the participant's initial full-time education and is almost 90% related to the participant's current work (Social and Economic Council of the Netherlands (SER), 2012). This market is largely dominated by private training institutes, which operate without government funding. They often maintain direct contacts with the business sector and are thus able to adequately meet the needs of both employers and employees. Eighty per cent of the 1.5 million Dutch adults taking part in such a training programme each year do so at a private training institute (Statistics Netherlands (CBS), 2009).

According to the higher education outline agreement (Zijlstra & Fischer, 2012) between the Ministry of Education, Culture and Science and the Dutch Council of Training and Education (NRTO) in 2012, the ministry acknowledges the major importance of private training institutes to postgraduate higher education. These parties have proven far better equipped to work in a flexible and demand-driven manner, offering tailor-made products. According to the SER recommendation 'Werk maken van scholing' ['Making Education Work'] (SER, 2012) and ResearchNed's 'Kenmerken, wensen en behoeften deeltijd hoger onderwijs' ['Part-time higher education: characteristics, wishes and needs'] (Van Casteren et al., 2012) research report, the availability of specially tailored courses, flexibility and a demand-driven approach are top priorities for both adult/professional participants and their employers.

Nicolai van der Woert (nicolai.vanderwoert@radboudumc.nl) is an educational scientist and works as a senior policy adviser on educational innovation at the Radboud University Nijmegen Medical Centre. He serves as chairman of the NeuroBlend Foundation, a global open educational resources (OER) network for neuroscience nurses, their trainers and lecturers. As a part of his position at the Radboud University Nijmegen Medical Centre, he develops policy strategies on the application of open educational resources in healthcare education. He is also a core member of the Open Education Special Interest Group.

Ria van 't Klooster (riavantklooster@nrto.nl) has served as director of the Dutch Council of Training and Education (NRTO) since 1 January 2011. She previously served as director of the Schoevers group (senior secondary vocational education and higher professional education programmes, corporate training courses and labour mediation) and management board member of the NRTO, where she was charged with the Lifelong Learning portfolio. Her previous positions include staff member at Utrecht University's Educational Sciences department, owner-director of EMC bedrijfsopleidingen and consultant at Vakcollege.

Mark Visser (m.visser@studytube.nl) has been active in the field of blended and adaptive learning for over fifteen years. In his capacity as managing director of ISM Learning and - subsequently - inBrain, he helped establish these businesses on the market as providing tailored e-learning services. He has worked at Studytube since late 2013 and chairs the NRTO's online learning market group.

Jody Hoekstra (jody@nrto.nl) has served as an NRTO policy staff member since 1 January 2012. She is responsible for the Higher Education, Languages and Online Learning portfolios. She worked as an English language trainer prior to taking up her position at NRTO.

The researchers responsible for authoring the report also conclude that participation in part-time higher education at funded institutions has halved over the past ten years, while the number of enrolments at private higher education providers has increased. In 2012, around 80,000 students took part in study programmes at a private university of applied sciences (NRTO estimate); some 60,000 students were enrolled at a part-time programme offered by a funded university of applied sciences or university (figures: DUO). This drop in the number of students taking part in government-funded part-time education in 2012 prompted State Secretary Zijlstra to call for an end to the funding of part-time programmes at government-funded universities of applied sciences, and advocate demand-based financing (financial facilities for part-time programme participants) in his letter to the Dutch Lower House. His successor, Minister Bussemaker, subsequently instructed a committee headed by Alexander Rinnooy Kan to issue a recommendation on measures that are to be taken to encourage a greater percentage of the workforce to participate in higher education. In January 2014, the Minister also sent the Dutch Lower House a letter on open and online education, positioning the postgraduate segment alongside undergraduate programmes.

Open higher education: facts and figures

Following the widespread acceptance of MOOCs (Massive Open Online Courses) in 2012, an increasing wealth of demographic data on course participants is now becoming available. The great majority (60-75%) of the customer base is an active part

of the workforce in the 25-and-over age group (Hill, 2013; Huhn, 2013). Around 70% have a Bachelor's degree or higher qualification. Although available data relates to a broad range of course subjects and is presented online in various formats by multiple parties, the information is relatively consistent. Table 1 provides an approximation of various average ranges. Although these figures are purely indicative, active members of the workforce with higher education qualifications and their employers are clearly benefiting most from the MOOCs.

Average age	32-36	**Bachelor's degree or higher**	65-75%
Under 25	25-30%	**Bachelor's degree**	30-35%
26-35	35-40%	**Master's degree or higher**	35-45%
36-45	15-20%	**Employed**	60-75%
Over 45	15-20%	**Full-time job**	45-55%
Men	55-60%	**Part-time job**	15-20%
Women	40-45%	**Unemployed, seeking employment**	10-15%
Geographic origin: approx. 25-40 % USA, 10-20% Europe, approx. 195 countries in total			

Table 1 MOOC participation, estimated average

The participant's perspective

A better understanding of the participant's perspective will be crucial in encouraging participation in postgraduate higher education. Those seeking to combine a study with their work (and, in some cases family life) want to do so in an efficient and result-oriented manner. More specific requirements will depend on the learning styles and personal situation of these employees or people re-entering the labour market. Participants want tailored solutions in the form of flexible learning paths, offered at times that suit their personal situation. Naturally, all existing forms of education can play an important role in this regard. However, any successful solution must reflect the current professional practice, and be based around relevant work experience and learning outcomes: which abilities will the employee have acquired by the end of the programme?

According to NIDAP (2013), the youngest generation's entry to the labour market will accelerate demand for open and online learning facilities. This generation, after all, is entirely accustomed to digital tools. According to the same NIDAP report, mobile learning is becoming increasingly popular among both people with low qualification levels and the more highly educated. These developments are not merely limited to the Netherlands, but are unfolding around the world. It is relevant to point out that OpenCourseWare and most MOOCs are currently available free of charge. However, the minimal restrictions in terms of study pace and method are also crucial. Open and online learning are often applied in combination in situations where remote learning is desirable or necessary. These forms of learning are highly suited to students seeking to combine work and/or family duties with a study programme (Van der Dussen and Kos, 2013). Crucially, we can distinguish between three different types of participants:
• those seeking to obtain a certificate in the most efficient, result-oriented manner, with a strong external incentive to complete the programme,
• those seeking to obtain the certificate at their own pace, through self-motivation,
• those seeking to complete parts of a study programme for the purpose of self-betterment, but not necessarily interested in obtaining a certificate.

The market for postgraduate open education is broader than those in search of further professional development or taking part in a company training course. Kitsiri (2013) also

identifies other groups of lifelong learners participating in MOOCs: advanced learners seeking to gain deeper knowledge of their study/discipline or field of interest, prospective students seeking to find out more about their intended profession, parents seeking further knowledge in order to help their children study, individuals interested in or in need of more in-depth knowledge and personal enrichment, and – last but not least – instructors.

It has also become clear that a growing number of people are taking MOOC courses in order to increase their employability (VanderArk, 2012): the available range of free or low-cost just-in-time training courses with a high degree of relevancy to the desired skill-set is more appealing than the traditional range of higher education programmes. Naturally, the accessibility of open education also plays an important role in this regard. Open (and) online education is suited to all of the aforementioned groups and can help boost lifelong learning, as long as it reflects the learning styles and wishes of participants.

The employer's perspective

The rise of open and online education is also having an impact on employers, for whom flexibility, tailored products and a demand-based approach are also important factors. According to a 2013 report by the NIDAP research agency, Dutch employers are increasingly opting for online learning solutions in view of cost considerations. Nevertheless, the open component of the available range of online programmes seems less popular here in comparison with the US.

The American business sector has embraced open education. Major companies such as AT&T, Google and Bank of America help to co-finance open online education and contribute to its development and production, while Yahoo offers scholarships to employees taking part in a MOOC programme (Belkin & Porter, 2013). With the emergence of fully certified learning tracks that are more effectively tailored to the desired (corporate) learning outcomes, there is no longer any need to send employees to a lengthy and expensive higher education programme. Several platforms (such as edX, Coursera and Khan Academy) have entered into alliances with employers in order to further expand this range. Coursera has been offering selected content for some time now, offering training and refresher courses for professionals at the appropriate level.

This unbundling may well represent a genuine threat to institutional providers. According to Forbes, these developments are also prompting HR departments to reassess their value propositions (Meister, 2013a). A focus on the following aspects will be crucial in order to avoid falling behind:
1. active participation in the provision of MOOCs offers branding opportunities,
2. formal learning can be further contextualised by linking company or customer social networks to a MOOC,
3. the education experience can be further improved by gathering (Big) Data yielded through the MOOCs and augmenting this information with learning analytics. HR must learn to apply these tools,
4. the system also offers employees a broader role than that of course participants alone: potential roles as peer reviewers or lecturers also lie within the realm of possibilities. It is important to trust one's employees in this respect,
5. growing demand amongst young employees for personal development and credentials can be fulfilled in exchange for the lower cost of corporate MOOC use. This will require different funding models, such as internal scholarship systems.

Recruiters also appreciate the potential of MOOCs: the large quantities of data on course participants makes it easier to scout for new talent. Job seekers with a successfully completed MOOC on their resume are likely to be independent, intelligent, and ambitious and possess effective learning capabilities. Furthermore, all MOOCs have a clearly identifiable level, and various MOOCs have been developed on the basis of practical knowledge rather than theory (Grant, 2013).

Open Badges can be awarded in order to demonstrate that a specific open course has been successfully completed (Mozilla, 2013). These badges can be stored in an online 'Backpack' or displayed on your LinkedIn profile. Successfully completed Coursera MOOCs can also be displayed on LinkedIn with the push of a button. A growing number of employers are acknowledging open education certificates. This is having both a civil and a motivational effect.

The rise of MOOCs has revolutionised corporate training courses, especially in the US. The opposite also applies: the specific demand for corporate learning is prompting the development of new types of open courses and learning arrangements. Will Europe follow suit, take its own course, or miss the boat entirely?

The training institute's perspective

Open and online education offers great opportunities for training institutes, with potential benefits to both private and government-funded higher education providers. As regards private institutes, major suppliers of written forms of distance education (such as NTI, LOI and NHA) and smaller specialised providers (such as Hogeschool Dirksen) have evolved into online learning suppliers. After having come to the realisation that a large group of participants was consciously opting for online education but still required the 'external motivation' and social aspects of a 'physical' course, these providers also started to offer blended higher education. On the opposite side of the spectrum, traditional education providers have embraced online education as a supplement to traditional forms of teaching. This development is expected to continue at a rapid pace. This might take the form of MOOCs, OpenCourseWare, or any other available format. The key question must remain: how can the education sector apply online tools to provide higher quality education that is more optimally tailored to the wishes of its students.

Government-funded institutions are becoming increasingly aware that open online education is crucial to the postgraduate segment, and seeking to play a more active role in this regard. Higher professional education institutes seem to be more willing to adopt this new mindset than their academic counterparts. The government-funded postgraduate higher education sector has taken a more active role in experimenting with open education formats, but still lags behind the private training sector when it comes to applying and gaining experience with online learning. There seems to be potential for mutual learning experiences here.

The education professional's perspective

Some of the professionals employed by postgraduate education providers have yet to embrace the new developments. The more traditionally-oriented training institutes are especially likely to view open online education as a threat; this is unfortunate and unnecessary. Professionals should take an open attitude to such new developments.

Adaptive online learning materials are ideally suited to the development of personalised learning pathways and a didactic approach tailored to the individual participant. Course content, instructions and exercises can be optimally adapted to the student's individual level. As the linkage between learning analytics and online education yields more potential applications, it will become easier to analyse learning behaviour and develop new adaptive education solutions. Participants can be encouraged to design their own learning pathway by means of an interactive process. The resulting solutions can then be applied in combination with online teaching materials, allowing for far more effective and practical group lessons in the classroom. These group sessions can also be (partly) conducted live in an online environment facilitated by webinar technology.

The didactic quality of study programmes will be effectively improved over the coming period, as learning components become (even more) adaptive. Once these learning components have been divided into small 'learning nuggets' and the participant's every action can be individually registered, the subsequent nugget can be determined at individual level and automatically offered to the participant on the basis of the previously completed nugget. This approach will help create a fully personalised learning experience. This will increase participants' motivation, and enable them to obtain the required certificate in a far shorter space of time. Learning analytics can also be applied to improve the quality of courses more effectively. The current system, whereby students can only start a course or study programme at one or two specific moments each year will become largely obsolete over time. The combination of open enrolments and online learning will facilitate a new style of learning that is truly independent of both time and location.

Unfortunately, many MOOCs currently still apply outdated education methods such as: strict deadlines, a fixed end date for assignments or examinations and face-to-face explanation by the lecturer. The recent Forbes Future Workplace Survey (Meister, 2013b) yielded various recommendations in terms of adjusting MOOCs more effectively to corporate learning requirements (see figure 1). This presents a challenge for education and HR professionals.
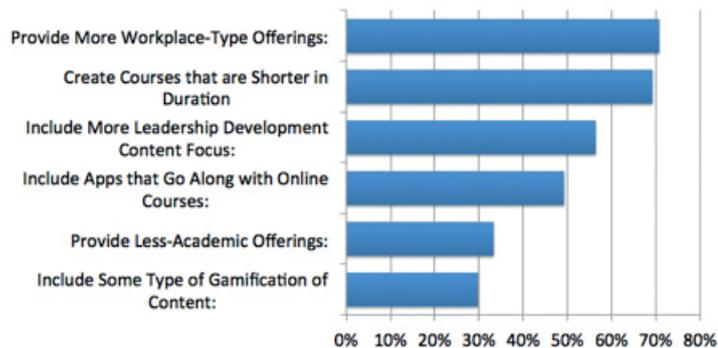

Figure 1 Recommendations on adjusting MOOCs to corporate learning requirements (Meister, 2013b)

Debate and conclusions

Demand for open and online education will continue to grow amongst both employers and participants. Open and online education offers great potential for the postgraduate market. Unfortunately, both the supply and demand side still lack the necessary awareness. Naturally, we will have to keep up with the latest digital developments if we aim to keep pace with the rest of the world and realise our institutional and national ambitions here in the Netherlands.

The corporate learning segment is taking an increasingly active role in shaping the form and content of MOOCs and open learning pathways, including the certification process. The resulting open educational resources are more practice-oriented than those offered by traditional higher education institutions. Education professionals will have to decide whether to take a leading role in this regard on behalf of their organisations, or to follow the market.

Open and online education formats can also serve as a catalyst for quality and yield optimisation. Adaptive learning and progress monitoring on the basis of learning analytics may prove to be especially crucial in this regard. The legislator will have to play a key role in this process, applying exit qualifications rather than study load benchmarks or contact hours as a criterion.

Finally, there is potential for cooperation and co-creation between the higher education sector and employers on the one hand, and government-funded and private institutions on the other, at both national and international level. After all, the development of open and online education can be costly, and business models are currently still evolving. The parties can reduce costs and share knowledge by joining forces and co-developing open and/or online education.

Online and open education is set to change the learning process at many levels, and will help make lifelong learning more accessible, effective and enjoyable. With current developments progressing at such rapid pace, quick action will be crucial in order to keep up with the field. In the end, all these efforts will benefit the participant!

Sources
- Belkin, D., Porter, C. (2013). Job Market Embraces Massive Online Courses. Wall Street Journal, New York. http://online.wsj.com/news/articles/SB10001424127887324807704579087840126695698.
- CBS Statline (2009). Data obtained via http://statline.cbs.nl/StatWeb/.
- Conrad, D. (2013). Assessment challenges in open learning: Way-finding, fork in the road, or end of the line? Open Praxis, 5:1.
- Conrad, D., & McGreal, R. (2012). Flexible paths to assessment for OER learners: A comparative study JIME, OER 2012 special issue.
- Filippini, M. (2013). How MOOCs and digital badges are rebuilding the resume. www.onlinedegrees.com/degree360/workplace/building-a-resume-with-moocs-and-digital-badges.html.
- Grant, M. (2013). Why Massive Open Online Courses Matter to Recruiters. Share, 126; ERE media, New York. www.ere.net/2013/04/29/why-massive-open-online-courses-matter-to-recruiters/.
- Hill, P. (2013). MOOCs Beyond Professional Development: Coursera's Big Announcement in Context. E-literate blog 4 June 2013. http://mfeldstein.com/moocs-beyond-professional-development-courseras-big-announcement-in-context/
- Huhn, C. (2013). UW-Madison Open Online Courses (MOOC's): preliminary participants demographics. University of Wisconsin, Madison. http://apir.wisc.edu/cssimages/UW-Madison_MOOC_Demographics_August_2013.pdf
- Kitsiri R. (2013). Who Should Take A MOOC?: 9 Types of Lifelong Learners Who Can Benefit. MOOC news and reviews. http://moocnewsandreviews.com/who-should-take-a-mooc-9-types-of-lifelong-learners-who-can-benefit/
- Meister, J. (2013a). How MOOCs Will Revolutionize Corporate Learning And Development. Forbes blog. http://www.forbes.com/sites/jeannemeister/2013/08/13/how-moocs-will-revolutionize-corporate-learning-development/
- Meister, J. (2013b). Future workplace survey. Forbes, New York.
- Mozilla (2013). Open Badges. http://openbadges.org/.
- NIDAP (2013). NIDAP Opleiding en Training Monitor 2013. NIDAP, Amsterdam.
- Social and Economic Council of the Netherlands (2012). Werk maken van scholing, advies over de postinitiële scholingsmarkt. SER, Den Haag. www.ser.nl/~/media/db_adviezen/2010_2019/2012/b30739.ashx.
- Van Casteren, W., van den Broek, A., Warps, J., Jacobs, J. & Braams, C. (2012). Kenmerken, wensen en behoeften deeltijd hoger onderwijs. ResearchNed, Nijmegen.
- VanderArk, T. (2012) MOOCs Shift From Curiosity to Employability. Huffington Post Blog. http://gettingsmart.com/2012/09/MOOC's-shift-from-curiousity-employability/.
- Van der Dussen, R. & Kos, T. (2013). Open en online onderwijs en de toekomst van het Nederlands hoger onderwijs. Capgemini Consulting.
- SER (2010). Werk maken van scholing, advies over de postinitiële scholingsmarkt. SER, Den Haag. www.ser.nl/nl/publicaties/adviezen/2010-2019/2012/b30739.aspx.
- Zijlstra, H. & Fischer, E. (2012). 2012-2016 OCW-NRTO Outline Agreement (Parliamentary Paper 31288-254).

MY (OPEN) EDUCATION APP

There are now a large number of apps designed to help search for (and find) open educational resources (OER) and make the process of participating in open education more pleasant and straightforward. The section below offers an overview of several variants, suited to Android, iOS, or both. The relevant details and latest versions can be found via Google Play or the Appstore. The amount of available apps and relevant functionalities are developing at a rapid pace.

A classic that still has not lost its appeal: *Lecture Leaks*. Users can record a lecture in audio format and directly publish the recording in a catalogue. The lecturer does not even have to notice. Interestingly enough, a large number of lectures from renowned institutions have been distributed via *Lecture Leaks*. Coincidence?

Collections of open educational resources and other related products can be found through platforms such as *iTunesU*, *TedSearch*, *OER Commons Search*, *Merlot OER search* and *Recent OER*.

MOOCs4U allows users to search for MOOCs. Simply search by start date, instructor, university, country or course name. The MyMOOCs app is a useful tool for those enrolled in one or more MOOCs, offering an overview of your current and completed MOOCs. Users can also search across the range of similar courses offered by other universities and platforms. This allows for comparison between various programmes. Once the user has obtained a MOOC certificate, he/she can link it to his/her LinkedIn profile. Watch lists can be created and shared via social media. The app also allows users to store MOOC alumni and testimonials. Despite still being in the development stage, *MyMOOCs* already offers many of the qualities you would expect from a small-scale personal learning environment. See Google Play for an extensive description.

The MOOC platforms have also been actively developing applications of their own: *Coursera Companion* offers mobile students a range of extras. After having logged in, users can check which courses they have completed, are still engaged in or are yet to begin. Streaming video clips (with subtitles) can be watched via wifi or viewed offline. The latter also applies to other course materials such as slides and quizzes. The *Coursistant* app (still) offers slightly less functio-

nality than *Coursera Companion*. The Coursera apps were recently launched, and additional functionality is expected to be added in the near future.

Naturally, users can also find open education programmes via the various institutes. MIT OpenCourseWare offers the *VirtU app*. In addition to courses (catalog), the app also offers several social features: *classmates*, *my classes* and a feedback channel. After all, learning is basically a social process. The app also offers a useful offline viewing feature, which comes in handy when there is no wifi connection.

OpenCME (Continuing Medical Education) is a good example of an app providing access to an entire field. In addition to a substantial collection of educational materials with extensive descriptions, the app also allows users to upload data for CMEs they offer themselves. *OpenCME* offers free and paid materials from a wide range of sources.

However, the ideal '*my (open) education app*' will require far more extensive functionality. An ideal app should offer access to both open and closed education, be independent of any particular MOOC platform or brand, allow the user to search for open educational resources and OpenCourseWare, issue alerts when a suitable product has been found, update the user's portfolio, feature social education network tools, accommodate both formal and informal learning and administer examinations on the basis of identity verification. Although this may seem like an extensive wish list, such solutions are not far off.

OPEN FOR BUSINESS?

by **Matthijs Leendertse** and **Jop Esmeijer**

The emergence of open forms of higher education has been receiving a great deal of attention over the past few years. MOOCs seem especially appealing, as they have the potential to make the highest quality knowledge globally available to everyone with a computer and Internet access. This article explores the extent to which open forms of education will yield new services and change economic positions in the higher education value network.

Open higher education: a lucrative investment?

In 2012, the total amount invested in education technology by venture capitalists rose to $ 630 million (CNBC, 2013). Traditional players such as universities are also increasingly investing in online (open) education. Open higher education platforms are proving to be especially popular. This raises the question: why are investors so enthusiastic about open education? After all, one would assume that 'open' equates to 'free', and is thus the most desirable option from the general public's perspective. In reality, though, the situation is far more nuanced. Coursera, currently the largest and most well-funded MOOC provider, is working hard to develop business models on the basis of its open proposition. Popp (2013) has identified several potential sources of income in this regard, such as the certification of successful course participation, paid access to the highest performing students for recruiters, and paid licenses to Coursera learnng material for education and training institutes. Many of these concepts are based on a so-called freemium model, whereby part of the content is offered free of charge in an open format, with other additional services available at a cost.

The rise of new learning technologies and the growing number of new providers is causing shifts in the value network. A value network is a system in which multiple parties jointly provide value (Peppard & Rylander, 2006). Despite this cooperation-based model, many value networks in the area of digital media see most of their economic value and power appropriated by a limited number of parties (Leendertse & Pennings, 2007). Google is a good case in point. Thanks to its overwhelming dominance on the search market, Google is able to deploy content from a vast number of providers to link consumers and advertisers, with great financial rewards. In order to clearly define the roles of the various actors in the open higher education value network, it is crucial that we understand the term 'open'.

A broader definition of 'open'

The most common definitions of open education, such as the one featured in the 2013 Open Educational Resources Trend Report (SURF, 2013), focus on the aspects we traditionally regard as educational resources: learning materials and learning environments. As Wiley points out, the most widely-known examples of open education are thus MOOCs and OpenCourseWare that can be freely re-used, adapted, mixed and distributed. However, any clear understanding of open education's economic impact will require a broader definition of the concept of 'openness'. On the one hand, educational technology is yielding new types of services that are impacting the evolving 'open' education landscape. On the other hand, the underlying data and algorithms are increasingly crucial to the performance of these platforms.

Matthijs Leendertse (matthijs@elmconcepts.com) is an entrepreneur, researcher and lecturer. His work centres around innovation in the fields of media and learning. He is the founder of ELM Concepts, a research and consultancy agency specialising in the educational application of media technology. He also teaches media business & innovation at Erasmus University Rotterdam. He has authored various reports on the future of learning on behalf of organisations such as the European Commission, the Education Council of the Netherlands and Kennisnet.

Jop Esmeijer (jop.esmeijer@tno.nl) works as a researcher and consultant at the Netherlands Organisation for Applied Scientific Research (TNO). His work centres around the social impact of Big Data, data-driven innovation and the Internet of Things, with a specific focus on the way in which these developments impact education, educational resources and the learning process itself.

The emergence of digital educational resources is spawning new platforms that allow students and education professionals to find the content they need, when they need it. These platforms help bring together supply and demand, both 'open' and otherwise. Examples include Apple's iTunes U and advanced platforms such as InBloom and Knewton, which add ingenious algorithms (learning analytics) to the mix. Learning analytics applies the data gathered on students, their behaviour and learning context to optimally support the learning process. For example, students can be directed towards suitable tasks, content or support from fellow students, lecturers or education professionals that optimally reflect their personal learning needs (Siemens, 2012; Chatti, 2013). For example, US-based platform Knewton applies data and learning analytics to facilitate adaptive education. Knewton focuses on publishers specialising in educational resources and universities. The platform allows these parties to add Knewton's learning analytics to their range of educational resources for a fee. The data generated by students using these educational resources then enables these content producers to offer personalised education. The platform thus makes its intelligence available to third parties. This trend has the potential to reach a broader section of the education market, as it offers a solution for universities and publishers that lack the necessary knowledge or means for in-house development. Platforms such as Knewton illustrate the increasingly important role of data and algorithms in open, digital education.

As is the case with educational resources and learning environments, the true 'openness' of data and analytics is often debatable (Morozov, 2013). Who is entitled to use the collected data on students, and for what purpose? Do students have any control over this process? Are all educational resource providers entitled to use this information to distribute their content more effectively, or is this privilege limited to the party that gathers the data? To what extent will we gain insight into the assumptions underlying these complex learning analytics applications (Richards and King, 2013)? For example: do we have a way of determining why specific content is being recommended, or determine why we may – or may not – advance to the next level? What kind of profile is being created on the basis of our capacities, motivation and preferences? Can students or lecturers exert any influence in this regard if they feel these assumptions are incorrect? Will we be able to adjust the results (Corbalan Perez, Esmeijer, Van der Plas, 2013)?

These questions are extremely important, as data and learning analytics are crucial to the successful performance of all OERs - from MOOCs and OpenCourseWare

to intermediary platforms. Without them, it would be almost impossible to reduce the massive scale of MOOCs – in which thousands of students can take part – to individual proportions in order to offer a personalised learning experience, or make the large amount of content offered through platforms such as iTunes U manageable for students and lecturers. Data and learning analytics are thus key to shifts in the value network. Their significance to the economic impact of open education will be discussed in the next section.

A new value network?

Open education is offered by a broad range of parties. We can distinguish certain traditional roles in relation to the provision of educational materials, learning pathways and evaluations. For example, there are a large number of content providers; from universities offering educational materials to open access journals and websites featuring relevant knowledge. A growing number of parties are also specialising in online open learning pathways, such as entire modules within a MOOC or courses offered through the provider's own platform. These learning pathways, in turn, use both regular and open content. There are also certification bodies with the legal authority to recognise learning achievements by means of a certificate or diploma. These mainly consist of traditional education institutions and testing institutes, and standards such as the NIMA marketing standard or TOEFL English proficiency standard.

These more traditional parties are seeing their business become more fragmented, as is common to all digital information markets (Benkler, 2006). This is mainly due to the fact that information and services can now be found more easily, which is crucial if the number of products and services increases. Intelligent search and aggregation services help users find and combine the information they need with increasing ease. This allows users to choose products that reflect their personal learning requirements. New platforms also make it increasingly easy for users to publish and share their own content. A good case in point would be the aforementioned digital learning environments - such as MOOCs - that allow users to choose from a range of online course providers. New content distribution platforms such as iTunes U also offer contextualised access to a range of different sources, in a manner comparable to a syllabus. The data generated on these platforms can then be used for smart analyses, which will then allow for further personalisation of the available content. Despite the growing number of platform and analytics services, we may see a trend towards consolidation in this area. A single platform dominates many media sectors, such as YouTube in the online video market, or Facebook in the social media sector. Network effects, whereby value increases as the number of users grows, also prompt further consolidation. After all, open education users help each other: the more available data, the more effective the resulting analyses. The platforms with the largest number of users attract the largest number of (the most important) content providers, which then helps boost the platform's appeal to students and lecturers. YouTube, for example, has perfected this strategy.

The winner takes it all?

As regards open education, we are likely to see the more traditional roles – the provision of educational materials, learning pathways and evaluations – fulfilled by a growing number of providers, whereas the new platform and data-driven roles are likely to be fulfilled by a few major providers as a result of the aforementioned network effects. This is visualised in figure 1, which outlines the value network for open higher education.
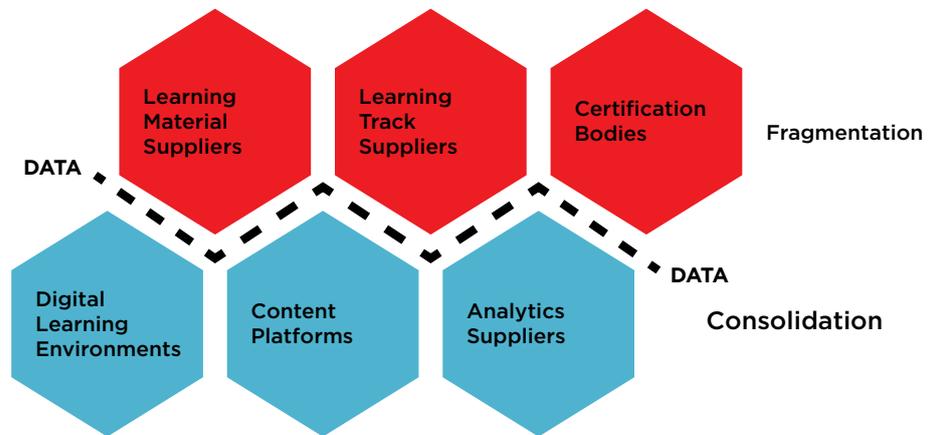
Figure 1 An open education value network

In this value network, data is the oil that keeps digital open education running smoothly, as it facilitates personalised learning (Redecker et al., 2011). The red roles in the value network basically provide the building blocks for this personalised range of learning products. The blue roles facilitate online learning. The interaction between the two generates the data needed to achieve these goals. The central role of digital learning environments and content platforms, augmented with analytics and supplemented with user data, ensures that the parties fulfilling these roles are optimally positioned to monetise the network's economic value, although parties such as Knewton – focused primary on analytics – could also play a crucial role in this area. After all, the traditional range of products - educational materials and learning pathways in particular - are offered to the end user free of charge via platforms running on unique, personalised data. Any financial transactions will be processed via the platform. This may consist of paid content via an Apple or Coursera platform, or certification by traditional providers such as MIT and Harvard's edX. The small number of elite universities will be able to capitalise on their status. They will most likely fulfil one or more blue roles, in a similar vein to the edX platform. We do not expect to see each individual higher education institution build its own platform or develop in-house analytics. These institutions will thus not be able to retain control over the data, or gain insight into (let alone control over) the analytics underlying the learning processes or personalised recommendations issued to students. As a result, relationships with students, data on users and user interactions with other users will be largely handled by providers fulfilling the blue roles.

Discussion

The economic value generated by open higher education will most likely be largely accrued by the parties holding ownership of the data and algorithms. This is reflected in the fact that these parties are attracting venture capital investments. From a commercial perspective, we do not expect these platforms to be open despite the fact that they may offer free content. This may have an impact on what we consider to be open, public education and the form and content of higher education itself. For example, Knewton's website states that the platform is limited to subjects with clearly definable correct or incorrect answers. This leads to the question whether the use of analytics will lead to a focus on the most easily quantifiable aspects. Will there be any room left for more constructivist forms of testing or less measurable skills such as creativity and the ability to think and work in an interdisciplinary manner? Will open education driven by data and algorithms leave any space for such skills? If the 'winner takes all' scenario common to other

digital information markets were to manifest itself here, what will we end up losing? It is simply not possible to answer these questions at the time of writing. Despite the promise of open education, the growing focus on data and algorithms seems to pose a threat to openness and transparency. It's the data, stupid!

Sources

- Benkler, Y. (2006). The Wealth of Networks. New Haven: Yale University Press.
- Chatti, M.A., Dyckhoff, A.L., Schroeder, U., & Thüs, H. (2012). A reference model for learning analytics. International Journal of Technology Enhanced Learning, (4) 5/6, 318–331.
- CNBC (2013). Education Start-Ups are exploding.
  In: www.cnbc.com/id/101096185.
- Corbalan Perez, G., Esmeijer, J. and Plas, van der A. (2013) Learning Analytics to support self-directed Learning and learning transfer. Delft: TNO.
- Esmeijer, J., & Van der Plas, A. (2013). Learning analytics and self-directed learning [Learning Analytics en Zelfsturend Leren]. Soesterberg: TNO.
- Heussner, K. (2012). Online education start-ups: a field guide.
  In: http://gigaom.com/2012/06/22/online-education-startups-a-field-guide/.
- Morozov, E. (2013) Why We Are Allowed To Hate Silicon Valley.
  In: www.faz.net/aktuell/feuilleton/debatten/the-internet-ideology-why-we-are-allowed-to-hate-silicon-valley-12658406.html
- Peppard, J. & A. Rylander (2006). From value chain to value network. Insights for mobile operators. In: European Management Journal Vol. 24, issue 2, 2006.
- Popp, T. (2013). MOOC U. In: The Pennsylvania Gazette March-April 2013.
  In: www.upenn.edu/gazette/0313/PennGaz0313_feature4.pdf.
- Redecker, C., M. Leis, M. Leendertse, Y. Punie, G. Gijsbers, P. Kirschner, S. Stoyanov & B. Hoogveld (2011). The Future of Learning: Preparing for Change. Luxembourg: Publications Office of the European Union.
  In: http://ftp.jrc.es/EURdoc/JRC66836.pdf.
- Richards, N., and King, J. (2013). Three Paradoxes of Big Data. In: 66 Stanford Law Review Online 41 (2013). In: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2325537.
- Siemens, G. (2012). Learning Analytics: Envisioning a Research Discipline and a Domain of Practice. Keynote LAK12, 29 April - 2 May 2012, Vancouver, BC, Canada.
- SURF (2013). 2013 Open Educational Resources Trend Report: open online onderwijs breekt door. Viewed on: 5 January 2014 In: www.surfspace.nl/media/bijlagen/artikel-697-e6ff5871e0b67d5685ced7a7e88e2f53.pdf.
- Varian, H. and Shapiro, C. (1999). Information Rules. Boston: Harvard Business School Press.
- Wiley, D. (No Data) Defining the "Open" in Open Content. Viewed on: 5 January 2014. In: http://opencontent.org/definition/.

MOOC PLATFORMS

M	Massive	Large number of participants, exceeding the lecturer's capacity.
O	Open	MOOCs are freely accessible and free of obligation. Everyone can take part while the MOOC is ongoing. Some MOOCs are also available under an open licence.
O	Online	MOOCs are offered online. MOOCs cannot be burnt onto a DVD.
C	Course	MOOCs offer a full course experience, with a start and end date and a coherent package of educational content: • a full course experience, • content (teaching materials), learning activities and testing, • interaction with peers, fellow 'classmates', • teacher presence: the learning process is monitored (to a certain extent), • results and feedback on completed assignments/tests, • resulting in informal (non-accredited) certificates.

MOOCs are provided through MOOC platforms. edX and Coursera are the current market leaders. In the Netherlands, a total of three universities are currently affiliated with Coursera (Leiden University, the University of Amsterdam, and Eindhoven University of Technology) while one university is affiliated with edX (Delft University of Technology). The Open University is affiliated with a European portal, OpenUpEd. Relevant links:

- SURFspace: information on MOOCs,
- OpeneducationEuropa: an overview of European MOOCs,
- Wikipedia: an up-to-date overview of MOOC platforms,
- Blog Donald Clark: a description of various MOOC platforms.

MOOC platforms and courses offered through these platforms are still evolving. For current figures, please consult the individual platforms. The overview below outlines key characteristics of the most relevant MOOC platforms in terms of the Dutch higher education sector:

	Profile	Available courses	Platform type	Open licence resources?
Coursera (www.coursera.org)	commercial	MOOCs offered by universities around the world	closed	No
edX (www.edx.org)	not-for-profit	MOOCs offered by universities around the world	open source	Several
Udacity (www.udacity.com)	commercial	corporate training courses	closed	No
Canvas.net (www.canvas.net)	commercial	MOOCs and online courses	open source	Yes
Futurelearn (www.futurelearn.com)	not-for-profit	MOOCs offered by universities around the world	closed	Unknown
OpenupEd (www.openuped.eu)	not-for-profit	MOOCs and online courses offered by universities around the world	closed	Unknown
Iversity (https://iversity.org)	commercial	MOOCs offered by individual professors	closed	Yes
Blackboard course sites (https://www.coursesites.com)	commercial	MOOC platform based on the familiar LMS Blackboard Learn	closed	Yes

In addition to these MOOC platforms, we are also seeing the emergence of language/target group-specific MOOC platforms, based on existing platforms such as edX. For instance:

- EdRaak: Arabic MOOC platform (www.edraak.org),
- France Université Numérique: French national MOOC platform (www.france-universite-numerique.fr),
- Miríada X: Spanish MOOC platform (https://www.miriadax.net/),
- XuetangX: Chinese MOOC platform (https://www.xuetangx.com/).

RECOGNITION OF MOOCS IN THE EDUCATION SECTOR

by **Marja Verstelle, Marije Schreuder** and **Hester Jelgerhuis**

The explosive rise in the number of available MOOCs prompts the question: what is the real value of a MOOC certificate? How do Dutch higher education institutions and organisations specialising in continuing education and refresher courses for professionals view the issue of MOOC recognition? Which issues and dilemmas do they come up against? What sort of solutions have been developed at home and abroad? Do students genuinely benefit if they decide to spend a few dozen Euros on optional services offered by MOOC platforms, such as Coursera's Signature Track? Which aspects should examination boards and refresher training agencies take into account when approached by students seeking an exemption? This article assesses the current situation, describes developments in the Netherlands and abroad, and closes with a series of conclusions and suggestions.

Formal and informal recognition

MOOC recognition comes in various forms, such as:

a) formal recognition by higher education institutions: the relationship with accreditation. Universities of applied sciences and universities offering accredited study programmes seek to assure the value of their diplomas. Students with a MOOC certificate may request exemption for a course from the examination committee of the study programme, who will - as would be the case with any other exemption request - assess the certificate against applicable accreditation standards. In a subsequent part of this article, we will describe the steps taken by the examination board of Leiden University's Faculty of Law in response to such a request.

b) formal recognition by the professional field, such as accreditation by organisations specialised in the continued training of professionals and/or allocation of education credits to training activities for specific professional fields. Certification bodies for specific occupational groups apply their own assessment criteria for the recognition of training activities, such as the quality of the education provider and number of contact hours. This article describes the case of a sworn translator seeking to have a MOOC certificate count towards his mandatory annual refresher training.

c) informal recognition. We are seeing the emergence of a growing number of informal recognition formats, to which the market is yet to respond. Examples include www.openstudy.org, where the student's efforts are assessed by peers who then award the participant a badge. Or www.accredible.com, where learners can build an online showcase portfolio based on MOOC certificates and assignments completed as a part of these MOOC courses, which can then be endorsed by peers. In another interesting development, learners can also integrate MOOC certificates obtained from edX or Coursera in their personal LinkedIn profiles.

This article focuses on formal recognition: a student with a MOOC certificate submits a request for recognition to a university of applied sciences, university or continued training institute (the aforementioned categories a and b). Informal recognition (category c) does not fall within the scope of this article.

Marja Verstelle (verstelle@iclon.leidenuniv.nl) works as a coordinator at Leiden University's academic ICTO programme and Learning Futures programme manager at the Centre for Innovation, Faculty Campus The Hague.

Marije Schreuder (m.a.p.schreuder@bb.leidenuniv.nl) is an educational scientist and member of the policy staff at Leiden University's Board Office. Her areas of expertise include internal and external regulations, joint degrees and part-time education policy.

Hester Jelgerhuis (hester.jelgerhuis@surf.nl) is project manager at SURF's Open Education Innovation Programme (www.surf.nl/openeducation). She is also a core member of the Open Education Special Interest Group.

Types of MOOC certificates

There are various types of MOOC certificates. As regards recognition, there are three important aspects to take into account:

1. for which purpose was the certificate issued: does the certificate serve as proof of participation or a specific level of comprehension? In the second case: which forms of testing were applied (multiple choice, peer assessment, automated essay grading, etc.)?
2. how can you be sure that the person whose name is featured on the MOOC certificate actually completed the relevant examinations, and did so without outside help? We are currently seeing the emergence of four different variants:
   a) certificates obtained without authentication or supervision. Most MOOC platforms offer this option free of charge to all participants meeting the final attainment levels. In this case, the honours code accepted by all participants serves as the only 'guarantee'.
   b) certificates obtained on the basis of online authentication (verified certificates), such as Coursera's Signature Track for which participants pay a free of approximately $ 50. In this case, participants show an ID via their web cam. Their identity is then checked and confirmed on the basis of biometric information (unique typing pattern) and/or facial recognition. edX applies the system of verified certificates, based on the use of an ID and photograph.
   c) certificates obtained on the basis of online proctoring, or online monitoring, such as those offered by Coursera. This services comes at an additional charge of approximately $ 50. Participants are then monitored via their live web cam (in the case of other providers: retroactively, on the basis of a fully recorded examination) to check for irregularities. The student is required to offer a 3600 webcam view of his/her environment prior to the examination. Many regard this view of monitoring as being extremely prone to fraud. However, the procedure is increasingly accepted as legitimate and has already been applied in corporate training courses such as those offered by Dutch provider EXIN. In the Netherlands, various providers such as recent start-up Proctor2Me now offer proctored exams.
   d) certificates based on examinations administered in an exam room with physical supervision. The German Iversity platform offers MOOC students the option of taking an examination at a specific time and physical location

       in Germany for a fee, offering successful participants ECTS credits in recognition of their efforts.

3. Is exemption on the basis of the certificate subject to permission? In the case of Coursera MOOCs, the university offering the MOOC must grant permission. The request must be submitted via Coursera, and will generally be approved. This process does not involve any additional charges. Other MOOC platforms do not mention such permission requirements in their terms of use.

Developments abroad

Naturally, the issue of recognition is not unique to the Netherlands. The next section highlights a number of international examples. The American Council on Education (ACE) College Credit Recommendation Service, an independent organisation with almost forty years of experience in the assessment of postgraduate courses and non-formal education, assessed five MOOCs in early 2013. The organisation subsequently issued a recommendation to its members (1800 affiliated universities and colleges), prompting them to accept the Signature Track certificates issued by these MOOCs in exchange for credits. ACE based this recommendation on the following criteria: the reputation of the institution offering the MOOC, the exit qualifications, the attention devoted to the professionalisation of and support for lecturers, the user-friendliness of the learning environment, information on graduation percentages, test scores, etc. It should be pointed out that universities and colleges are free to accept or reject the ACE's recommendations as they see fit. For example, the University of Maryland University College states the following on insidehighered.com: "We recognize prior learning and many of our students bring transfer credit and we're really set up for it. As we looked at MOOCs, they are just another way of learning." In order to qualify for credits, students must have completed a proctored examination on the basis of online authentication.

On the other end of the spectrum, leading universities such as Columbia University, MIT and Harvard University do not issue credits in recognition of MOOC certificates from other universities. In one frequently-quoted example, MIT once offered a scholarship to a 15-year-old student from Mongolia, the only person to achieve a perfect MOOC score. He was then admitted as a regular student. After having arrived on campus, the new student was then required to retake all examinations, as the institution did not recognise his MOOC certificate.

In Europe, the German Iversity MOOC platform issued a communication in September 2013 stating that two of their MOOCs would be offering ECTS credits to students who successfully completed an offline examination. Further inquiries showed that students are not awarded ECTS credits for activities undertaken as part of the MOOC itself: credits are awarded in recognition of an examination taken at a specific time after completion of the MOOC at a physical location in Germany. Students pay a fee of € 129 to take this examination. At the EMOOCs 2014 conference, Iversity announced the introduction of several new services, including on-site proctoring at universities and testing centres worldwide, online proctoring, and essay assessment by a pool of certified 'correctors in the cloud'.

As Robert Schuwer justifiably concludes on his blog, the allocation of ECTS credits in recognition of MOOCs would constitute a genuine revolution, were it not that European universities (more specifically: their examination boards) are free to decide whether or not to allocate credits for MOOCs. Europe enjoys the benefits of the Europe-wide ECTS system, which has been implemented in all member states; this form of standardisation has the potential to facilitate cross-border credit recognition. This will require a clear indication of the MOOCs' level and study load.

Developments in the Netherlands

In order to assess the current state of affairs here in the Netherlands, we will be examining two case studies in the section below, exploring the issue of MOOC recognition from different perspectives.

Case 1: student obtains MOOC certificate from another institution and requests an exemption from his own university

What would happen today if a student submitted an exemption request to the examination board of Leiden University's Faculty of Law on the basis of a MOOC certificate from another institution, such as an international law certificate from an Ivy League university? The examination board would normally require an authenticated certificate from an accredited body, and would subsequently assess the relevant mark, the institution and the contents and level of the completed course. This assessment would be conducted on the basis of a course description and the relevant bibliography; in case of doubt, the board might request a copy of the examination. Where necessary, the board will seek advice from the relevant lecturer. The faculty applies strict policies, as it is bound by requirements of the relevant occupational group, the 'civil effect provision'.

As regards MOOC certificates, the following considerations are also relevant:

1. is the course also offered as part of the institution's own study programme?
2. if so, is the certificate comparable to the own study programme course in terms of exit qualifications (content and level)? Most MOOCs are offered at basic Bachelor's level, and thus generally match the level of propaedeutic year courses. This comparison is limited by the fact that day students in the propaedeutic year are subject to a mandatory attendance requirement. This does not apply to part-time students, who are thus the only group to qualify for recognition of Bachelor's level MOOC certificates under the current system.
3. if the course is not offered as part of the institution's own study programme, it may qualify to exempt the student from a third-year elective. Courses in the law domain must thus be at third-year level, whereas courses from other domains will be accepted at propaedeutic year level (the level of most MOOCs). At present, however, elective subjects must have a minimum value of 5 ECTS credits per individual subject. This means a MOOC must represent 5 ECTS credits in order to qualify.
4. how was the examination administered? Testing on the basis of online proctoring offers potential, but is currently only accepted by the board if further information can be provided on procedural reliability. The examination board does put stock in 'offline' test locations with physical monitoring. However, such locations must be deemed suitable: the faculty will not, for example, accept examinations administered in a consulate.
5. will students that do not attend any lectures and complete a MOOC that overlaps with the curriculum be allowed to take the relevant examination? This will be allowed (regardless of whether the student completes a MOOC or reads a book) providing the student is enrolled at the university, and is not subject to any attendance requirements or obligation to take interim examinations. The university could also allow non-enrolled students to take the examination if relevant contract courses would be made available.

In short, the recognition of MOOC certificates for formal education is subject to the following preconditions:
• the institution must gain trust in online proctoring,
• the MOOCs on offer must be verifiable in terms of content, level and study load,
• the MOOCs must be offered in units of sufficient scale (such as 5 ECTS credits or more), in other words: must be considerably larger than the majority of courses offered through platforms such as Coursera (offering a range of 5-week introductory courses).

Case 2: recognition of MOOCs from the perspective of a continued training institute
Here in the Netherlands, a large number of occupational groups are awarded permanent education (PE) credits as a part of mandatory continued training and lifelong learning programmes. This raises the question to which extent they will see fit to recognise MOOCs as a valid form of continued training: are there any known cases in which PE credits have been awarded for a MOOC certificate?

For the purposes of this article, we will focus on a case study involving the Bureau for Sworn Interpreters and Translators (Wbtv) centred around permanent education. The approximately 3,700 translators and interpreters featured in its register for sworn translators and interpreters are obliged to take permanent refresher courses and must obtain at least 80 PE credits for training activities over a period of five years (whereby each PE credit represents one hour of training). In 2013, the bureau received a request from a translator inquiring whether - and if so, how many – PE credits could be awarded in recognition of a certificate obtained for a MOOC in European Law from Leiden University.

This prompted the Wbtv, which had previously focused on face-to-face education, to examine its position on online education and MOOCs, and determine whether (and if so, how many) PE credits should be awarded in recognition of such certificates. This is easy to assess in the case of face-to-face education at universities and universities of applied sciences with accredited study programmes, where one ECTS credit represents 28 hours of study. However, it is far more difficult to determine the amount of time invested by MOOC participants. Furthermore, how do you accurately assess the quality of the course and the institution?

The Wbtv is currently developing new policies in the area of permanent education, which will extend to MOOCs and online education. After all, these forms of education offer great potential for the bureau's target group. Amongst other benefits, MOOCs are free, there is a broad range of available courses, certificates can be obtained at an extremely low cost, professionals have a relatively high degree of freedom in terms of the type of training activity they participate in and the relevant content, MOOCs can be completed in their own time at any location, and are often offered by leading universities with accredited study programmes and an excellent reputation. MOOCs also offer the opportunity to acquire knowledge on subjects not covered by regular education in the Netherlands, such as language-related education.
There is a need for practical guidelines to help determine the level and scale of MOOCs: a way of determining the number of hours required to successfully complete the MOOC, the value of the subsequent certificate and MOOC level/quality, and the quality of the institution (especially in the case of universities of applied sciences and universities outside of the Netherlands offering accredited study programmes). In other words, there is a need for criteria that facilitate the assessment of MOOC providers and allocation of PE credits to individual MOOCs. The Wbtv would like to see this responsibility allocated to the MOOC providers themselves. This represents a great opportunity for the Dutch higher education sector, which can definitely learn from the experiences gained by organisations such as the US American Council on Education.

What position are the Ministry of Education, Culture and Science and NVAO taking on MOOC recognition?

In a letter to the Lower House from early January 2014, the Minister of Education, Culture and Science stated that she views the trend towards more open and online education as a promising and inspiring development which she is keen to 'promote and facilitate'. She also emphasised that 'open and online education offers great potential for the facilitation of lifelong learning, due to its inherent flexibility.' In the Minister's view, open and online education should feature more prominently in the overall range of programmes.

She is, and we quote, not planning to introduce new legislation or regulations. In her view, the current legislative framework and its application in the relevant accreditation and inspection process will suffice for the coming years. New legislation and regulations might unintentionally impede the aforementioned dynamic development. She is, however, 'open to signals on any legislation or regulations impeding further progress and will duly apply recommendations issued by the Rinnooy Kan Committee on flexible higher education for the employed.'

The letter also states, and we quote, that the value of diplomas remains undisputed. The quality of education can only be guaranteed through the independent and stringent assessment of exit qualifications and an accreditation process that does justice to the growing number of study options. Quality assurance bodies collaborate closely at international level in order to coordinate various aspects of the quality control process, such as assessments, examinations and the relationship between online and physical education.

In the spring of 2014, the NVAO (see footnote 1) is set to publish a position paper exploring the formal accreditation of online education, the allocation of ECTS credits and incorporation into existing study programmes.

A view to the future

In addition to existing regulatory restrictions, the experimental nature of MOOCs currently seems to be the main impediment to their formal recognition. However, this process may well speed up dramatically in the (near) future as the development of MOOCs continues.
- a large portion of the currently available MOOCs consist of introductory courses at propaedeutic level that merely require prior qualifications at pre-university education level. MOOC recognition will become more relevant with the emergence of more varied levels comparable to regular curricula. In order to encourage more participants to complete their MOOCs, many providers (with the exception of those offering courses via edX) are currently opting to offer relatively short MOOCs with low study loads. More widespread recognition will require MOOCs (or a set of MOOCs) that are comparable to regular courses in terms of scale. An indication of the relevant number of ECTS credits will promote course acceptance by examination boards and continued training institutes. This represents an opportunity for MOOC providers.
- traditional study programmes also test students' ability to establish correlations with other courses and build on the information offered in previous courses; this also represents a challenge in terms of MOOC recognition and an opportunity for MOOC providers. Institutions can award credits for specific combinations of MOOCs (both external and internal courses). The same applies to institutions focusing on continued training and refresher courses for professionals and by employers. Combined MOOCs also offer greater commercial potential in relation to labour-intensive – and thus costly – RPL procedures.

The trend towards bundled MOOCs is certainly of interest in this regard. For example, Coursera launched ten series of bundled MOOCs in January 2014, each of which culminates in an assignment ('capstone'). This offers students the opportunity to gain more in-depth knowledge of a specific theme. The capstone integrates all knowledge on the required MOOCs. Participants that obtain a verified certificate for all required MOOCs and complete the assignment will be issued a 'specialisation certificate'. Does such a solution address all the aforementioned objections? How will employers respond? Does this represent a step towards the issue of credits for MOOCs?

Universities and universities of applied sciences apply standards to the issue of diplomas and will continue to do so. In a broader sense, however, the rise of MOOCs and open and online education might well change the way in which students are expected to study for these diplomas. The higher education sector may also move towards the unbundling of its teaching and certification activities. We may also see the emergence of new authoritative organisations or market parties on the Dutch market, who operate alongside existing higher education institutions and assess, test and label MOOCs (or groups of MOOCs) in line with the activities of ACE. This may be of particular interest to the continued education and refresher training market.

As regards accreditation, developments in the area of authentication and proctoring are crucial in determining the value of a MOOC certificate. Students seeking accreditation can gain added value by paying for a certificate on the basis of online authentication or proctoring. Further insight into the possibilities, limitations and reliability of online proctoring is highly relevant to education institutions and continued education providers. Alternatively, 'informal recognition' in the form of badges, online portfolios or the integration of MOOC certificates in LinkedIn profiles may also prove to be sufficient for a growing target group.

Sources

- American Council on Education College Credit Recommendation Service: www.acenet.edu/news-room/Pages/College-Credit-Recommendation-Service-CREDIT.aspx.
- Letter on 'open and online education' to the Lower House from Minister Bussemaker of Education, Culture and Science (8 January 2014): www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2014/01/08/kamerbrief-over-digitalisering-van-het-hoger-onderwijs.html.
- Coursera (blog 7 February 2013), Five Courses Receive College Credit Recommendations: http://blog.coursera.org/post/42486198362/five-courses-receive-college-credit-recommendations.
- Iversity (blog 18 September 2013), ECTS credits for MOOCs on Iversity:: https://iversity.org/blog/ects-credits-moocs-iversity/.
- Conrad, D., Mackintosh, W., McGreal, R., Murphy, A., Witthaus, G. (2013). Report on the Assessment and Accreditation of Learners using OER.
- Palin, A. (24 November 2013), On course to become a credit worthy qualification, in the Financial Times: www.ft.com/intl/cms/s/2/003fef1a-505e-11e3-9f0d-00144feabdc0.html#axzz2q0wB21uf.
- Rivard, R. (8 August 2013), Rubber Hits the Road, in Inside Higher Ed: www.insidehighered.com/news/2013/08/08/researchers-wait-see-if-students-want-transfer-credits-moocs.
- Schuwer, R. (blog 8 January 2014), Credits voor een MOOC: soms lastig: http://robertschuwer.nl/blog/?p=745
- Schuwer, R. (blog 22 September 2013), ECTS credits voor MOOC's: http://robertschuwer.nl/blog/?p=655
- Schuwer, R. (blog 6 November 2013): OER en assessment en certificering van open leren: http://robertschuwer.nl/blog/?p=692.
- SURF report on 2013 open education study trip (October 2013): www.surfspace.nl/media/pdfs/1f222402037e1ce770d8bcddcb02bfcb_daily-openalle-edities.pdf.
- Wie borgt de MOOCs?' (12 December 2013), in ScienceGuide: www.scienceguide.nl/201312/wie-borgt-de-moocs.aspx

INTERMEZZO: OPEN EDUCATION AND THE SEMANTIC WEB

Semantics explores the meaning of symbols, language and data. The semantic web is a global framework for the sharing and reuse of meaningful data and makes up part of web3.0, a standard that integrates and facilitates interaction between online services and applications. Web3.0 can basically be regarded as an extension of the World Wide Web. All information and content (text, documents, media, open educational resources) is supplemented with meaningful semantic metadata. These entities are then interlinked within a semantic network. The end result is a dynamic knowledge network that can be navigated, queried and viewed in various ways (see www.linkeddatatools.com/semantic-web-basics). Global standards are applied to describe and model different types of data and information, and connect them into meaningful wholes. Content is described by means of the Resource Description Framework (RDF) and Web Ontology Language (OWL). Here in the Netherlands, efforts are underway to develop a framework of educational terms (http://browser.onderwijsbegrippenkader.nl) that will facilitate the application of semantic techniques. The current description framework is limited to primary and secondary education, but will also need to accommodate higher education in future.

The objective is to describe as much as possible of this data as linked open data (linked data for short) and make it available via an app or Internet application (see www.jisc.ac.uk/whatwedo/programmes/ukoer3/rapidinnovation/developinglinkeddata.aspx). The semantic web and linked open data will become crucial to open educational resources (OER) and open education-based applications. However, the majority of such applications are relatively new or still in the developmental phase. See www.scoop.it/t/semantic-web-and-oer for the latest news.

Examples of potential applications include:
- The creation of (open) text books featuring dynamic linked data. This could include an up-to-date overview of global temperature fluctuations, stock prices, or data on the spread of bird flu. Users can also combine elements from multiple text books, data sources and social networks to create a new e-publication. A semantic editor capable of creating such dynamic e-books has already been developed (http://50.57.115.119/). Semantic publishing is also possible (see www.slideshare.net/

oerpub/open-textbooks-creation-and-remixing-made-easy and www.zbmed.de/fileadmin/user_upload/Publikationsservice/OpenAccess/111_el-pub2012.content.pdf).
- It is currently possible to develop open learning materials with links to a semantic knowledge network on a specific topic. For example, the healthcare domain has made considerable progress in developing semantic networks with medical knowledge. This includes a semantic network featuring facts and research data on Parkinson's Disease, which can be made available in the form of teaching materials and used in a learning context. These systems are expected to yield great potential in various areas, including formative assessments (www.medbiq.org/conference2012/abstracts/semanticmodels; http://www.semantic-web-journal.net/content/linked-dataset-medical-educational-resources).
- The next step will be to connect related OERs and other content within a semantic network in order to create meaningful new wholes, which can then be linked to a didactic layer such as a learning context or narrative. A learning context could contain multiple learning paths or strategies, and feature various didactic approaches. A good example would be the Dynamic Learning Maps (DLM), which will enable the provision of tailor-made services to students. Each individual student can then have his/her own starting point within a knowledge domain created with DLM. This knowledge domain could feature embedded instructions, that also facilitate assessment: learning and instruction can now be melded, while the student's learning outcomes are continuously monitored (http://dynamiclearningmaps.org/; https://learning-maps.ncl.ac.uk/).
- Recommender systems issue recommendations to users (comparable to Amazon's 'customers that purchased this book were also interested in…'). Open education can apply such recommender systems for various purposes. This could include the recommendation of (other) courses, course components or curricular content. Alternatively, the system could recommend specific study tracks, learning strategies, a particular study pace, or groups of students with similar characteristics. This process will involve the application of Learning Analytics. These techniques will be crucial in creating a modern personal learning environment.

- The identification, harvesting and integration of suitable OERs with other types of content has also become the focus of recent attention. Once the OER's meta data has been harvested, it will be findable for smart harvesters and can be linked to related content. This process may involve the use of Dynamic Learning Maps or Dynamic Content Maps. The development of educational materials within dynamic authoring environments based on these semantic technologies is close to becoming a reality, although it will take some time before such systems perform effectively and can be made available to the general public.

- OER tracking by means of para data (where does the OER end up, how is it used: reuse, revise, redesign, repurpose) represents another area in which semantic techniques are set to prove their worth over time. Once this information can be re-presented in an understandable manner, networks and communities can start to build curricula on the basis of shared interests. This could help to significantly increase the quality and scale of OER usage. (www.jisc.ac.uk/whatwedo/programmes/ukoer3/rapidinnovation/trackoer.aspx).

- For our final example, we turn to the field of educational research. Here, too, semantic techniques have proven their worth: once research data has been stored in a semantic network, it becomes far easier to establish relationships between the data, which can then be studied (and visualised) far more effectively. (http://semantic-mediawiki.org/wiki/SMWCon_Fall_2013/Adding_power_to_educational_and_research_wikis_with_Semantic_MediaWiki).

MOOC TESTING AND ASSESSMENT

bij **Meta Keijzer-de Ruijter** and **Sofia Dopper**

MOOCs can be subdivided into two types: xMOOCs and cMOOCs (Schuwer, 2013). The cMOOC is based on connectivist didactics, whereas an xMOOC is more structured along the lines of traditional higher education courses: videos and articles are alternated with forum debates, tests and/or written assignments. The question is: how do you assess assignments and provide feedback to students throughout the learning process if the course has thousands of participants located all around the world? This article provides an overview of the various testing methods and challenges facing the MOOC platforms and describes how the latest MOOC developments might impact higher education in the Netherlands.

MOOC learning goals and assessment

An xMOOC consists of a varied range of activating teaching methods designed to help the student process the course content as effectively as possible. For example, participants are expected to contribute to the debate forum, carry out homework assignments, write an essay and complete a final examination.
Participants enrol in MOOCs for a highly diverse range of reasons (Kizilcec, Piech & Schneider, 2013). Some take part out of interest in the subject matter, others seek to broaden or intensify their existing knowledge of a subject, while others wish to keep up with the latest developments in their field. A small portion of participants are seeking to obtain a certificate in order to further their career or obtain an exemption for a specific study programme course component. This personal motivation determines the extent to which MOOC participants actively engage in assignments and activities or specific components thereof.

Tests with closed questions

MOOCs generally offer content, such as brief web lectures and excerpts from texts, alternated with short tests on the basis of closed questions in order to process the acquired knowledge. Students immediately receive automatic feedback.
Although the functionality of digital testing modules within the MOOC platforms is not yet comparable to the options offered by specialised testing systems, these modules are developing at a rapid pace. Various partners within the MOOC consortium contribute to the further development of the platform and related testing module. For example, test questions have been developed that allow MOOC participants to build an electronic circuit using various building blocks.

Testing with open questions and essays

In addition to testing on the basis of closed questions, MOOCs are also experimenting with the provision of feedback on open questions and assignments. This certainly represents a challenge: the manual correction of assignments by a lecturer or team of lecturers is not an option due to the large number of participants. Nevertheless, edX

Meta Keijzer-de Ruijter (m.a.keijzer-deruijter@tudelft.nl) is an expert in the area of digital testing and a core member of SURF's Digital Testing Special Interest Group. She serves as project leader on various digital testing projects at Delft University of Technology: from testing system selection and implementation of both technical and functional support to the design and furnishing of computer testing rooms.

Sofia Dopper (S.M.Dopper@tudelft.nl) is an e-learning adviser at Delft University of Technology's Focus Educational Centre and project leader for the Delft Online Education programme.

and Coursera have announced that they wish to make this form of testing available on their platforms.

edX aims to use an Automated Essay Scoring (AES) system, whereby assignments are graded by a computer and supplemented with automated feedback. Coursera, on the other hand, has opted for a system based on assessment by fellow students: '*Calibrated Peer Review™*' (CPR), developed by UCLA. Stephen Balfour (2013) has conducted a comparison of both methods.

Automated Essay Scoring

AES systems are based on the following principle: a lecturer assesses 100 essays, which are then analysed by the system's learning algorithms in order to learn how an essay should be assessed and supplemented with feedback. AES offers students rapid and consistent feedback on important aspects of their written assignment, such as grammar, incorrect wording, style and irrelevant text excerpts (Graesser & McNamara, 2012).

According to Balfour (2013), an AES system is not suited to the assessment of unique essays or more freely defined written assignments, such as those in which students are free to choose their own subject. Unfortunately, students and lecturers remain sceptical about the use of AES systems, despite studies proving that automated assessment is more reliable than grading by a team of human assessors in the case of short essays with a specific focus (Shermis, Burstein, Higgins & Zechner, 2010).

Calibrated Peer Review

The CPR system is a web-based application that facilitates both the review and quality measurement aspects of the peer assessment process. The review process consists of the following steps:
1. the student submits an essay,
2. the student assessors are 'calibrated': students assess three essays selected by the lecturer. The lecturer now compares these student assessments with his/her own assessment. The students are now allocated what is known as a Reviewer Competency Index (RCI), that serves as a weighting factor for the assessment of fellow students' work,
3. the student now assesses three essays by his/her fellow students. The quality of the review is now assessed by comparing the three peer reviews with the average of the three fellow students' assessments,
4. the student reviews his/her own work,
5. the student receives feedback from the peers responsible for assessing his/her work.

Balfour (2013) identifies one of CPR's crucial technical limitations: the original application was not designed to cope with the participant volumes common to MOOCs. In practice, 10% of essays are assessed three times by reviewers with a low RCI score. In the case of MOOCs with up to 10,000 participants this effect can still be corrected by means of a lecturer review (comparable to the 100 lecturer reviews required in AES assessments). In the case of a MOOC with 100,000 participants, however, this will no longer be possible with the amount of poorly reviewed essays totalling 1000. This problem can be largely resolved by offering students intensive supervision during the calibration stage of the review process (Keeney-Kennicutt, Guernsel & Simpson, 2008).

MOOC certification

MOOC participants that have actively engaged in the various assignments and successfully completed the final examination will receive a certificate attesting to their participation. Although such a certificate will suffice for most students taking part in the final examination, most MOOC platforms offer a signature track or verified identity certificate at a surcharge. This may help some participants improve their labour market potential.

Participants seeking to obtain a verified identity track must register at the start of the MOOC. The participant must then show a valid proof of identity and pay the required surcharge, after which he/she will be photographed via the web cam. The participant will subsequently be requested to identify him/herself at various points during the course. The final examination will be administered under supervision. Coursera also requires students – after having registered for the track – to create a personal typing profile which is then verified at crucial junctures in the process.

The final examination

In cases where participation in a MOOC counts for a diploma, the circumstances under which the relevant examination was administered or assignment was submitted will play an important role. If there are many participants spread out over a large geographical area, it may prove difficult to guarantee the integrity of the examination process (Allan, 2013). Participants will be more likely to engage in fraud under such circumstances, as they have a greater vested interest in obtaining this type of certification (McGabe, Butterfield & Treviño, 2012).

In addition to the verification of student identity, the protection of examination components is also crucial to this form of examination. In view of the fact that participants are located around the world and need to be able to schedule the examination at a time of their choosing, the examination will be 'open' for a period of several days. In order to ensure that examination components are not compromised, strict monitoring will be required to prevent the copying of questions. Furthermore, exam questions must be drawn from a database at random.

As regards the security of final examinations administered to verified identify track participants, MOOC platforms such as Coursera, edX and Udacity are assessing the solutions used by many US universities and colleges as a part of their online remote education.

Examinations can be administered under supervision by means of an online proctoring service. This online proctoring procedure is based around students completing the examination from a location of their own choosing, such as their

home. The student contacts the proctoring service via Internet prior to the start of the examination. Once the student's identity has been confirmed, the examination can begin. The candidate will be monitored via a web cam while completing the examination.

There are two forms of online proctoring services (Secure Software Inc, 2013). One is based on the use of 'live proctors' that monitor the student for the entire duration of the examination. The other applies web cam recordings, which are assessed by the reviewer at high speed after the examination has been completed in order to check for any suspicious actions. This form of proctoring is also referred to as on-demand proctoring. In both cases, the student's computer is also monitored by means of forensic software that 'flags' any suspicious activities.

Some MOOC platforms have also conducted small-scale pilot projects to assess the use of globally accessible Pearson Vue test centres. The student must then visit a physical test centre, where he/she can then complete the examination under live supervision. According to the BIS Research Paper (2013) published by the Department for Business Innovation & Skills, there is insufficient published data on the yields of proctored exams administered in test centres. As a result, there is little information on experiences gained through this method of MOOC testing.

Potential impact on the higher education sector

As the above demonstrates, MOOC providers still face plenty of challenges when it comes to digital testing, peer reviews, machine learning and fraud prevention. According to Balfour (2013), well-regarded existing methods and applications such as automated essay grading (Shermis & Hamner, s.a.) and peer reviews (Piech, et al.) cannot simply be applied to the MOOC process as is.

Technological development

The development of platforms for the creation and distribution of MOOCs is currently the focus of much attention. The various parties involved are seeking each other out and forming consortia (Straumsheim, 2013), thus catalysing the speed of developments. The trend seems to be veering towards open source programming. For example, last summer edX published its source code (see http://code.edx.org) and Google and edX recently announced that they will be working together to make the edX platform more accessible to ambitious developers.

As a result of these initiatives, various technologies currently applied by the traditional institutions can be introduced into the MOOC platform and further elaborated. Many hands, after all, make light work. The institutions, in turn, can then benefit from the innovations developed within the MOOCs. An example: automated essay review and peer review systems are currently applied on a small scale in the Dutch higher education system. The online education sector's focus on this technology and the resulting developments may promote its application in campus-based education and help reduce scepticism about the use of such systems.

More flexible testing methods at traditional education institutions

According to Kolowich (2013), the current generation of students has yet to discover MOOCs as a viable alternative to normal studying methods. edX also recently terminated its agreement with Pearson Vu on the administration of final examinations

at global test centres, (Kos, T. 2013), underlining that the time may not yet be ripe for this development.

Nevertheless, efforts are underway to identify new ways of rewarding participation in MOOCs with credits, such as the administration of certified examinations at the student's own institution or the idea of designating specific MOOCs as a 'textbook' that can be used for a specific course (Ouwehand & Jacobi, 2014, see page 41).

Once MOOCs are more widely recognised and used by a greater number of students, students may find it far easier to acquire specific knowledge through MOOCs and circumvent the campus timetable. Under the current situation, study progress is often hampered because students cannot take a specific course due to scheduling problems. The ability to take a comparable course online (and obtain academic credits) may actually help speed up their study progress.

The institutions participating in these MOOCs will gain experience in the application of online proctoring, which can then be applied to regular campus-based education. Students will be free to choose how they wish to take a particular examination: free of charge in the large exam hall, or at a more suitable moment for an online proctoring surcharge. This can offer greater flexibility in terms of personal curriculum planning, but may also help resolve bottlenecks in the area of examinations scheduling.

Automated Essay Scoring systems
AES systems are not a recent development. The first successful AES system was actually developed as early as 1973. Well-known systems include e-rater™ from Educational Testing Service (ETS), Intellimetric™ from Vantage Learning and Intelligent Essay Assessor™ from Pearson Knowledge Technologies.

Sources

- Allan, E., (2013, August). Confessions of a MOOC Reviewer. WCET blog. In: http://wcetblog.wordpress.com/2013/08/13/confessions-of-a-mooc-reviewer/, viewed on 30 November 2013.
- Balfour, S. (2013, summer). Assessing Writing in MOOCs: Automated Essay Scoring and Calibrated Peer Review™. Research & Practice in Assessment. Volume 8. In: http://www.rpajournal.com/dev/wp-content/uploads/2013/05/SF4.pdf, viewed on 30 November 2013.
- Coursera Peer assessments http://help.coursera.org/customer/portal/topics/521177-peer-assessments/articles.
- Department for Business Innovation & Skills. (2013). The Maturing of the MOOC. BIS research paper no. 130. London. In: www.gov.uk/government/uploads/system/uploads/attachment_data/file/240193/13-1173-maturing-of-the-mooc.pdf, viewed on 29 November 2013.
- Graesser, A. C., & McNamara, D. S. (2012). Automated analysis of essays and open-ended verbal responses. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), APA handbook of research methods in psychology, Vol 1: Foundations, planning, measures, and psychometrics (pp. 307-325). Washington, DC: American Psychological Association.
- Heidebrink, A., (2013, April 15). How Can MOOC Platforms Be More Dynamic? A Comparison of Major MOOC Providers. MOOC News & Reviews. In: http://moocnewsandreviews.com/can-mooc-platforms-be-more-dynamic/, viewed on 29 November 2013.

• Jordan, K. (2012, September 8). IHT&S – the 'p' words: peer grading, plagiarism and patch writing. MoocMoocher Blog. In: http://moocmoocher. wordpress.com/2012/09/08/ihts-the-p-words-peer-grading-plagiarism-and-patch-writing/, viewed on 1 December 2013.

• Keeney-Kennicutt, W., Guernsel, A. B., & Simpson, N. (2008). Overcoming student resistance to a teaching innovation. Journal for the Scholarship of Teaching and Learning, 2(1), 1-26.

• Kizilcec, R.F., Piech, C. & Schneider, E. (2013). Deconstructing Disengagement: Analyzing Learner Subpopulations in Massive Open Online Courses. In: www.stanford.edu/~cpiech/bio/papers/deconstructingDisengagement.pdf, viewed on 13 December 2013.

• Kolowich, S. (2013, July 8). A University's Offer of Credit for a MOOC Gets No Takers. The Chronicle of Higher Education. In: http://chronicle.com/article/A-Universitys-Offer-of-Credit/140131/.

• Kos, T. (November 2013) TU-I\internal presentation on 'Open & Online education 2014-2016'.

• McGabe, D.L., Butterfield, K.D., & Treviño, L.K. (2012). Cheating in College. Why students do it and what educators should do about it. Baltimore, MA: The John Hopkins University Press.

• Ouwehand, G.M., & Jacobi, R.K. (2014). Integratie en hergebruik van open education in het formele onderwijs. 2014 Open Education Trend Report, pp 41-46.

• Schuwer, R. (2013, September). MOOCs kansen en vraagstukken. Onderwijsinnovatie. In: www.ou.nl/documents/10815/36316/OI_2013_3_Onderwijs_Moocs.pdf.

• Shermis, M. D., Burstein, J., Higgins, D., & Zechner, K. (2010). Automated essay scoring: Writing assessment and instruction. In E. Baker, B. McGaw, & N.S. Petersen (Eds.), International encyclopedia of education (3rd ed., pp. 75–80). Oxford, England: Elsevier.

• Shermis, D. & Hamner, B. (s.a.) Contrasting State-of-the-Art Automated Scoring of Essays: Analysis. In: www.scoreright.org/NCME_2012_Paper3_29_12.pdf, viewed on: 28 November 2013

• Software Secure Inc. (2013). Watchful Eyes: A comparative Look at Online Test Proctoring Models. Download via: www.educationdive.com/library/watchful-eyes-a-comparative-look-at-online-exam-proctoring-models/, downloaded on: 26 November 2013

• Straumsheim, C. (2013, September 11), Open-Source MOOCs. Inside Higher education. In: www.insidehighered.com/news/2013/09/11/edx-and-google-develop-open-source-mooc-platform, viewed on 1 December 2013.

• Piech, C., Huang, J., Chen, Z., Do, C., Ng, A. & Koller, D. Tuned Models of Peer Assessment in MOOCs. In www.stanford.edu/~cpiech/bio/papers/tuningPeerGrading.pdf, viewed on 29 November 2013.

• Young, J.R. (2012, August 16). Dozens of Plagiarism Incidents Are Reported in Coursera's Free Online Courses. The Chronicle of Higher Education. In: http://chronicle.com/article/Dozens-of-Plagiarism-Incidents/133697/, viewed on 1 December 2013.

DATA SOURCES ON OPEN EDUCATION AND MOOCS

Now that open educational resources (OER) and open education have been available in various formats for some time, an increasing amount of (open) data is becoming available for those interested in numbers, learning effects, completion rates, applied media and didactic approaches, differences between individual platforms, demographic student data and many other aspects. Most of the websites featured below update their information on a regular basis. Some allow the user to filter and combine data, yielding clearly under-standable graphic representations.

'Course completion data for MOOCs' by Katy Jordan. Regularly updated. Interactive graph allowing the user to filter on the basis of completion criteria, platform, university and assess-ment type (www.katyjordan.com/MOOCproject.html).
Further analysis of course completion data by Katy Jordan: http://nogoodreason.typepad.co.uk/no_good_reason/2013/12/completion-data-for-moocs.html

'MOOC research hub' (www.moocresearch.com, supported by the Bill & Melinda Gates foundation) studied various aspects of open learning and Open Online Courses over the course of 2013. Initial results have since been made available. Starting early 2014, the website will also feature an evidence hub con-taining research papers and research reports.

'Learning Design data of MOOCs' focuses on the applied media and didactic approaches and learning design (http://nogood-reason.typepad.co.uk/no_good_reason/2013/12/the-learning-design-of-moocs.html).
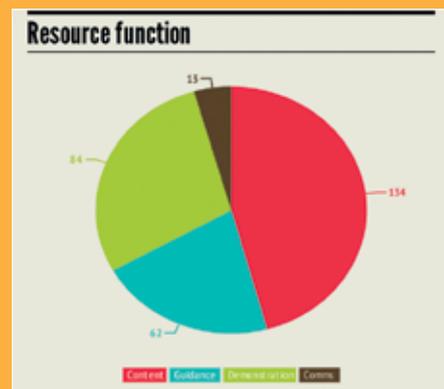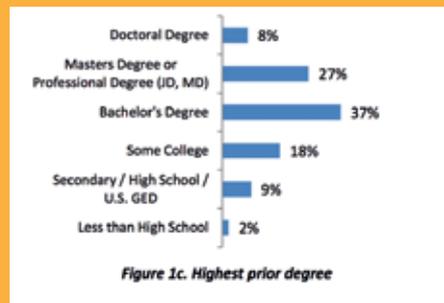
The OER Research Hub gathers research data, information on the latest research progress and news on OER and open education. The initiative is funded by the William & Flora Hewlett Foundation (http://oerresearchhub.org/). The data can be accessed through multiple interactive views.


'Open Education in Europe' features an up-to-date 'European MOOC scoreboard' developed by the European Commission (http://openeducationeuropa.eu/en/european_scoreboard_moocs). This infographic is also available in PDF format. When interpreting the numbers please bear in mind that many MOOCs are in the language of the country of origin, only some with (English) translation.
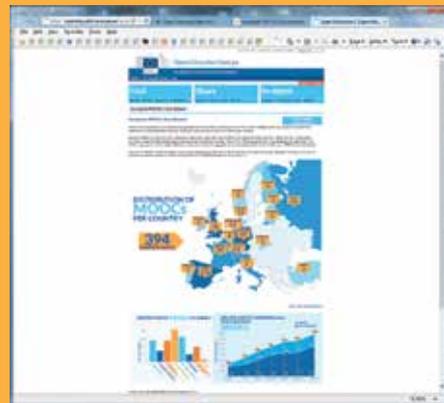
Demographic data on previous MOOCs can be found via search engines. Overarching cross-platform data is not available as of yet. For some examples, see:
http://augmentedtrader.wordpress.com/2013/01/27/mooc-student-demographics/ and http://mfeldstein.com/moocs-beyond-professional-development-courseras-big-announcement-in-context/.

Figure 1c. Highest prior degree

'OLnet Open Learning Research' is an international research hub (http://www.olnet.org/). The affiliated Evidence Hub for Open Education (http://ci.olnet.org/) offers a 'living' map featuring a wide range of questions and answers on open education. Users can interactively browse key challenges, issues, potential solutions, research claims, evidence and resources.
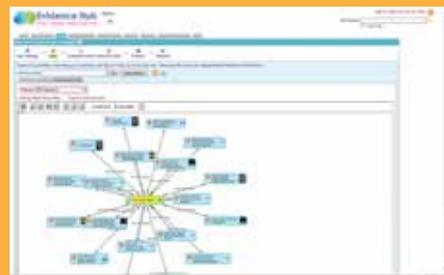
INTEGRATION AND REUSE OF OPEN EDUCATION IN THE CONTEXT OF FORMAL EDUCATION

by **Martijn Ouwehand** and **Ria Jacobi**

Since the introduction of OpenCourseWare in 2001, the available range of (legally) reusable and accessible online teaching materials on many different subjects has grown substantially. MOOCs are currently undergoing the same development. Nevertheless, the reuse of OpenCourseWare is still a rare occurrence. Study success and study yields are still prioritised in the Dutch higher education sector. However, the potential applications of open education (such as OpenCourseWare and MOOCs) do feature more prominently in the ongoing debate (Janssen, 2013). This article explores the various ways in which open education can be integrated into formal education. We will discuss the latest trends and identify opportunities for the integration and reuse of open education in Dutch higher education.

Reuse of open education within the current education system

Despite the complexity involved in influencing study success rates (Van den Bogaard, Verbraeck & De Graaff, 2013), a more effective use of contact hours and more active participation by the student seem to be key indicators for effective education at micro level (Delft University of Technology Didactics working group, 2011). The availability of both OpenCourseWare and MOOCs is also relevant in this regard. For example, OpenCourseWare offers a broad range of educational resources that could help change the way in which knowledge is transferred. MOOCs offer an additional dimension thanks to the integration of learning activities, subsequent monitoring/ feedback and a learning experience shared with 'classmates' from around the world.

We will describe the various ways in which OpenCourseWare and MOOCs can be integrated with formal (campus-based) education at micro level.

Use of online sources in existing didactic model

The degree to which open education is integrated into the formal education model may vary. At minimum, OpenCourseWare can be used as a supplementary source, without any need for major adjustments to the didactic model. The openness of these educational resources offers added value over other ICT implementations, in the sense that there is no longer a legal impediment to their reuse. For example, the practical example in the text box outlines a broad range of learning activities involving the application of open educational resources.

Cases in point: prime examples of open education reuse within the context of formal education. Several years ago, a mathematics lecturer at the AUAS/HvA who teaches his subject to informatics students, decided to record curricular subjects - along with the relevant assignments, elaborations, instructions and answers - in the digital Maple TA testing system. Every three weeks, his students complete the assignments on a specific subject, and subsequently receive online feedback. In addition to the relevant answers and explanations, this feedback often includes a short video clip featuring additional elaboration. All materials used by the lecturer are OER and sourced from the Khan Academy, YouTube, fellow lecturers or the Internet. Students are tested on the subject every third week. They must have completed all test questions in order to take part in the examination. During the first two weeks, students can make use of the f2f supervision hour. The lecturer can meanwhile monitor the students' progress, checking who has completed which assignments and how they have done their work. Senior general secondary education and university preparatory education pupils manage to complete the assignments on the basis of the instructions, test questions and feedback. Senior secondary vocational education pupils are more likely to make use of the supervision hour. Study yields increased from 70% to 95%.

Study success rates can also be improved by applying open educational resources (without further adjustment of the didactic model being required) to the following study success factors (Hattie, 2008):

- as remedial course materials in the form of OpenCourseWare or open e-books (examples, repetition and practice),
- in the form of feedback on digital tests (as a means of providing immediate feedback),
- in study choice processes (in support of the selection process) in the form of OpenCourseWare (preparation, motivation),
- in language modules (national and international students) in open online courses or an open e-book (examples, repetition and practice),
- as supplementary material in honours tracks in the form of OpenCourseWare, an open online course or open e-book (examples, motivation, practice).

'Flip the classroom' models

However, the application of open educational resources will only offer added value if the didactic model is adjusted in such a manner that students can be activated and motivated in different ways (Schaffert & Geser, 2008; Dopper & Bijsterveld, 2012). An example in which the didactic model and availability of open educational resources serve to strengthen one another would be the reversed teaching model developed by Prof. Sicco Santema (Santema, Ghijs & Nijnam, 2011). This model encourages students to process the course content more intensively by prompting them to actively seek out online teaching materials and argue why they supplement the course content.

The flipped classroom model has blossomed thanks to the availability of open education. This model applies the benefits of OpenCourseWare to an optimal effect, with knowledge now transferred during the (independent) preparation phase. With more time available for the further intensification of knowledge, debate and tailor-made supervision, contact hours can be used more effectively. In addition to the many existing examples to have emerged over time (see the Flipped Classroom Field Guide), other formats may also be developed in the future.

Martijn Ouwehand (g.m.ouwehand@tudelft.nl) works at the Education Techno-logy Department of Delft University of Technology, and focuses on the support and development of open and online education. He is also a core member of the Open Education Special Interest Group.

Ria Jacobi (r.k.jacobi@hva.nl) works at the AUAS/HvA's Education and Research (02) policy staff department, where she also serves as an education team coordinator. Her areas of focus include the development of blended education, open educational resources, educational in-novation, the professionalisation of teaching staff and internationalisation. Her activities in each of these areas are based around the idea of 'how to strengthen the lear-ning of students'. She is also a core member of the Open Education Special Interest Group.

Hybrid learning

The flipped classroom model and the concept of hybrid learning are highly similar in the sense that they both involve blended education models (Horizon Project, 2013). Where the flipped classroom model emphasises a distinction between independent preparation (by means of open education) and the effective use of contact hours (Tangient LLC, 2014), hybrid learning centres around the integration of open education and contact time.

Griffith (2013) distinguishes several strategies for integrating MOOCs into the formal face-to-face education model. For example, students that have successfully completed a MOOC can be rewarded with credits. This format is not yet commonly applied around the world. The allocation of credits in acknowledgement of completed MOOCs is hampered by an important bottleneck: the non-committal nature of the attendance and certification process, which is generally not subject to any fraud prevention measures. However, the major MOOC providers are experimenting with signature tracks and verified identity certificates. Existing procedures for the recognition of prior learning can also facilitate the recognition of MOOC certificates (Keijzer-de Ruijter & Dopper, 2014, page 33).

However, the focus of this article is limited to the integration of MOOCs in regular courses, with students receiving tailor-made supervision for the duration of the MOOC. For example, Leiden University conducted a pilot project in 2013 whereby an existing course book was replaced by a MOOC developed by VanderBilt University. Not only do students have access to richer sources and a large community of fellow MOOC participants, contact hours also tend to be utilised more effectively. In order to achieve more ambitious learning goals, students are encouraged to adopt the role of MOOC moderators, offering online supervision to their fellow students in parallel to their course work on campus (MIT, 2013).

San Jose State University and California State University have already achieved promising results through the application of edX MOOCs in hybrid education formats (edX, 2013 - see text box).

San Jose State University and California State University have conducted pilot projects. A group of students was randomly divided over three groups during the autumn of 2012. Two groups took the regular on-campus course, while the third group took the same course as part of a blended education module, combined with an edX MOOC on the same subject. The project was repeated in the spring of 2013, with one difference: participating students were now free to choose a test group. The percentage of students to pass the MOOC-based course proved significantly higher in the autumn of 2012. The percentages for all groups participating in the spring 2013 trial were also higher (it should be pointed out that five students in group 2 dropped out in spring 2013; if we discard these students, the percentage still totals 95%). This pilot project raises the question whether the higher passing rate can be attributed to the application of a MOOC, or more intensive supervision and an alternative form of education. Interestingly enough, the greater freedom of choice offered in the spring 2013 pilot project does seem to have yielded higher percentages amongst all participating groups.

	Autumn of 2012 (random allocation)			Spring of 2013 (allocation on the basis of individual choice)		
	Group 1	**Group 2 (edX MOOC)**	**Group 3**	**Group 1**	**Group 2 (edX MOOC)**	**Group 3**
Passing rate	56.6%	95.1%	73.8%	77.8%	87.0%	81.6%
Number of enrolments	55	83	86	36	78	49

Opportunities, a view to the future

This article explores the various ways in which open education can be integrated into formal education. Most Dutch higher education institutions currently seem to be experimenting with the integration of open education elements into formal (campus-based) education at micro-level; blended education applying elements of the open education model.

On a global scale, we are seeing the gradual development of long-term visions on the integration of open education and formal education models. For example, the State University of New York (2013) has identified opportunities for cooperation between multiple campuses, whereby MOOCs are developed as part of a joint effort and integrated into the formal education model (State University of New York, 2013). MIT also sees potential for a more intensive integration of open and formal education, based around the innovation of face-to-face education through blended education formats. MIT seems to be pushing for a more modular and flexible range of open and online education programmes (Institute-wide Task Force on the Future of MIT Education, 2013).

These visions describe a future in which institutions such as the State University of New York and MIT facilitate the large-scale application of MOOCs and OpenCourseWare in the existing curriculum, both within the institutions' own formal campus-based education and other academies as well as at other institutions around the world.

Such developments offer opportunities for the Dutch higher education sector. Firstly, the Dutch higher education sector could start by integrating open education resources from other institutions into the existing curriculum on a larger scale. More generic fields offer the greatest potential in this regard, whereby the focus should be directed towards improving the quality of existing campus-based education.

Potential developments in this regard include (1) the integration of open education into the formal curriculum (2) the composition, development and/or facilitation of various learning pathways - shaped partly by the student - consisting of teaching modules developed by the institution itself and external online modules and (3) further modularisation of the curriculum based around the incorporation of external modules. The theme of higher education flexibilisation can thus regain its relevance (Crul, 2013), while the application of blended education formats can help ensure a more effective utilisation of contact hours. These developments will impact the role of the lecturer, whose added value will inevitably be affected (Bussemaker, 2013-1 & -2).

Secondly, because of open education more intensive cooperation between (academies or faculties within) higher education institutions does seem to be within reach, based on the example set by the State University of New York. This vision seems to be supported by Dutch higher education institutions (especially higher professional education institutes) with a view to common themes such as information competencies (Janssen, 2013).

Conclusion

Over the course of the past one or two years, we have seen a new momentum build; open education now drives the debate on the potential for an ICT-based restructuring of the education system, at both course and curriculum level. However, any such restructuring effort on the basis of open education would have a major impact on institutional strategy, or even the education system as a whole (Netherlands Scientific Council for Government Policy, 2013). Crucially, leading institutions such as the State University of New York and MIT seem to be taking on this challenge. It remains to be seen whether other institutions will follow suit.

No matter what the future may hold, Dutch higher education institutions are currently taking concrete steps in terms of the integration of open and formal education. The challenge will lie in finding the courage to share and accept (open) educational resources and daring to experiment and innovate. This, after all, is what open education is all about.

Sources

- Bogaard, M. van den, Verbraeck, A. & De Graaff, M. E. (2013). Modeling student success with students. In: Proceedings of the 41st SEFI Annual Conference Leuven pp. 8. SEFI & KU Leuven, KU Leuven Faculty of Engineering Science.
- Bussemaker, M. (2013)-1. Speech by Bussemaker at opening of the academic year, InHolland University of Applied Sciences, Amsterdam. Speech, 4 September 2013: www.rijksoverheid.nl/documenten-en-publicaties/toespraken/2013/09/04/opening-hogeschooljaar.html.
- Bussemaker, M.(2013)-2 Bussemaker at opening of the academic year, Erasmus University Rotterdam. Speech, 30 August 2013: www.rijksoverheid.nl/regering/bewindspersonen/jet-bussemaker/toespraken/2013/09/02/bussemaker-spreekt-tijdens-opening-academisch-jaar-erasmus-universiteit-rotterdam.html
- Crul, M. (2013). Preface, Zijlstra, W., Asper, H., Amrani, A., Tupan-Wenno, M., Crul, M.M.V.M. & Van Stapele, N. (2013). Generiek is Divers. Utrecht, November 2013.
- Dopper, S.M. & Bijsterveld, C.A. (2012). Integreren van Open Educational Resources in het curriculum, 2012 Open Educational Resources Trend Report. Open Educational Resources Special Interest Group, pp 17-20.

- Flipped Classroom Field Guide, a compilation of best-practices and community resources centred around the flipped classroom and blended learning initiatives of the Coursera-partner community. https://docs.google.com/document/d/1arP1QAkSyVcxKYXgTJWCrJf02NdephTVGQltsw-S1fQ/pub?pli=1#id.8bnb53eqjw6a
- Griffiths, R.J. (2013). MOOCs in the Classroom. Ithaka S+R.
- Hattie, J. (2008). Visible learning. A Synthesis of Over 800 Meta-analyses Relating to Achievement. Taylor & Francis Ltd.
- Horizon Project, 2013. NMC Horizon Report, 2014 Higher Education Edition Wiki. http://horizon.wiki.nmc.org/Flipped+Classroom.
- Institute-wide Task Force on the Future of MIT Education (2013): Re-inventing MIT education together, 21 November 2013.
- Janssen, B. & Jelgerhuis, H. (2013). Presentation on SURF Strategic Workshops on open education at 10 Dutch higher education institutions (streaming video). 2013 SURF Education Days, 12 November 2013. http://event.mediamission.nl/Mediasite/Play/290f3fc93a0b4ec5a4b911ce46f222641d?catalog=5a0d8062-2044-4cee-9d62-6c619ceaa0eb
- Keijzer-de Ruijter, M.A. & Dopper, S.M. (2014). Toetsen en beoordelen binnen MOOC's, 2014 Open Education Trend Report, pp 33-38.
- MIT, 2013. The first Year at MIT. For Associate Advisers. http://web.mit.edu/firstyear/associates/rightnow/flags.html.
- http://openeducationeuropa.eu
- OpenCourseWare Consortium (2013). OCW Consortium Feedback Survey Data (March 2011- May 2013). http://www.ocwconsortium.org/projects/surveyresults/.
- Presentation at edX Consortium meeting , 25-27 November 2013.
- Santema, S., Ghijs, S. & Nijman, R. (2011). Can frontal teachers reverse their teaching through the use of YouTube movies on their subjects? Internal project evaluation, Delft University of Technology.
- Netherlands Scientific Council for Government Policy (2013). Naar een lerende economie. Investeren in het verdienvermogen van Nederland. Amsterdam University Press, Amsterdam.
- Tangiend LLC (2014). Wikispaces blended-classrooms > The Flipped Classroom. http://blended-classrooms.wikispaces.com/.
- Schaffert, S. & Geser, G. (2008) Open educational resources and practices. Elearning Papers,(7), 1-10. Obtained from www.elearningpapers.eu on 9 September 2011
- State University of New York (2013). OPENSUNY. www8.esc.edu/esconline/cdlrev2.nsf/7ee05c19c4623d128525767800520634/581ad7d9e2ccc8f7852579fb006695d0/$FILE/OpenSUNYFinal.pdf.
- Delft University of Technology Didactics Working Group (2011). Koersen op Studiesucces. Delft University of Technology, 5 October.

PUBLICATIONS

The following 2013 publications on OER and MOOC are must reads:

- **The MOOC Phenomenon: Who Takes Massive Open Online Courses and Why?**
  This article describes a study on 32 MOOCs offered by the University of Pennsylvania through the Coursera platform. The study offers insight into the participants' geographical spread, backgrounds and results. (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2350964)

- **Open Schooling with Open Educational Resources: Opening doors, creating opportunities**
  This Commonwealth of Learning report describes experiences in the area of OER development from the perspective of lecturers at various education institutions in the non-Western world. (www.col.org/resources/publications/Pages/detail.aspx?PID=467)

- **Open Educational Resources: Innovation, Research and Practice**
  This Commonwealth of Learning report describes practical experiences and studies on OER from around the world and features valuable information for those considering using or publishing an OER. (www.col.org/resources/publications/Pages/detail.aspx?PID=446)

- **Journeys to Open Educational Practice: UKOER/SCORE Review Final Report**
  The final report featuring findings from the JISC/HEFCE OER programme, conducted in the UK from 2009-2012. (http://bit.ly/HEFCEoerReview)

- **Open and online education and the future of higher education in the Netherlands**
  SURF commissioned Capgemini Consulting to conduct a study on the potential impact of global open and online education developments in relation to the Dutch higher education sector. (http://www.surf.nl/kennis-en-innovatie/kennisbank/2013/rapport-open-en-online-onderwijs-en-de-toekomst-van-het-neder-landse-hoger-onderwijs.html)

- **Overview and Analysis of Practices with Open Educational Resources in Adult Education in Europe**
  Results from a 2013 study by The Institute for Prospective Technological Studies (IPTS) on the impact of OER on lifelong learning. (http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=6744)

- **MOOCs and Open Education: Implications for Higher Education**
  JISC/CETIS report aimed at offering policy-makers insight into the latest MOOC-related developments and the resulting impact on their institutions. (http://publications.cetis.ac.uk/2013/667)

- **The Maturing of the MOOC**
  Review of literature on MOOC and other forms of remote open learning, conducted by the UK government's Department for Business, Innovation and Skills. (www.gov.uk/government/uploads/system/uploads/attachment_data/file/240193/13-1173-maturing-of-the-mooc.pdf)

- **Massive Open Online Courses (MOOCs): A Primer for University and College Board Members**
  Despite having been written from a US perspective, this report offers a useful introduction to MOOCs and their potential significance to the higher education sector. (http://agb.org/sites/agb.org/files/report_2013_MOOCs.pdf)

OPEN EDUCATION, BIG DATA AND LEARNING ANALYTICS

by **Sander Latour** and **Robert Schuwer**

The growing popularity of MOOCs has sparked major interest in the potential of open and online education amongst Dutch higher education institutions. With participants numbering in the thousands to tens of thousands, such courses yield large quantities of data on both usage and users. In a parallel development, the number of available MOOCs and other open educational resources is rising steadily. Although learning analytics can be applied to this data to great effect, yielding opportunities for the further improvement of open and online education, this also presents a number of challenges. This article describes two such opportunities and one relevant challenge.

What is learning analytics?

SoLAR, the international community for research in this field, defines learning analytics as the 'measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs'. The community shares the view that this involves a cyclical process, as described in (Clow, 2012). This cyclical process can be compared to a lecturer posing a question in order to take a didactic decision on the basis of the analysed answer. As the scale of courses expands, it is proving difficult for lecturers to optimally improve their education by means of this cycle. At the same time, a growing portion of the learning process is manifesting itself in the form of digital data. Learning analytics uses this digital data to apply the same cycle on a large scale in support of the learning process.

Learning analytics centres around the support of students and lecturers. Related fields apply some of the same data and technologies used in learning analytics, while focusing on different questions (Chatti, 2012). Whereas learning analytics focuses on supporting the learning process, educational data mining is more oriented towards the technological potential for extracting value from large quantities of data (Ferguson, 2012). Finally, academic analytics applies techniques from the field of business intelligence to data at institutional level in order to improve study yields (Long, 2011).

Challenge: contaminated data

With such large numbers of participating students, MOOC has the potential to yield a wealth of data which can be analysed with learning analytics techniques in order to identify areas of improvement at course level. Such analyses can also offer greater insight into the learning process (for example, see http://blog.socrato.com/learning-analytics-and-moocs).

Sander Latour (sanderlatour@gmail.com) has been active in the field of learning analytics since 2012, and is involved in many initiatives in this field. Up until February 2014, he worked at the University of Amsterdam (UvA) and served as chairman of the core team at SURF's Learning Analytics Special Interest Group. He continues to serve as a member of the core team and is still active in the field.

Robert Schuwer (robert.schuwer@ou.nl) works at the Open University of the Netherlands. He has been involved in numerous OER projects at the Open University and other institutions since 2006. He serves as chairman of the core team at SURF´s Open Education Special Interest Group.

However, MOOCs suffer from a high drop-out rate. This is partly attributable to the fact that participants do not start a MOOC with the intention of completing the course, but are merely interested in specific course components or register out of curiosity (Clow, 2013). As a result of the low enrolment threshold and minor consequences involved in dropping out of a MOOC, priorities tend to shift elsewhere (such as deadlines for assignments). This could potentially result in data contamination: in most cases, there is no available information as to why a student has dropped out, and such reasons are not necessarily related to the contents of the course.

Many analytics techniques applied in the higher education sector traditionally focus on predicting study success rates on the basis of previous students' behaviour (Siemens, 2013), the assumption being that students will enter the course at approximately the same level and will be aiming to reach the same goals. Due to the large discrepancies in terms of MOOC participants' intentions and circumstances, it is far more difficult to identify and subsequently apply meaningful correlations from the resulting data. At the very least, efforts to monitor group progress are more complicated than would be the case if there were a greater degree of uniformity. After all, a student might be on track to achieve his/her personal learning target while lagging behind in terms of the final examination.

As a result, the use of such techniques is subject to far higher standards than would be the case in a traditional course. Their application in MOOCs is thus potentially problematic (Clow, 2013). Although learners can be required to clarify their intentions (via a short survey at the start of the course, for example), these intentions can change over the course of the process due to reasons unrelated to the course. An alternative approach would be to automatically classify the participants into sub-groups (Kilzilcec, 2013). Learning analytics techniques could then be applied to each of these sub-groups, in the hope that the individual groups are more uniform.

However, other learning analytics applications are entirely or largely immune to the problem of data contamination. Examples are mentioned in (Fournier, 2011; Ferguson, 2012). For example, individual student data can be visualised in support of the reflection process. The learning analytics applications that preferably require a homogenous population seem to be more relevant to xMOOCs than cMOOCs (Schuwer, 2013b).

Opportunity 1: determining the quality of OER

The quality of OER depends on a large number of criteria (Schuwer, 2013a). Several of these criteria are related to the context within which OER is used and reused. These include target group characteristics, the applicable didactics and existing prior knowledge on the subject. Lecturers seeking to reuse an OER often find it impossible or difficult to find data on these criteria (from reviews by previous users). This makes it difficult for lecturers to determine whether the relevant OER can be applied within his/her context and to identify the necessary adjustments.

Learning analytics could offer a solution by automatically supplementing some of this context. For example, linkage with existing data from a learning management system offers potential for the automatic generation of OER metadata (Duval, 2004). A relatively simple example of this solution would be the identification of patterns in metadata on other educational resources applied in combination with the OER. As more detailed learning environment data is linked to the OER collections, it will even become possible to add learning characteristics of students that previously used the relevant OER. This would help lecturers acquire data on the suitable target group. Learning analytics could even be applied to compare the stored characteristics with those of prospective students in order to create a ranking.

Relevant information can also be extracted from actual usage. For example, the amount of attention devoted to the OER by learners over the duration of the course could also be measured (Ochoa, 2006). It also seems reasonable to expect that learning analytics will eventually allow us to draw conclusions on the efficacy of OER. After all, OER is often applied in the same context in which examinations are administered. Once data from these examinations can be collated with data on OER use, statistical models will be able to estimate the OER's effect on student performance. These estimates can then be featured in the list of OERs consulted by the lecturer, or serve as input for an algorithm used to automatically present educational resources to the individual student.

Finally, OER authors could benefit from feedback in the form of qualitative information on interactions between students and the OER. In the case of an instructional video, for example, it might be highly informative to know where students tend to rewind or pause the clip.

The aforementioned learning analytics applications will perform more effectively when supported by an infrastructure that gathers feedback from the actual learning environment in an OER database. The standards required in order to allow these systems to communicate about such data are currently starting to take shape. Based on recent developments within the IMS standards platform (Learning Measurement for Analytics Whitepaper, 2013), we can conclude that the various existing standards are also becoming increasingly integrated. Although a central database that can process, analyse and present such OER data is yet to materialise, the three required components are starting to take shape.

Opportunity 2: on the path towards mass customisation

Mass customisation is an approach based on efficient adjustment of available learning situations to reflect the characteristics and wishes of the individual learner. The potential for offering such mass customised solutions is growing as OER and MOOCs become more widely available (Yuan et al., 2008). Potential examples include the availability of various alternatives at course or learning unit level, or the configuration of individual learning pathways to reflect a specific curriculum. Examples of such

alternatives include electives, the availability of different cases within an individual course or questions at different difficulty levels. However, the scale of education is too great for lecturers to manually offer such alternatives at individual level.

Technology would appear to offer a solution in this regard, which could roughly take two different forms. The learning analytics community is working to facilitate the decision-making process for both students and lecturers, whereas the educational data mining community generally focuses on systems that automatically implement a decision by means of adaptiveness (Siemens, 2012). According to an exploratory study, the available data sets from other learning object repositories can already be used to issue automatic recommendations on relevant teaching materials (Verbert, 2011). Such data is also applied to support lecturers during the curricular development process (Verbert, 2012).

Specialists in the adaptive (educational) hypermedia sector generally view the challenge of OER personalisation as part of the open corpus problem (Brusilovsky, 2007; Kravčík, 2013). This problem also comprises the challenge of representing educational resources in such a way that they can be used to generate mutual links. Efforts have been made to resolve this problem through the semantic web (Henze, 2004). Semantic web representations have also been applied to personalise curricula (Baldoni, 2011). In these examples, however, a considerable part of the required information must be explicitly added to the system. This represents a major challenge due to the large scale of existing OERs.

However, learning analytics could apply this large scale to its advantage, using the large quantities of OER user data to generate teaching material recommendations (Duval, 2011), thus eliminating the need to manually add extensive information to the materials. The adaptive strategy also offers alternatives to the knowledge-intensive approach. For example, the massive increase in available data will allow for the automatic extraction of intelligent tutoring system components (Koedinger, 2013).

In order to ensure that mass customisation solutions are genuinely centred around the learner, data must be linked to the learner rather than a system. The learner should be able to transfer his/her user data to other systems in order to maintain access to the same range of personalised solutions. Mass customisation does pose a risk in the sense that learners can become mired in the same types of recommendations, without being exposed to new opportunities.

Conclusion

This article discusses two open education opportunities and one learning analytics challenge. Although collaboration between the two areas does appear to offer potential, some of the aforementioned applications are yet to be developed and could even be designated as speculative. Research in these areas is currently fragmented and thus less efficient and effective than it could be. We would thus advocate the establishment of a national OER research agenda, for both this and other research themes.

Data becomes more valuable when it is augmented with learning analytics. There is demand for a flexible infrastructure that facilitates the transportation of such data. Building such an infrastructure, however, represents both an economic and a technological challenge. Despite these factors, the combination of open education and learning analytics offers invaluable potential.

Sources

- Baldoni, M., Baroglio, C., Brunkhorst, I., Henze, N., Marengo, E., & Patti, V. (2011). Constraint modelling for curriculum planning and validation. Interactive Learning Environments, 19(1), 81-123.
- Brusilovsky, P., & Henze, N. (2007). Open corpus adaptive educational hypermedia. In The Adaptive Web (pp. 671-696). Springer Berlin Heidelberg.
- Chatti, M. A., Dyckhoff, A. L., Schroeder, U., & Thüs, H. (2012). A reference model for learning analytics. International Journal of Technology Enhanced Learning, 4(5), 318-331.
- Clow, Doug (2012). The learning analytics cycle: closing the loop effectively. In: LAK12: 2nd International Conference on Learning Analytics & Knowledge, 29 April - 2 May 2012, Vancouver, BC.
- Clow, Doug (2013). MOOCs and the funnel of participation. In: Third Conference on Learning Analytics and Knowledge (LAK 2013), 8-12 April 2013, Leuven, Belgium.
- Duval, E. (2011). Attention please!: learning analytics for visualization and recommendation. In Proceedings of the 1st International Conference on Learning Analytics and Knowledge (pp. 9-17). ACM.
- Ferguson, Rebecca (2012). Learning analytics: drivers, developments and challenges. International Journal of Technology Enhanced Learning, 4(5/6) pp. 304-317.
- Fournier, H., Kop, R., & Sitlia, H. (2011). The value of learning analytics to networked learning on a Personal Learning Environment.
- Henze, N., Dolog, P., & Nejdl, W. (2004). Reasoning and Ontologies for Personalized E-Learning in the Semantic Web. Educational Technology & Society, 7(4), 82-97.
- Learning Measurement for Analytics Whitepaper. (2013). Retrieved December 18, 2013 from www.imsglobal.org/IMSLearningAnalyticsWP.pdf.
- Long, P., & Siemens, G. (2011). Penetrating the fog: Analytics in learning and education. Educause Review, 46(5), 30-32.
- Kizilcec, R. F., Piech, C., & Schneider, E. (2013, April). Deconstructing disengagement: analyzing learner subpopulations in massive open online courses. In Proceedings of the Third International Conference on Learning Analytics and Knowledge (pp. 170-179). ACM.
- Koedinger, K.R., Brunskill, E., Baker, R.S.J.d., McLaughlin, E.A., Stamper, J. (in press) New potentials for data-driven intelligent tutoring system development and optimization. To appear in AI Magazine (Vol 43, no 3).
- Kravčík, M., & Wan, J. (2013). Towards Open Corpus Adaptive E-learning Systems on the Web. In Advances in Web-Based Learning–ICWL 2013 (pp. 111-120). Springer Berlin Heidelberg.
- Ochoa, X., & Duval, E. (2006). Use of contextualized attention metadata for ranking and recommending learning objects. In Proceedings of the 1st international workshop on Contextualized attention metadata: collecting, managing and exploiting of rich usage information (pp. 9-16). ACM.
- Schuwer, R. (2013a). Kwaliteit van open leermaterialen. SURF, Utrecht. Available at: www.surf.nl/binaries/content/assets/surf/nl/kennisbank/2013/artikel-kwaliteit-van-open-leermaterialen-07-11-2013.pdf.
- Schuwer, R. (2013b) Massive Open Online Courses, www.surfspace.nl/artikel/1024-massive-open-online-courses-moocs/.
- Siemens, G. (2013). Learning Analytics The Emergence of a Discipline. American Behavioral Scientist, 57(10), 1380-1400.
- Siemens, G., & Baker, R. S. D. (2012, April). Learning analytics and educational data mining: Towards communication and collaboration. In Proceedings of the 2nd International Conference on Learning Analytics and Knowledge (pp. 252-254). ACM.
- SoLAR: www.solaresearch.org/mission/about/

- Verbert, K., Drachsler, H., Manouselis, N., Wolpers, M., Vuorikari, R., & Duval, E. (2011, February). Dataset-driven research for improving recommender systems for learning. In Proceedings of the 1st International Conference on Learning Analytics and Knowledge (pp. 44-53). ACM.
- Verbert, K., Ochoa, X., Derntl, M., Wolpers, M., Pardo, A., & Duval, E. (2012). Semi-automatic assembly of learning resources. Computers & Education, 59(4), 1257-1272.
- Yuan, L., MacNeill, S., & Kraan, W. (2008). Open educational resources— Opportunities and challenges for higher education. Retrieved 18 December 2013 from: http://learn.creativecommons.org/wp-content/uploads/2008/09/oer_ briefing_paper.pdf.

UNIVERSITEIT VAN NEDERLAND

www.universiteitvannederland.nl offers access to lectures from the best Dutch university professors. According to its founders Alexander Klöpping and Marten Blankensteijn, the Universiteit van Nederland (University of the Netherlands) is intended for everyone interested in learning a little about a broad range of subjects. In December 2013, the website featured 45 video lectures by 9 professors.

The videos help make knowledge (on subjects such as psychiatry, law, economics and physiology) available and accessible to a broad section of the Dutch population. As Jet Bussemaker emphasised during the official opening of Universiteit van Nederland on 8 October 2013: "The Universiteit van Nederland offers young people a clearer picture of the various available study programmes, enabling them to make more effective choices. Over time, we hope the initiative will help us reduce drop-out rates. The Universiteit van Nederland is an ideal ambassador for the Dutch universities."

By December 2013, the Universiteit van Nederland had attracted a total of around 1.3 million views. This represents an average of 140,000 views per professor.

MOOCS: THE OPPORTUNITIES AND PITFALLS ACCORDING TO STUDENTS

by **Marianne Kaufman** and **Tim van den Brink**

The digitisation of higher education, and MOOCs in particular, raises various questions. Is this development a hype? Will the higher education landscape change for good until we are left with online universities where students must purchase education, with other providers offering paid supervision? These issues are generally discussed with policymakers, officials, politicians, lecturers and members of university boards. However, students' voices also need to be heard: after all, the debate on MOOCs is about the future and development of the higher education sector. This article discusses the opportunities and pitfalls of MOOCs from a student's perspective.

Despite our use of the term open educational resources, MOOCs are only partially 'open' in reality. They are available to everyone with an Internet connection. However, MOOCs are not openly available for reuse, nor do they allow for the individual modification of learning materials. Furthermore, it is uncertain whether MOOCs will remain indefinitely accessible to everyone with an Internet connection. In an effort to maintain the platforms' financial viability, efforts are underway to assess the potential for offering specific MOOCs at a charge. This development is reflected in the emergence of Small Private Online Courses (SPOC), created for and marketed to individual organisations (Coughlan, 2013). If this trend continues, the accessibility of MOOCs - and thus the distribution of knowledge to everyone with an Internet connection - will be restricted. As a result, MOOCs will become one of many stages on the road towards educational privatisation and commercialisation. If this were to happen, we would miss a great opportunity to improve the quality of education, involve students more closely in their own education and encourage greater individual responsibility.

The number of MOOCs has continued to increase dramatically since the Year of the MOOC in 2012 (Pappano, 2012). These developments are largely taking shape outside of the Netherlands. The majority of MOOCs are still developed by US universities and are offered through the largest platforms, such as Coursera, Udacity and edX. These platforms mainly offer English-language MOOCs. European and Asian universities are also working to develop MOOCs, some of which are offered in their own language. There is no available data on the number of Dutch students currently participating in MOOCs. However, several Dutch universities are starting to take their first cautious steps in this area. For example, in January 2014 the University of Amsterdam (UvA) followed up the very first Dutch MOOC with a course participated in by 25,000 students (now offered by Coursera). This development may attract new international talent, facilitating a more open and accessible education system. Delft University of Technology is also incorporating MOOCs into several of its Bachelor's programmes and courses. Universities of applied sciences are still in the exploratory phase, and are lagging behind in terms of MOOC development.

Marianne Kaufman is a member of the Dutch National Student Union (LSVb) board. Under her leadership, the issue of digitisation was allocated its own individual portfolio for the first time. Marianne holds a degree in organisational anthropology and is a qualified Social Studies teacher.

Tim van den Brink is a member of the LSVb education policy staff and a board member at Studiekeuze123. He also studies law at the University of Amsterdam (UvA).

As students, we feel the Dutch higher education sector should be making more effective use of MOOCs' potential. In order to help ensure that we make the most of these opportunities, we will describe the potential of MOOCs and the relevant pitfalls. If we can manage to avoid the pitfalls ahead, nothing can stop us from optimising this potential and bringing out the best in students while improving the quality of their education. In our view, this development is absolutely crucial. We are currently seeing a trend towards less freedom of choice for students, restricted access to education, very large student numbers and suboptimal student counselling. Students are also taking insufficient responsibility for the improvement of their own education. We also believe students are not being encouraged to actively shape their own education, or made aware of the need to do so. Thankfully, there are also positive developments, such as a growing focus on 'the right student in the right place'. MOOCs have the potential to help resolve the aforementioned problem areas. We will be focusing on this aspect below.

Opportunities

Accessibility

Here in the Netherlands, access to higher education is restricted by financial barriers. Potential political measures such as abolition of the OV public transport pass and basic grant will further jeopardise this accessibility. MOOCs help increase the accessibility of education and knowledge exchange. The integration of MOOCs into the current higher education system will facilitate the exchange of knowledge with national and international education institutions, and offer students access to other institutions. Furthermore, prospective students that would not have the necessary financial means to follow a higher education programme will gain access to high quality knowledge and supervision. However, we should add a critical side note. Over the course of the Winter Seminar on MOOC accreditation organised by the Accreditation Organisation of the Netherlands and Flanders (NVAO) and the European Consortium for Accreditation in higher education (ECA), it became clear that the largest group of MOOC participants consists of (former) students with a higher education diploma. The romantic notion that students from under-represented groups with limited access to higher education will gain such access through MOOCs may be appealing, but does not always coincide with reality.

Ownership

Lecturers create and distribute education. MOOCs and digitisation cannot be effectively incorporated into the education system until lecturers are intrinsically motivated to do so. Intrinsically motivated lecturers with the freedom to acquire new teaching methods are of the greatest value to students. In our view, there

is little point in pressuring lecturers to incorporate more digitisation in their teaching methods . A strategy that does work – and is applied at Delft University of Technology – is known as the knock-on effect. Lecturers with the necessary motivation and ability are offered an opportunity to further develop and disseminate a MOOC. Their enthusiasm and the subsequent results achieved by participating lecturers will inspire other lecturers to get on board. The popularisation of digital education will require effective mutual cooperation and interaction between students and lecturers. A good case in point from our own practical experience: lecturers that actively participate in debates on Blackboard automatically motivate students to do the same. This can create an effective platform for more in-depth exploration of the course materials, while helping students remember what they have learned more efficiently: these objectives are all furthered through mutual discussion and debate on the relevant subject matter. Active student participation in such discussions could also be rewarded in the form of a higher examination mark.

Raising the standard of education
MOOCs can free up lecturers to offer more individual supervision rather than focusing on classroom-based knowledge transferral: the 'flipping the classroom' principle. More effective student counselling will also yield greater insight into knowledge level differences and the needs of individual students. MOOCs can thus serve as a means of course preparation, helping to harmonise students' entry level qualifications. This will allow us to kill two birds with one stone: lecturers can spend less time answering questions that are basically not relevant to the curriculum, allowing them to focus on more in-depth exploration of the course materials. Students will no longer be annoyed or bored due to discussions below the expected level, and will be more motivated to get to grips with the curriculum.

Lecturers can use MOOCs to keep abreast of the latest teaching methods and developments in the field. MOOCs also facilitate peer reviews, with fellow lecturers now in a position to review their colleagues' work online at a time of their choosing. This will make it easier to offer feedback on didactic skills, thus improving the quality of education.

Freedom of choice
MOOCs offer students an opportunity to tailor the available education to their wishes, providing access to an almost unlimited range of elective courses. This will allow students to accentuate aspects of their choosing, thus effectively customising their study programme. This will help increase their sense of commitment to the study programme, thus increasing their motivation and potentially improving their study success rate (Education Council of the Netherlands, 2008). MOOCs can also offer more in-depth knowledge, in parallel to the student's individual study pathway. Students tend to complain that they are not being sufficiently challenged. A form of blended learning can be applied to supplement the existing curriculum with open educational resources and MOOCs. This will facilitate the acquisition of more in-depth knowledge. As a result, ambitious students will have more freedom to fulfil their potential without any need to charge additional fees (contravening the recent trend towards higher tuition fees for honours tracks). We also feel it is important that students are allowed and encouraged to take greater responsibility for the composition of and participation in their own education. Instead of being more or less passive recipients, they can now independently determine which online courses they wish to take and why.

Pitfalls

Quality assurance

The quality of education could decline if there is no certainty as to the quality of available MOOCs. The greatest impediment to the successful implementation of MOOCs is thus the aspect of quality control. The current quality assurance system is not designed to accommodate the assessment of individual modules.

The institutional aspects of the quality assurance process could be addressed by embracing initiatives such as the Quality Matters Program. Institutions that have successfully completed the NVAO Institutional Quality Assurance Audit could also be granted a mandate to experiment with MOOCs and digital education. The online format also offers an ideal way of actively involving students in the quality assurance process. Examples include reviews on the platform websites, student evaluations and liquid feedback.

Lack of human interaction

MOOCs and digital education are largely applied in combination with 'physical education', through formats such as the flipped classroom and blended learning. We wholeheartedly support this development. In a parallel development, we are also seeing a debate on the 'unbundling' of education, whereby education no longer takes place at a single location or building, and each component (supervision, contact hours, content) can be purchased separately. Although actual education may still be offered on location, students can then choose to pay for (online) student counselling or additional practice materials. In a far-reaching future development, we may also see the emergence of entirely online education. All aspects of the student's education would then be purchased and completed online.

We would like to take this opportunity to emphasise some of the dangers of any such drive towards fully online and unbundled education. We believe a number of fully online programmes could certainly contribute to the range and potential of higher education. However, a move towards fully online higher education would be a loss for the education sector and students alike. The loss of social interaction, a sense of connection with the physical teaching environment, and the great potential generated when students can actively participate in the opportunities offered by a student city. Although we do not expect these developments to become concrete any time soon, we would like to emphasise the dangers of an excessive focus on digital education.

Conclusion

The digitisation process is advancing at a rapid pace. We believe this development offers potential for the improvement of higher education. MOOCs can help improve quality and accessibility, offering students greater responsibility in shaping their own education. In terms of key potential improvements, we are seeing a move towards more flexible education tailored to the individual student, a more active role for students in shaping and improving their own education, the improvement of educational quality and more clearly-defined institutional profiles. In order to achieve these goals, it is crucial that lecturers are intrinsically motivated to apply these tools, which new lecturers must be frequently exposed to. The intrinsic motivation of both lecturers and students can be significantly increased by actively requesting feedback from students and by involving them in the MOOC development process.

In our view, blended learning currently offers the greatest potential. This format regards MOOCs and digital education as a supplement to physical education, rather than a replacement. This will help maintain the sense of mutual connection between students, the building and the city, while making the most of the aforementioned benefits offered by MOOCs.

Sources

- Coughlan, S. (24 September 2013). Harvard plans to boldly go with 'Spocs'. BBC News. www.bbc.co.uk/news/business-24166247.
- Daniel, J. (12 September 2012). Making Sense of the MOOCs, Sir John Daniel, 12 September 2012 www-jime.open.ac.uk/jime/article/viewArticle/2012-18/html.
- ECA-NVAO Winter Seminar on MOOCs and External Quality Assurance, 11 December 2013. http://www.nvao.net/page/downloads/Presentaties_ECA_NVAO_seminar_MOOCs_dec_2013.pdf.
- HarvardX Set To Launch Second SPOC (17 September 2013). The Harvard Crimson. www.thecrimson.com/article/2013/9/17/kennedy-school-spoc-edx/.
- Introduction to Communication Science UvA, Coursera. www.coursera.org/coursecommscience.
- Many professors are hostile to online education, The Economist , 12 October 2013. www.economist.com/news/united-states/21587820-many-professors-are-hostile-online-education-learned-luddites.
- Education Council (2008). Een succesvolle start in het hoger onderwijs. The Hague.
- Pappano, L. (2012). The Year of the MOOC. New York Times, 2 November 2012. www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?_r=0.
- Quality Matters Program. A National Benchmark for Online Course Design. www.qmprogram.org.
- Veletsianos, G. (2013). Learner Experiences with MOOCs and Open Online Learning. Hybrid Pedagogy. In: http://learnerexperiences.hybridpedagogy.com.

OPEN EDUCATION AND ACADEMIC RANKING

There is much speculation within the open education community as to whether a good performance in the area of open educational resources (OER) and open education will yield a higher position in the rankings. Several institutions certainly hope to achieve this goal. But what is the actual relationship between open educational resources and open education on the one hand and academic ranking on the other?

A high score in the academic rankings is certainly desirable. There are many different types of rankings: the global Academic Ranking of World Universities (ARWU, formerly Shanghai Ranking), national rankings, rankings issued by governments, journalists, students, etc. Some rankings rate an entire university, while others are limited to a specific field. Naturally, these rankings can be based on a large number of indicators. In addition to serving as a useful tool for students seeking to choose an institution, rankings also play an increasingly important role in policy-related, political and financial decision-making processes, and have an increasingly major impact in terms of reputation.

However, the various rankings leave a lot to be desired in terms of comparability. OERs and open education are basically accessible to students from around the world, and require institutions with comparable and transparent quality and reputations. In 2011, UNESCO held a conference aimed at addressing the proliferation of ranking systems and formulating a response to the demand for transparency and comparability as a result of the increasingly globalised higher education system ('Rankings and Accountability in Higher Education: Uses and Misuses'). Europe has since introduced a new system designed to accommodate 'multiple dimensions of excellence within an international context': U-Multirank. Unfortunately, these developments barely reflect the use of OERs and open education, the degree of educational openness or the changing higher education market. In fact, the terms 'open educational resources', 'OpenCourseWare' or 'open education' are not even mentioned in the 'Berlin Principles on Ranking of Higher Education Institutions' or IREG Ranking Audit Rules, which serve as a basis for many modern ranking systems.

Most ranking systems, including the more recent ones, were designed for conventional higher education institutions offering programme-based, closed (campus-based) education in accordance with the traditional model. However, the traditional form of ranking is not suited to the characteristics of a truly open education market. Such a market is characterised by a large number of new providers, collaboration/co-creation between institutions, and collaboration between institutions and corporate parties. We have recently seen the emergence of a growing number of (accredited and non-accredited) programmes comprised entirely or almost entirely of open materials and courses. These programmes may thus contain components sourced from multiple authors and institutions. Employers on the one hand and institutions on the other apply different requirements to the content and quality of open courses and open education programmes.

Some institutions purchase OpenCourseWare or MOOCs from external providers and incorporate them into their own study programmes. We can also identify new categories of learners, such as lifelong learners and self-learners. As of yet, it is unclear which type of ranking these new learners will need in order to accurately gauge the quality of institutions offering open courses or programmes. This development calls for a new type of ranking; furthermore, we have yet to determine the appropriate indicators in this regard.

Developments are currently unfolding at a rapid pace. At the time of writing, it is impossible to predict how the modern (open) higher education market will evolve. This makes it difficult to take any decisions on new, different forms of academic ranking. This may be a good thing: innovation needs sufficient leeway, not restrictive frameworks. One thing is clear, though: open materials and the open education market are certain to impact the way in which we view and apply rankings. For now, the emphasis on quality seems to be directed more towards the various forms of accreditation (a focus on courses or small-sized programmes) rather than ranking (a focus on the institution or an entire curriculum). This, too, may be a good thing.

OPEN EDUCATION AND LEGAL ISSUES: TRENDS AND DEVELOPMENTS

by **Esther Hoorn** and **Robert Schuwer**

The modernisation of European privacy and copyright law is important, but should not impede educational innovation. If we regard law as an open system, we can distinguish a set of standards that regulate higher education and offer room for innovation. This article explores the legal issues surrounding open education, summarises the various points for action in relation to copyright in the European Commission's 'Opening Up Education' programme and their relevance to Dutch copyright law developments. Finally, we will argue that greater transparency on aspects such as sources represents a desirable step on the way to achieving a good balance between open and closed education.

Case study

A lecturer uses a current example to help explain something to his students: a newspaper article or recent scientific publication. His explanation seems to appeal to the students. Then, someone raises their finger: "Do we have to know this for the exam?". A familiar situation for all lecturers offering face-to-face education. The student wants to know what is expected of him, and claims responsibility for his own learning process.

So, how does this process unfold if the learner is independently using open educational resources (OER) or participating in an Massive Open Online Course (MOOC)? Under these circumstances, there is no homogeneous group working towards a final examination. The learner will now adjust his behaviour to reflect his personal learning goals. If the learner can freely choose which skills and knowledge he wishes to acquire, we could also do away with a large portion of current education law. Naturally, this does not apply in the case of combined online and face-to-face education, where the learner seeks recognition for his acquired competencies in the form of exemption from a university course, or situations in which a lecturer is recommending participation in a MOOC as part of his course. In these cases, it will be crucial to identify relevant legal issues at an early stage. The growing integration of social media and data mining applications will inevitably spark new legal issues. Which of these issues will come to the fore once the focus shifts to the needs of the learner – who is no longer necessarily dependant on the range of courses offered by a single institution – and his learning process? This question has become all the more relevant since the launch of the European Commission's 'Opening up education' initiative, aimed at promoting systematic educational innovation and ensuring a balanced mix between face-to-face and online learning solutions.

New legal issues in connection with openness

The rise of MOOCs has broadened the debate on openness. Open educational resources have been clearly defined as educational resources with an open licence, accommodating their reuse. This reflects an idealistic ambition towards global

Esther Hoorn (e.hoorn@rug.nl) works as a lawyer at the University of Groningen. Earlier she was one of the pioneers in the field of ICT in legal education. Since 2005, she has focused on academic information services and evolved into an expert on open access and copyright. In 2007, she was awarded the Victorine van Schaick Prize in recognition of her publication 'Creative Commons for cultural heritage institutions: a Dutch perspective'.

Robert Schuwer (robert.schuwer@ou.nl) works at the Open University of the Netherlands. He has been involved in numerous OER projects at the Open University and other institutions since 2006. He serves as chairman of the core team at SURF's Open Education Special Interest Group.

cooperation on freely available educational resources, offering an alternative to the current commercial model based around exclusivity. However, many lecturers still lack the basic copyright knowledge needed to grasp this potential, while most academic institutions are yet to develop policies in this area (see 'Policies for OER uptake'). Within the context of this mix between open and traditional education, a more broadly-defined vision on openness would offer an opportunity to develop new policies on the basis of concrete questions. This would open up the possibility of using other copyright-protected works instead of traditional learning materials. Such materials could include overviews of mandatory literature and recorded lectures. A transparent online overview of a selection of relevant sources would for example also offer students added value.

In more general terms, transparency and debate on legal issues is key to the process of creating a more open academic education system. As a case in point, FutureLearn, the joint UK MOOC platform, works to bring together the best of the open web as a part of the effort to promote greater openness. The FutureLearn initiative links traditional universities' experiences with open education resources to the experiences gained at Open Universities, whose study programmes tend to emphasise different aspects of openness. FutureLearn applies the following broad vision on open education:
1. content should be open and findable,
2. education should combine the best of the open web,
3. course providers should take part in online debates,
4. content should be accessible on the largest possible number of devices,
5. the earning model and design process should be transparent.

These new perspectives on openness in relation to MOOCs are creating new legal issues. This can be illustrated on the basis of FutureLearn and the aforementioned student's question.

User data and privacy
Back to the question: "Do we have to know this for the exam?". The student is taking an active role in the learning process by asking a question, even though the question in this example may not be particularly inspiring to his classmates or contribute to the substantive debate in the classroom. All data generated by students over the course of this active learning process is stored online. This data also represents a substantial contribution to the MOOC earning model, and can be analysed in order to improve face-to-face education and support students in their learning process. The data can also be sold to companies in search of new staff members. Regulations on

privacy and the storage and reuse of data are becoming increasingly relevant to the education sector.

No specific regulations have been developed for online education. Such regulations will have to be defined on the basis of concrete questions. In order to ensure user privacy, technical solutions will also have to be implemented during the design phase. For example, links to social media platforms for the purpose of displaying a certificate should be designed on the basis of scientific privacy by design research. As with all online content, there is also the issue of legal precedence. For example, European database law authorises institutions that have made substantial investments in a database to reuse data, whereas US law does not feature any such provisions. This is why it is so important to offer the learner a transparent overview of the privacy policies applied by the relevant MOOC platform and education institution. See the text box on the approach applied by FutureLearn.

The FutureLearn platform applies a privacy policy and data protection policy
For example, learners can request an overview of their personal data recorded by FutureLearn for a small fee. FutureLearn also applies a data protection policy which includes the provision that all staff members at partner institutes charged with processing data must receive training on good practices in data protection.

Certification

Students want a clear overview of all mandatory literature in order to prove that they have attained their learning goals by the end of the learning process. Certification and quality control are also crucial to online education. Traditional universities currently still hold a legally enshrined monopoly on the issue of study programme certificates. A growing number of MOOC platforms have incorporated the option of paid certification of participation into their business model. FutureLearn aims to display these informal participation certificates through linkage with existing social media platforms. We know this because the platform has defined design process transparency as a key objective. One MOOC offered through the FutureLearn platform is currently experimenting with the option of taking examinations at a 'real world' exam centre. Major MOOC platforms are exploring collaborations with online testing centres that apply surveillance technology. There is also a need for further debate on the conditions attached to the use of such certificates by certain MOOC platforms. For example, Coursera does not currently seem to allow students to use its certificates for the purpose of submitting an exemption request at traditional education institutions without prior written permission. Here in the Netherlands, the Delft University of Technology is currently experimenting with study programmes that culminate in a 'real world' examination. The Dutch Higher Education and Research Act (Wet op het hoger onderwijs en onderzoek, WHW) already provides a framework for institutions seeking to offer online examinations to students around the world. However, practical implementation of such a measure will require a General Order in Council.

The Ministry's perspective

Legal requirements with regard to contact hours and the location principle – reflected in performance agreements with the individual institutions – are also relevant in this regard. In a letter to the Dutch Lower House of January 2014, Minister Bussemaker indicated that she currently has no plans to introduce new legislation on open and online education in view of the limited amount of available online courses and the existing leeway offered by current legislation. The Minister also wishes to

ensure that current dynamic and innovative developments within the open education sector are not impeded by the introduction of new legislation. However, she does wish to see new developments reflected in the accreditation and inspection process.

More than teaching resources alone

"Do we have to know this for the exam?" The requirements applied by traditional education institutions may be of interest to independent online learners. Universities that are currently still apprehensive about any policies that would basically offer open access to all their educational resources could take an intermediate step by offering access to recordings of lectures and recommendations on sources used as part of the learning process. Formulating clear definitions on learning process expectations can be useful in achieving a good balance between open and face-to-face education. The appropriate mix of open educational resources and other means of support during the learning process will depend on the objectives of the individual MOOC and of the institution through which it is being offered. For example, the University of East Anglia is currently offering the 'Preparing for Uni' course through the FutureLearn platform, an online course outlining the university's expectations of prospective students. The course also focuses on the skills needed to study the recommended literature independently. The availability of online information on the required course materials can help to improve the feasibility of traditional courses. We expect to see future Dutch higher education standards increasingly emphasise this aspect of transparency.

Opening up education' and copyright developments in the Netherlands

This chapter discusses the EU's vision on copyright in the context of its educational innovation agenda, and the potential resulting effects on Dutch higher education.

The European Commission's 2013 policy document on educational innovation is entitled 'Opening up education'. The document underlines existing uncertainty as to whether current copyright law exemptions on permissible reuse offer sufficient clarity for end users. This issue is currently being examined in further detail. In its capacity as financier of research and education through the Erasmus+ and Horizon 2020 programmes, the EU will increasingly require institutions to make their results available for reuse under an open licence. At the same time, lecturers will retain their freedom to recommended traditionally published sources or OER. Partnerships (such as alliances between lecturers, publishers and ICT companies) will be promoted to offer a broader range of higher quality open educational resources and develop new business models and technical solutions providing end users greater transparency on copyright and open licences. Member States will also be encouraged to extend open access policies to publicly funded educational materials. Governments should promote the use of digital teaching materials and OER at every level. At the same time, this agenda also represents the start of a learning process for the EU. An European Commision initiative to offer open access to publicly funded education materials will be assessed in order to determine the resulting economic and social impact. Copyright holders, education institutions and other stakeholders in the education process will be consulted in order to explore the current practice and quantify demand for more intensive sharing.

European policy explicitly mentions the lecturer's freedom of choice in terms of source materials. Dutch law enshrines the duty to ensure academic freedom in the WHW (Louw, 2011). Lecturers or researchers may submit a complaint to their institution if they feel institutional policies are encroaching on this freedom. Some authors believe institutional copyright guidelines have the potential to endanger academic freedom. As a result, the Netherlands is seeing a debate unfold on the

ownership of publicly financed research and education. In a 2013 article in a Dutch periodical for legal professionals, Dirk Visser and Charlotte Vrendenbarg argued that the development of MOOCs is subject to presumption of transfer to the developer, based on a regulation in the copyright act about motion pictures. As a result, institutions would have – at minimum – control over the availability of educational resources when developing a MOOC. Nevertheless, the authors recommend that MOOC developers reach supplementary agreements with lecturers on the reuse of MOOC components in a different context. Potential agreements between the MOOC platform and institution are also relevant in this regard. In supplement to European policies, institutions can also offer more clarity and promote collaboration on open educational resources by means of further recommendations and agreements.

As regards traditional reuse of copyright-protected research and education materials, libraries enter into international agreements with publishers. Students also individually purchase educational materials. Contrary to Anglo-American copyright systems, the continental-European Dutch copyright system does not have a broad fair use exception, but an array of specific exceptions. Contrary to the specific exception for the education sector, reuse that is potentially subject to Dutch exception for citation will not require payment of any fees. However, this exception is subject to the condition to mention the relevant source. This provision can also be of interest to students in cases where - for example - an illustration or film clip is used in a presentation. In order to facilitate a flexible attitude towards reuse and user-generated content within the Dutch legal framework of exceptions, a recent recommendation suggested the establishment of a copyright hub based around the British model (Gerkens, Rutten & Quaedvlieg, 2013). A procedure for the joint formulation of best practices combined with expert recommendations on the applicable legal framework could then be introduced for the education sector.

Dutch copyright law also contains an exception for the education sector. This exception is subject to the payment of fair compensation. Institutions and publishers have an agreement on the incorporation of short excerpts for teaching purposes based on this exception, which is not effectively tailored to the specifications of online education (Guibault, 2009). These agreements currently involve the payment of a settlement which applies exclusively to reuse within a closed learning environment. The stakeholders agree that this settlement amount could be reduced if the academic world continues to move towards open access. With a view to this development, the institutions and publishers want the freedom to control the nature and scale of reuse for educational purposes. This can be achieved through verification within the closed learning environment or a provision instructing lecturers to publish their literature sources online. As regards the reuse of scientific articles, the selection process of a teacher will serve as the link between scientific research and education. The selection of source materials will then serve as an indication of the scientific significance of the relevant authors' contributions. Ensuring the open access availability of such articles is the most effective way of facilitating their recommendation for open education purposes. This will help to promote both educational innovation and a shift towards open access . Amongst other strategies, European recommendations on open access policy suggest an effort to identify new incentives for promoting and rewarding a culture of online sharing. This could be achieved by ensuring that reuse in online teaching materials is measurable, as Paul Wouters of the CWTS recently suggested in an interview with the NRC newspaper (2013). The reuse of open access articles and freely available learning materials under open licence could also be promoted in this regard in an effort to control costs. Open education should also be promoted by offering lecturers more incentives to contribute to the free online availability of knowledge, within the confines of the law. According to the principles of good scientific research and education, the source of all applied knowledge must be verifiable, even when transmitted orally.

The Association of Universities in the Netherlands' (VSNU) Code of Conduct (2012) specifies that all educational materials - even those transmitted in oral form - must state their source or origin. In online terms, the software used to record lectures could thus be required to feature the necessary functionality in order to present links to the relevant sources. In response to the Inholland University of Applied Sciences incident, the WHW now features a provision specifying that the actual teaching format must be recorded in such a way that students can derive rights from this information. Institutions are currently considering the option of featuring a course guide in their teaching and examination regulations. The online publication of key sources would reflect the spirit of this law.

Conclusion

In order to promote the systematic innovation of education through ICT, it is important to identify interfaces with the relevant legal preconditions and explicate the implicit norms on the sharing of knowledge applied in the higher education sector. As this article emphasises, this should not be limited to copyright issues.

Sources

- European recommendations on open access policy: http://ec.europa.eu/research/science-society/document_library/pdf_06/recommendation-access-and-preservation-scientific-information_en.pdf.
- European 'Opening up Education' programme. http://openeducationeuropa.eu/nl/initiative.
- FutureLearn. www.futurelearn.com/about/our-principles.
- Gerkens, A., Rutten, P. & Quaedvlieg, A. (2013). Flexibel auteursrecht: samen op weg naar oplossingen. www.voice-info.nl/assets/voice/rapport%20flexibel%20auteursrecht%20-%20samen%20op%20weg%20naar%20oplossingen_26.11.2013.pdf. Also see: www.copyrighthub.co.uk.
- Guibault, L. (2009). Auteursrecht en open leermiddelen. Study commissioned by the 'Promoting the use of Digital Learning Materials' steering group. www.ivir.nl/publicaties/guibault/auteursrecht_en_open_leermiddelen.pdf.
- Louw, R.G. (2011). Het Nederlands hoger onderwijsrecht: een thematisch commentaar op de Wet op het hoger onderwijs en wetenschappelijk onderzoek (dissertation at Leiden University). https://openaccess.leidenuniv.nl/handle/1887/17700.
- Poerup – Policies for OER Uptake. www.poerup.info.
- Visser, D. & Vrendenbarg, C. (2013). Net als in de film. Massive Open Online Courses (MOOC's) en auteursrecht, Nederlands Juristenblad, issue 42, p.2912-2919.
- VSNU (2012). De Nederlandse Gedragscode Wetenschapsbeoefening Principes van goed wetenschappelijk onderwijs en onderzoek. www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsbeoefening_2004_(2012).pdf.
- Wouters, P. (2013, 7 December). Wetenschapsmeter wil niet meer botweg wetenschap meten. NRC Handelsblad.

XYOC: MOOC VARIANTS

A large number of MOOC variants were developed over the course of 2013, all of which consisted of online courses. The section below features an overview of these courses, with links to the relevant websites for those in search of further information. This intermezzo is based on the blog post entitled 'MOOC and its variants: a jungle?' (http://robertschuwer.nl/blog/?p=721)

Acronym	Meaning	Reference
MOOC	Massive Open Online Course	http://en.wikipedia.org/wiki/Massive_open_online_course (this description is regularly updated)
mOOC	Micro Open Online Course	Mini courses, offered by OER University: www.oeruniversity.org www.scienceguide.nl/201311/na-moocs-nu-de-mooc.aspx.
SPOC	Small Private Online Course	Online course, often closed (enrolment is limited to the institution's own, paying students) www.bbc.co.uk/news/business-24166247.
SOOC	Selective Open Online Course	SPOC, without restrictions in terms of the number of enrolments, but based on a selection process designed to limit the number of participants. Also referred to as an SPOC. http://etcjournal.com/2013/09/26/spocs-are-mooc-game-changers/.
DOCC	Distributed Open Collaborative Course	MOOC in which participants collaborate on the basis of distributed expertise. Very similar to the cMOOC. http://moocs.com/index.php/from-mooc-to-docc-new-directions-in-open-online-education
LOOC	Local Open Online Course	Derived from a MOOC, but offered online to the institution's own student community; may be adjusted. Not available outside of the community. www.ecampusnews.com/around-the-web/loocing-future-digital-learning.
MOOR	Massive Open Online Research	MOOC with a substantial research component. For example, participants may be offered the opportunity to contribute to ongoing research projects during the course. www.technoduet.com/mooc-spoc-moor-and-the-walking-dead-the-journey-continues.
ROOC	Regional Open Online Course	MOOC with a regional appeal, reflected in the language used or the specific cases. Regarded as a MOOC application for higher professional education institutions. http://blog.han.nl/hanicto/van-mooc-naar-rooc/
HOOC	Hybrid Open Online Course	MOOC with an intensive focus on student participation. This may vary from mixed classes with students also taking the on-campus version of the course, or the delegation of supervision tasks to active participants. www.universitybusiness.com/article/course-connections-new-mooc-phase-student-engagement.
COOC	Classically Offered Online Classes	Online course that seeks to emulate the classroom-based approach. The actual extent of this course's openness is unclear. www.nebhe.org/thejournal/coocs-over-moocs/.

Donald Clark formulated a MOOC taxonomy applying the relevant didactic approach as a starting point: http://ticeduforum.akendewa.net/actualites/donald-clark-taxonomy-of-8-types-of-mooc/. This taxonomy does not include the gMOOC (Game-based learning MOOC) or rgMOOC (Rhetoric game-based MOOC). These can be found at: www.slideshare.net/autnes/gmooc-and-rgmooc-theory-and-design.

SURF