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Version: Version of Record

Link(s) to article on publisher's website:

http://oasis.col.org/bitstream/handle/11599/2362/2016_Guidelines-QAA-MOOCs.pdf?sequence=6&isAllowed=y

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Guidelines for Quality Assurance and Accreditation of MOOCs

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COMMONWEALTH *of* LEARNING

The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to promote the development and sharing of open learning and distance education knowledge, resources and technologies.



Commonwealth of Learning, 2016

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Guidelines for Quality Assurance and Accreditation of MOOCs

Version 1

ISBN 978-1-894975-82-7



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Acknowledgements

COL acknowledges with thanks Professor Allison Littlejohn (The Open University, UK) and Dr Nina Hood (University of Auckland, New Zealand) for the research and drafting of the guidelines. We also thank the participants in the Delphi study, conducted whilst these guidelines were being developed. Thanks are also due to Adam Brimo (OpenLearning.com, Australia), Dave Cormier (University of Prince Edward Island, Canada), Stephen Downes (National Research Council Canada), Professor Mohamed Amin Embi (Universiti Kebangsaan Malaysia), Dr Rebecca Ferguson (The Open University, UK), Professor Rozhan M. Idrus (Universiti Sains Islam Malaysia), Professor Paul Kawachi (Japan), Professor Mangla Sunder Krishnan (Indian Institute of Technology Madras, India), Associate Professor Dr Woo Tai Kwan (Open University Malaysia), Dr Sanjaya Mishra (Commonwealth of Learning, Canada), Professor John Arul Phillips (Asia eUniversity, Malaysia), Dr K. Rama (National Assessment and Accreditation Council, India), Dr Nurbiha A. Shukor (Universiti Teknologi Malaysia), Nigel Smith (FutureLearn, UK), Associate Professor Dr Nantha Kumar Subramaniam (Open University Malaysia), Associate Professor Safiah Binti Md. Yusof (Open University Malaysia) and Nurkhamimi Bin Zainuddin (Universiti Sains Islam Malaysia) for their active participation in the two-day Expert Meeting held in Kuala Lumpur, Malaysia, 2–3 May 2016 to finalise the guidelines.

Foreword

There has been a growing interest in massive open online courses (MOOCs) amongst governments, policy makers, higher education providers — both public and private — and development agencies supporting education, ever since the first Canadian offering of an online course that drew over 2,000 students to enrol for free. MOOCs, which started as simple online courses with large enrolments, have developed into a significant innovation to increase access to lifelong learning for all. The fact that there were more enrolments in MOOCs in 2015 compared to the previous three years combined indicates that MOOCs are here to stay. However, there are unresolved questions about the acceptance of MOOCs towards formal credits and qualifications. Whilst a majority of MOOC providers are not yet prepared to grant credits for completed courses, some higher education institutions, such as Georgia Tech, have taken the initiative to offer full programmes using the MOOC approach. MITx is offering a MicroMasters programme that provides credits which can count as a semester for a residential master's programme in that institution. Recently, the BBC reported that FutureLearn online courses will “provide credits towards a University of Leeds undergraduate degree.” The Malaysian Qualifications Agency has developed a credit transfer framework for Malaysian MOOCs. The University Grants Commission in India is considering the development of regulations to provide credits for MOOCs which will allow them to comprise up to 20 per cent of the total credits for a programme of study.

At the heart of credit equivalency is the issue of “quality.” Offering credits for MOOCs provides a new opportunity for open and distance learning institutions as well as for face-to-face teaching institutions to embrace new technologies to increase access. At a time when over 60 per cent of the population in the Commonwealth is under 29, the demand for skills and higher education is greater than ever before, and creating more brick-and-mortar institutions is not an economically viable option. MOOCs can be a valuable bridge between higher education and the growing demand for employability. Therefore, it is important to raise awareness about and improve the quality of MOOCs by adhering to certain guidelines.

Realising the importance of assuring the quality of MOOCs, and responding to stakeholders' requests for quality assurance and accreditation guidelines for MOOCs, the Commonwealth of Learning (COL) developed this document in consultation with several experts in the field. Whilst the field of MOOC quality

assurance is still emerging, expert consultations led to a better understanding of how the quality and integrity of MOOCs can be assured. COL developed a separate document, entitled *Quality in MOOCs: Surveying the Terrain*, to provide an in-depth analysis of quality issues.

Based on wide consultations and surveys, this publication aims to assist the four key stakeholders — governments, MOOC providers, learners and accreditation agencies — with clear guidelines on how to assure the quality of MOOCs. As such, this document is not prescriptive and urges stakeholders to develop their own quality measures after having gained a clear understanding of MOOCs. For accreditation agencies, though, it provides a quality checklist. We believe that these Guidelines will be useful for thinking about the purpose and quality of MOOCs, taking meaningful decisions to improve quality and offering credits towards formal qualifications.

MOOCs are an emerging field that encourages us to review current practice and imagine creative futures. We hope this document will not only generate discussion and debate but also encourage us to collaborate and to learn from one another. I look forward to your comments and suggestions for the next version of these Guidelines.

A handwritten signature in black ink, appearing to read 'Asha Kanwar', written in a cursive style.

Asha S. Kanwar
President and Chief Executive Officer
Commonwealth of Learning

Introduction

1.1 Purpose of the Guidelines

Massive open online courses (MOOCs) have emerged as an educational innovation with the potential to increase access to and improve the quality of education. The generic name for MOOCs emphasises their commonalities of scale (massive), economic/philosophical perspective (open), location (online) and structure (course). MOOCs are viewed by governments across the Commonwealth as a way to extend access to higher education for numerous groups:

- People who cannot participate in campus-based education because of their geographic location (for example, people living in remote areas where travel is difficult).
- People with a disability.
- People who have other responsibilities (such as caring for children or elderly family members) that reduce or negate their ability to be on campus.
- People who cannot afford university fees or who have to work and generate income alongside their studies.
- People who would prefer to study online or part-time rather than make the commitment to full-time, on-campus study.
- Learners who do not have access to good-quality teaching.
- Those who already have a higher education qualification but would like to extend their experience at that level.
- Those who have not successfully gained enough credits at a lower level to be able to access conventional university programmes.
- People who would like to gain experience in studying at this level before committing to a conventional university course.

Different stakeholders in education view MOOCs from different perspectives. However, there are common questions related to the quality of these courses and to the granting of equivalent credits. This document provides a set of guidelines designed to support decision making about the sorts of quality measures that are appropriate in different contexts. These MOOC Quality Guidelines can be

used by governments, accreditation agencies, institutions and learners with an interest in developing, running, accrediting or participating in MOOCs, to improve quality assurance (QA) and accreditation. The guidelines are structured around a framework pointing to a variety of quality instruments, indicators and rating mechanisms that can be used to measure quality in MOOCs. These guidelines are designed to operate as a supporting tool. They do not provide answers or a coherent set of robust measures that may be employed to assess quality in MOOCs. Rather, they highlight various high-level dimensions that different actors can consider when approaching discussions of quality and quality assessment in MOOCs. Users of the guidelines therefore need to engage their qualitative and critical judgement to apply the ideas and concepts being raised to their particular context and purpose. The guidelines are intended to prompt and promote critical reflection around issues and questions related to the quality of MOOCs, and to result in informed practice.

1.2 Guidelines Development Process

In order to develop the guidelines, Professor Allison Littlejohn and Dr Nina Hood worked together to review the existing literature and practices relating to MOOCs. This resulted in the document *Quality in MOOCs: Surveying the Terrain*,¹ which identified a range of issues and contradictions in quality measures developed from different perspectives. The review used John Biggs's framework to categorise the various dimensions of quality in MOOCs under three broad headings: Presage, Process and Product. They continued the exploration of quality issues with a group of 17 experts in three rounds of a Delphi survey to identify and delineate a set of quality guidelines for different stakeholders. Results of the survey indicated that quality measures depend on the purpose of the MOOC, which may vary depending on the perspective of the stakeholder. For example, governments are likely to be more concerned with the product or outcomes of learning. Conversely, institutions and instructional designers are more likely to focus on the variables before learning, such as content and instructional design. Learners will be more concerned with their learning experience during the learning process. Once a draft guideline was prepared based on the literature review and the surveyed experts' views, we organised a two-day face-to-face meeting with a group of experts, in Kuala Lumpur, Malaysia, held 2–3 May 2016; the aim was to discuss different scenarios of quality from the points of view of different stakeholders, and to share the practical experiences of MOOC developers, governments and QA agencies. Based on the comments and discussion at this meeting, the present guidelines were refined and shared.

We consider this a work in progress, as the field of MOOCs is constantly changing for the better, and new opportunities and mechanisms continue to emerge.

1 <http://oasis.col.org/handle/11599/2352>

As these guidelines were being developed, two important findings surfaced:

- Many courses branded as MOOCs are neither massive nor open; instead, they are online distance learning courses, so the established quality measures for online distance education should be used to assess them.
- For courses that are truly massive and open, quality measures should shift from the perspective of the state or institution towards measures aligned with the learners' goals. We appreciate that quality is a form of power and influence used to drive forward explicit opportunities (such as opening access to education and/or improving learning) and tacit agendas (for example, reputation and/or control over the trajectory of education). We therefore recommend that stakeholders reflect on the application of these guidelines and consider how they might focus on learners' perspectives.

1.3 The World of MOOCs

In higher education there is a general consensus as to the overarching purpose of a course or programme. However, there are broad perceptions of MOOCs, which are defined as open access courses in which anyone can participate free of charge, irrespective of their prior experience. The original MOOCs were designed as networks connecting large numbers of people so they could learn from each other and from expert “instructors.” In these networks, learning is self-driven by the learner.

At a meeting of MOOC experts in Kuala Lumpur, Malaysia, on 2–3 May 2016, Stephen Downes described the hallmarks of a MOOC as “autonomy, diversity, openness, interactivity.” According to Downes: “These are the conditions for a constructive dialogue and are thus the design principles for a MOOC.” Other experts at the meeting described MOOCs as online courses presented as sequences of video lectures for students who are registered in university courses. These courses may not be open or massive in scale, and the learning pathway is driven by the instructor. Such courses could better be described simply as online courses. In between are MOOCs hosted (most often) by platform providers. These MOOCs tend to have a structured learning pathway as well as start and end points. They also tend not to focus on network interactions to the same degree as original MOOCs. Their advantage is that the learner has a structured environment in which to learn and does not have to regulate his or her own learning. However, all the advantages of learning and knowledge building in networks are reduced.

The largest MOOC providers are Coursera (USA), edX (USA) and FutureLearn (UK). These platforms partner with universities and other organisations to provide MOOCs worldwide. Other platform providers include OpenLearning² (based in Australia) and Peer 2 Peer University³ (P2PU, based in the USA).

² <https://www.openlearning.com/>

³ <https://www.p2pu.org/en/>

To assure quality as well as the transferability of earned credits, the major MOOC providers provide accreditation of the courses in a number of different ways:

- Udacity offers Nanodegrees,⁴ whereby students can select short courses and earn micro-credentials (i.e., much smaller than what are required for a full degree).
- Coursera's Specializations⁵ programme offers accredited degrees.
- edX's Xseries⁶ offers professional certificates of achievement.
- FutureLearn's Programs⁷ allow learners to earn professional accreditation or academic credit that can be used as credit transfers to shorten the length of time (and cost) of a university degree.

For many proponents of open education, a MOOC does not have to be either accredited or facilitated by a university. Indeed, the United States Government, the World Bank, the American Museum of Natural History, the Museum of Modern Art (New York), Google and AT&T are some of the many non-university organisations that have run successful MOOCs to provide open and free access to learning experiences. However, some universities in India and Malaysia are designing MOOCs with a different purpose. These MOOCs are part of accredited degree courses, and students may engage as part of their university degrees.

Radically new ways to connect with instructors are emerging, wherein learners connect to a central hub using a mobile app that then connects them with a tutor or other forms of help from around the world, a tracking system enables fees to be charged and transferred between the student and the tutor, online assessments verify the learner's identity, competence and skills, and a blockchain system records each transaction so that the student has a verified set of qualifications associated with him or her.

Clearly, governments, institutions and learners may regard MOOCs and their purposes from different perspectives. These diverse views disrupt conventional QA methods.

1.4 Scope of the Guidelines and Usage

Two main factors influence how we might assess the quality of a MOOC: purpose and perspective. By *purpose* we mean the reason(s) the MOOC has been developed and facilitated. By *perspective* we mean who is measuring the quality. These two factors are intrinsically linked. From a university perspective, investing in setting up and running a MOOC in, for example, Clinical Trials, may be a worthwhile investment if it serves the purpose of extending global reputation. But for a learner, the purpose of participating in the MOOC could be to network with other students. The university may measure quality by

4 <https://www.udacity.com/nanodegree>

5 https://www.coursera.org/featured/top_specializations_locale_en_os_web

6 <https://www.edx.org/xseries>

7 <https://www.futurelearn.com/programs>

monitoring the scale and reach of the students — so, if the MOOC has over 25,000 participants from 46 countries, it could be viewed as high quality. However, learners may find it difficult to connect with other students on the MOOC platform. For this reason, the MOOC will appear low quality to them. This link between purpose and perspective makes the measurement of quality challenging.

The present *Guidelines for Quality Assurance and Accreditation of MOOCs* have been developed to guide the selection of quality metrics by four stakeholder groups: governments, accreditation bodies, institutions and learners. There are two stages for using the guidelines. The first stage involves identifying the purpose(s) of the MOOC from the stakeholders' perspectives. In the second stage, stakeholders are encouraged to reflect on the metrics that will determine whether that purpose has been achieved. A range of quality metrics, associated with different stages of learning (before, during or after MOOC creation and participation), is provided in Appendix 1. Each of the stakeholder groups is likely to be interested in different stages of the learning process and different measures.

Appendix 1 presents a range of metrics that can be used to measure quality at different stages of the MOOC lifecycle — before, during or after learning. We have grouped these measures as follows:

- Presage metrics are used to measure quality before learning. Typical metrics include instructional design quality and media quality.
- Process metrics measure quality during learning. These metrics are not as well developed as presage metrics but offer real insight into whether the MOOC supports learning.
- Product metrics measure quality after learning. Typical measures include completion rates or employment statistics. These metrics are commonly used in conventional, campus-based education, but they are less useful for MOOCs.

In order to understand the different metrics used in the presage, process and product categories, we recommend users of the present guidelines to read the COL publication *Quality in MOOCs: Surveying the Terrain*.⁸

It is important to note that quality measures are distinct from accreditation and should be treated separately. The accreditation checklist in Appendix 2 prompts quality accreditation agencies to consider quality strictly from an accreditation perspective.

8 <http://oasis.col.org/handle/11599/2352>

Guidelines for MOOC Stakeholders

2.1 Guidelines for Governments

Participation in higher education and ongoing professional development and learning are increasingly essential for success in the labour market. In the move away from training people for jobs for life to enabling people to upskill and learn continually, there is a need for diversity in opportunities and forms of learning. Governments must consider how both “conventional courses” and other forms of learning can be developed and used to meet growing educational needs.

MOOCs are re-operationalising traditional concepts in education. Whilst they draw on elements of existing educational and learning models, they represent a new approach to instruction and learning. These changes that MOOCs represent require a shift in mindset and culture in order to extend new learning opportunities beyond conventional designs. The unique features of MOOCs, such as their scale and openness, challenge the parameters of learning (and education) through both the flexibility of their offerings and their ability to be utilised by governments (and other institutions) for a range of purposes.

Given these contexts, it is suggested that governments:

- *Support a strategic commitment to reforming quality control.* This involves taking a broad view of quality in open, online learning, considering all dimensions (massive scale, openness, online and student learning).
- *Encourage institutions to measure a broad range of MOOC quality metrics.* These should incorporate presage, process and product variables that are specifically developed to reflect the dimensions of MOOCs.
- *Develop new quality infrastructures that take different perspectives on learning into consideration.* Quality can be operationalised as a mixture of “perspectives” (e.g., learners’ perspectives) from those who measure/assess/evaluate quality, and of “variables of quality” (e.g., instructional design quality), as things that are to be assessed/evaluated/measured. These different perspectives are important as education diversifies and opens up.

- *Develop new quality infrastructures that support a variety of organisations and learning opportunities.* In formal education, quality is relatively simple to determine, since learners commit up front by enrolling in, and paying for, a degree programme; they clearly signal that they intend to complete all the component parts, and they wish to be awarded a degree at the end of their programme of study. MOOCs are inherently different. The “open” aspect means that very little (or no) commitment is demanded up front. This has led to different types of learner engagement and learner motivations. As the needs of learners and opportunities for learning evolve, there must be support for private, public and professional bodies as well as civil society organisations to increase their involvement in learning in a way that ensures and maintains quality learning opportunities for all learners.

The starting point for MOOC QA is to consider the purpose of a MOOC. There are three broad reasons governments may support the introduction of MOOCs: (i) MOOCs offer the potential for far-reaching effects — for example, they can increase public awareness of a topic; (ii) MOOCs can be used to improve professional practice and skills; and (iii) MOOCs can increase access to education and have the potential for institutional reputation enhancement as well as global impact around education. Each of these purposes requires a distinct form of QA, and QA measurements can be mapped against each one, as illustrated in the examples below.

Example One: A MOOC designed to increase public awareness

Quality assurance in MOOCs designed to *increase public awareness* will focus primarily on variables that can be measured prior to learning (i.e., presage variables), including content and instructional design.

In 2016, the London School of Hygiene and Tropical Medicine ran a MOOC on the Zika virus, hosted by FutureLearn. The UK government wants to improve public understanding of the virus worldwide. QA measures should therefore be focused on presage variables, including specific examination of the accessibility of the MOOC for people from diverse demographics. Presage variables and instruments are illustrated in Appendix 1. In relation to this example, we recommend that QA be measured using the MOOC CourseScan Instrument developed by Margaryan and colleagues.⁹

Example Two: A MOOC designed to improve skills and/or professional practice

Process variables (i.e., factors during learning) are more useful for measuring the quality of MOOCs designed to *improve skills and/or professional practice*.

⁹ Margaryan, A., Bianco, M., & Littlejohn, A. (2014). Instructional quality of massive open online courses (MOOCs). *Computers and Education*, 80, 77–83. doi:10.1016/j.compedu.2014.08.005.

The Evidence-Based Midwifery Practice MOOC¹⁰ was run in 2015 by a network of midwifery practitioners based in Denmark and Australia. These midwives wanted to enable professionals to share ideas from their professional practice with other people around the world, building a network of midwives and supporting them in collaboratively developing new ideas for their practice. Health agencies could measure the quality of the MOOC by focusing on how midwives engaged with the course resources, instructors and other participants during the course. They could use a number of pre- and post-questionnaire instruments designed to measure learning. The initial QA could be followed up five years later with an “impact in five years” measurement, run by health organisations.

Appendix 1 includes a number of process variables and instruments that can be used to measure quality.

Example Three: A MOOC designed to promote the reputation of a university

MOOCs designed for promotional purposes can be quality assured using product variables that measure learning outcomes. These output measures include the number of students enrolled in the course, which signals the number of people who are, as a result of the MOOC, more likely to be aware of the university’s research.

The MOOC The Discovery of the Higgs Boson,¹¹ offered by The University of Edinburgh, which features Professor Peter Higgs, promotes UK universities as world class. QA can be measured through impact assessment focusing on the product, as well as through process measurements, including pre-post MOOC surveys measuring learning gains. Other types of product variables, and instruments for measuring these, are described in Appendix 1.

The guidance process illustrated through these three examples is provided in Fig. 1. We suggest you use a blank template and plan your own quality measurements as follows:

1. **Define the purpose(s) of your MOOC.** The MOOC may be intended to enable people to improve general knowledge about a subject, to support people in developing skills or professional knowledge, or to promote a university or department.
2. **Decide whether you will focus on presage, process and product variables to measure quality.** The purpose of the MOOC will define the metrics that can be used to measure quality. For example, if the purpose of the MOOC is to improve general knowledge about a subject, then use presage metrics that can be measured prior to learning (see Appendix 1).

¹⁰ <http://www.moocformidwives.com/>

¹¹ <https://www.futurelearn.com/courses/higgs>

These metrics can include instructional design quality, media quality or even the role the instructor will play in the MOOC.

3. **Select the specific quality variables and instruments you will use.** Examples of presage, process and product variables and instruments can be found in Appendix 1.

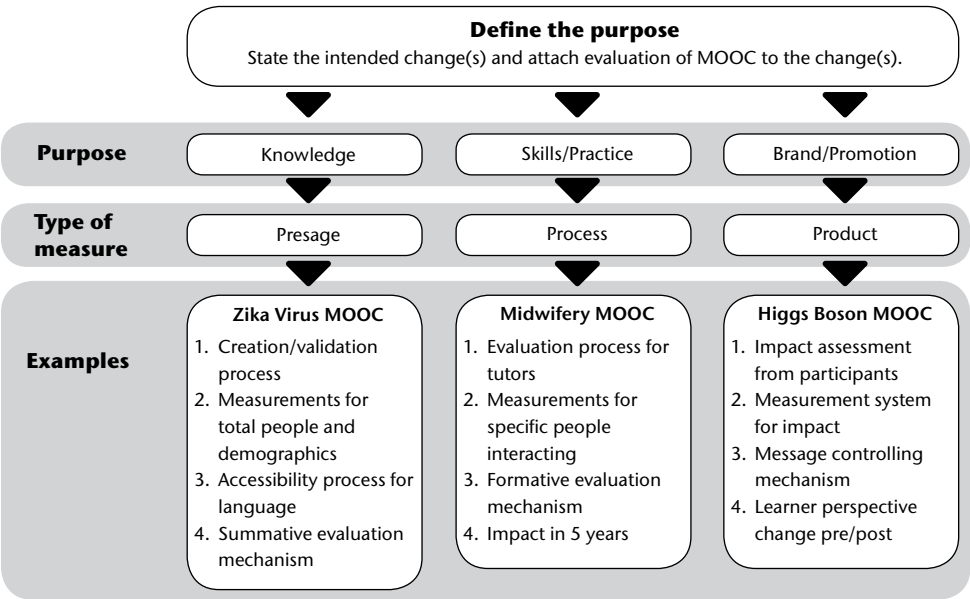


Fig. 1. Steps in deciding quality metrics for governments.

2.2 Guidelines for Institutions/MOOC Providers

Many university educators and educational institutions have limited knowledge of how to develop quality MOOCs but would like to do so.

MOOCs provide new opportunities for educational institutions to increase access to education, improve visibility and reputation, and generate additional revenue/income. Enrolments in MOOCs are open and flexible, resulting in learners with diverse motivations and goals, and with highly variable patterns of engagement. The curriculum in MOOCs is not always static, incorporating — both by design and through differing modes of learner engagement — a range of learning opportunities and pathways, which individual learners are able to self-select and independently navigate. Successful learning in MOOCs increasingly is learner driven and determined.

Given the unique features of MOOCs, which challenge many traditional parameters of learning (and education), institutions need to reorient their approach to measuring quality.

Therefore, it is suggested that MOOC providers:

- *Consider the purpose of the MOOC from various perspectives.* From the institution's point of view, the purposes can range from offering free education to positioning the university as a leader in a niche disciplinary area.
- *Employ a range of measurements.* This requires consideration of the assumptions underpinning quality measurements. These gauges should extend beyond the narrow concentration on quality measures focused on content, completion or media, to include measures of cognitive, affective and behavioural evaluations of student learning.
- *Select relevant quality measures.* Rather than applying "standard metrics," practitioners should focus quality measures on the specific dimension of interest. However, it also is important that in doing so, they engage with enough measures to provide a well-rounded and robust assessment of quality and encompass measures on the specific dimensions of interest around presage, process and product variables that are aligned with the dimensions of MOOCs (i.e., massive, open, online, course).

Fig. 2 identifies dimensions of quality, categorised by presage, process and product measures, to help institutions develop individualised approaches to continuous QA processes. The dimensions are generalised; however, they may be used in conjunction with the information in Appendix 1, which identifies specific measures or tools for assessing quality.

Presage dimensions relate to the steps institutions should take prior to and throughout the process of developing a MOOC. These dimensions establish the strategic framework for the development and implementation of the MOOC in an institution. To ensure quality, MOOC providers/institutions:

- *Identify the **purposes*** for creating and running a MOOC. Subsequent quality processes will relate closely to these purposes. Multiple purposes are possible. Identifying and differentiating primary and secondary purposes is important and requires reflection by relevant individuals at the institution.
- *Establish **key performance indicators (KPIs)***, the metrics that will be used to evaluate the quality and success of the MOOC.
- *Consider the **resources*** — financial, material, technological and human — required to develop and run a MOOC. Resource allocation has implications for presage, process and product variables, as well as the longer term sustainability of the MOOC.
- *Take a systems level approach to MOOC development*, which allows institutions to explore how the MOOC can **cross-align** with other activities, as well as how it is positioned in relation to the institution more generally.

- *Consider* the overall design and structure of the MOOC during the planning and development stages. Design issues may include the employment of tools and resources, pedagogical approaches, assessment and feedback opportunities. **Instructional design** provides a way for assessing the teaching and learning opportunities offered by a MOOC. Instructional design frameworks can operate as course self-evaluation tools for instructors and institutions, as road maps for designing a new course, or as a way of retrospectively measuring the teaching and learning opportunities offered in a MOOC.
- *Develop* an **evaluation plan**. This could enable the continuous evaluation and iterative improvement of the MOOC during the teaching and learning process, as well as a summative evaluation. To achieve a balanced view of MOOC quality, it is critical to have any evaluation plan employ a range of measures.

Process dimensions identify steps that institutions should undertake during the running of a MOOC. To ensure quality, MOOC providers/institutions should do the following:

- *Monitor* the **learning activity and behaviour** of MOOC participants. New technological tools are being developed to provide real-time feedback to instructors and institutions about learners and learning, and to support the collection of both individual and cohort-level data. Institutions should consider how they might utilise these new technologies, in conjunction with other, more traditional, methods, to monitor the learning process.
- *Develop* systems for analysing and acting on the data collected about learning, to **continue improving** the MOOC.
- *Use* data and feedback to provide ongoing **support and guidance for staff**.

Product dimensions allow institutions to assess and report on the performance of the MOOC, and should relate closely to the presage and process dimensions and measures they have employed. To ensure quality, MOOC providers/institutions should do the following:

- *Collect* **KPI data** and report to stakeholders. Depending on the KPIs identified prior to the development of the MOOC, a range of data connected to presage, process and product variables might be applicable. Appendix 1 provides some tools and measures that will help institutions collect the necessary data.
- *Undertake* **SWOT analysis** (examining strengths, weaknesses, opportunities and threats) by engaging key personnel involved in the MOOC to learn from their experiences and support future planning and development.

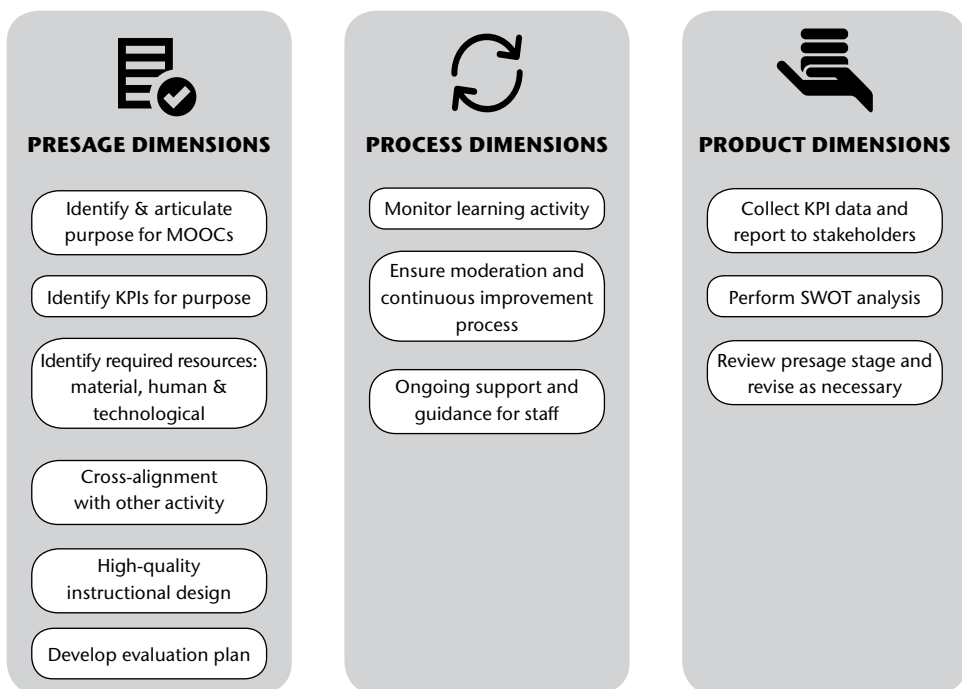


Fig. 2. Quality dimensions for MOOC providers.

2.3 Guidelines for Learners

MOOC learners exhibit diverse types of engagement and motivations. Successful learning in MOOCs is often learner driven rather than being determined by the institution. This means that traditional quality measures — focused on outcome variables and adhering to a pre-established, static standard — are of limited relevance to MOOCs. A more useful way of measuring quality is to have learners determine the quality of their own learning and participation outcomes in relation to their self-identified goals.

Purpose/goals/motivations

Learners have many reasons for participating in a MOOC, with individual learners often having multiple, and mutable, motivations. Reasons range from career advancement to meeting new people, engaging in part-time or distance study, or satisfying personal interest and enjoyment (Fig. 3). When a student joins a MOOC, he or she will make a decision about its quality based, in part, on other learners in it. This means that the quality extends beyond the course resources or instructors to include dimensions such as the associated network of other learners.

Means of realising motivations

Quality can be signalled through the means by which learners realise their motivations for participating in the MOOC. Means may include achieving a certificate, finding a new position or building a network to satisfy general interest, self-satisfaction or self-actualisation. The learner may (or may not) be interested in gaining a course certificate and/or networking with the other participants.

Measures

In this context, measures are the dimensions that learners may use to determine whether they have achieved their goals. Measures include but are not limited to:

- a recognised certificate;
- a path to employment;
- résumé building;
- developing new competencies, skills and knowledge;
- gaining access to a community of practice;
- sharing knowledge;
- being given access to a wide selection of learning resources;
- flexible entry to learning;
- minimal cost for learning;
- connecting with large number of learners; and
- opportunities for socialising.

It is important to note that individual learners need to be motivated and to have the confidence and capability to attain their goals. We do not expect learners to achieve the same goals in all instances, because some goals are not elements of specific MOOCs.

In all cases, the learner may acquire new knowledge, some of which might not be part of the MOOC curriculum — in fact, the subject matter of the MOOC is not necessarily the knowledge the learner wants to acquire. There is also a distinction between acquiring knowledge and acquiring a skill, and learners may not always be sure how to classify what they have gained.

Learners taking up MOOCs may find useful the following approach to decide the quality of a given course:

- *Define* why you are participating in the MOOC. Your purpose could be to advance your career, to learn new knowledge, to earn a course certificate, to study part-time or to meet new people. Other reasons for participating in a MOOC could be:
 - to improve your health;
 - to improve your learning skills;
 - to try out online learning;
 - to try out learning in a specific subject area;
 - to try out learning at the university level;

- to help care for others;
 - to work with others to help solve a major societal problem;
 - to help you develop your own course or MOOC;
 - to develop your teaching skills;
 - to develop expertise in the language in which the MOOC is carried out;
 - because it is required by an employer (e.g., a course in safety or in cyber security);
 - to support someone who (because of age or disability) cannot access the course alone;
 - to enrich your experience (e.g., by finding out about a country or site, or by contacting people who know that area);
 - to practice a skill you already have.
- *Decide* what measures will signal whether you have achieved your purpose for participating in the MOOC.
 - *Decide* on the quality variables and instruments that can measure quality, based on the outcomes of the previous two steps above. Examples of these variables and instruments can be found in Appendix 1.

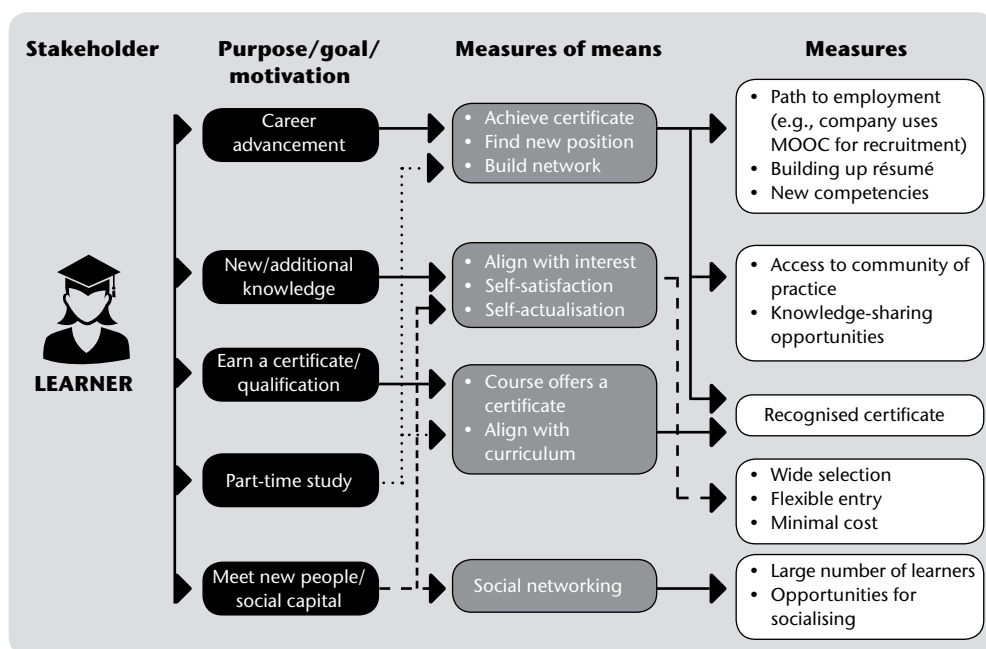


Fig. 3. Pathways to measure the quality of a MOOC, from a learner's perspective.

2.4 Guidelines for Accreditation Agencies

Quality accreditation of MOOCs is distinct from QA. Accreditation agencies are interested in ensuring that accreditation data meet a threshold standard; they focus on content validity, clear learning outcomes, defined workload and an agreed credit system. Therefore, the focus is on (i) whether the courses provide information about the expected learning outcomes and (ii) the measurement of these outcomes; the quality of learning and the impact after learning are not relevant in this context. Since the focus of QA for accreditation agencies is narrower than for other stakeholders, a checklist can be used to make sure all pertinent factors are included. Note, however, that this instrument does not assure the quality of the presage, process or product dimensions from the perspective of governments, institutions or learners.

Considering the complexities and variations in MOOCs, as well as their purposes and the multiple perspectives of the various stakeholders, it is suggested that MOOC accreditation agencies do the following:

- *Rethink existing quality metrics and frameworks.* MOOCs are challenging the traditional tenets and concepts of education and learning, so we need quality metrics and frameworks that recognise and accommodate the changes that MOOCs bring. It is important that these new metrics and frameworks not reinforce the status quo but instead be focused on future learning and learner needs.
- *Utilise a range of measures.* This involves the incorporation of measures for multiple dimensions — covering input, process and output variables; revisiting traditional measures that do not directly relate to the MOOC context; including measures that capture the context of individual MOOCs; employing measures that draw upon new technologies and digital tools to provide new insights into the learning process; and triangulating measures to provide a robust and multifaceted assessment of quality.
- *Contextualise MOOCs within the broader debate on the purposes of education and learning.* We need to contextualise the tensions and power imbalances between MOOC creators, the courses they develop, the learning they support and the learners themselves.
- *Position the learner at the centre of considerations of quality.* A majority of learners in MOOCs are not adhering to traditional expectations or learning behaviours. Successful learning in MOOCs increasingly is learner driven and determined. As a result, traditional quality measures related to outcome variables may be of limited relevance to MOOCs. It is important that quality agencies orient their efforts around the question “What is it offering students?” and develop a learner-centred approach to quality.
- *Focus on both accountability and improvement.* Quality measures should simultaneously support (i) the promotion of good practice in MOOCs as well as (ii) MOOC providers and institutions, instructors and instructional designers, to improve the learning opportunities they are providing.

An example

Government agencies in India and Malaysia are aiming to enable students to gain credit towards their degree by studying in MOOCs. QA in these cases is focused on accreditation processes rather than on instructional design, learning processes or learning impact. The relevant accreditation agencies want to ensure that the purpose of each course is clearly explained, its learning outcomes are available, the structure of the course is outlined, the purpose of the different communication tools is stated clearly, the instructor has provided a personal introduction and/or biography, prerequisite knowledge and skills are clearly indicated, the minimum technologies and technology skills required of the student are evident and links to the course resources are explicitly provided. Apart from the “global” QA of the course, there needs to be an internal QA mechanism to check the rigour of the design, development and delivery of MOOCs within institutions. It is also important to have in place a system to verify the identity of learners and ensure that in every case, it is the registered student who has submitted the assessment.

A suggested checklist for agencies accrediting MOOCs is provided in Appendix 2.

Appendix 1: MOOC Quality Dimensions and Measures

We use Biggs's (1993) 3P Model,¹² which conceptualises education as a complex set of interacting ecosystems, to list the dimensions of MOOC quality and suggest possible measures for assessing quality. Biggs divides each learning ecosystem (for our purposes, a MOOC is a learning ecosystem) into three types of variables: presage, process and product variables:

Presage variables are the resources and factors that go into the teaching and learning process, including the learners, instructors, institution and, in the case of MOOCs, the platform and platform provider.

Process variables refer to the processes and actions associated with the presage variables, including instructional design, pedagogical approaches, and learning resources and materials.

Product variables are the outputs or outcomes of the educational processes.

The guidelines outlined in the sections above can help MOOC stakeholders to identify the variables or dimensions that are particularly salient to their understanding and measurement of quality in MOOCs, whilst the table below notes some existing instruments that are available for measuring the different dimensions.

12 Biggs, J. (1993). From theory to practice: A cognitive systems approach. *Higher Education Research & Development*, 12(1), 73–85.

PRESAGE DIMENSIONS

Platforms and Providers

The nature of a platform (including the structure and operation of the organisation that administers it) plays an important role in determining the characteristics, reach and accessibility of the MOOC on offer.

The platform influences the instructional design, the technology that is available and the possible cost structures.

For example, some platform providers are experimenting with different cost structures, including offering pay-for-credentialing and course credit opportunities. The technical features offered by a MOOC platform also decide the nature of the MOOC. Several websites have been established which allow MOOC participants to rate courses they have taken. Coursetalk.com has amalgamated the ratings of individual courses to provide overall ratings of MOOC providers. So, decide on the features that you, as providers of a MOOC, would like to have in your MOOC to measure quality.

Credentials/Credit

Some MOOC providers have developed their own credentials. In other cases, providers have partnered with universities to offer credit for individual courses or to provide whole degree structures.

Specific credits are offered by some MOOC platform providers and their partners — for example, Nanodegrees from Udacity, Specialisations from Coursera, and XSeries from EdX. MITx has introduced its MicroMasters programme, through which learners receive credit for the first half of a full master's programme¹³ on campus.

Institution

- MOOCs have been created by a range of providers, including institutions (particularly more prestigious universities), companies, governments and individuals.
- Often the institution is responsible for the strategic management of a MOOC, including its development, creation, operation and sustainability.

OpenupEd¹⁴ has six benchmark indicators related to institutional strategic management of MOOCs: strategic management, curriculum design, course design, course delivery, staff support and student support.

¹³ <https://campustechnology.com/articles/2015/10/13/mit-intros-mooc-micromasters.aspx>

¹⁴ http://www.openuped.eu/images/docs/OpenupEd_quality_label_-_Version1_0.pdf

Instructor

Even though MOOCs have massive numbers of learners, the instructor can influence the learning.

Research suggests that in MOOCs on the Coursera platform, there are three common types of instructors: (1) the distant rock star or academic celebrity lecturer; (2) the co-participant or facilitator within a network; and (3) the automated processes that act as a proxy for a human tutor or assessor. However, these categories may be less representative of activities on other MOOC platforms, such as FutureLearn, or in connectivist MOOCs, where the learners are teaching each other to a large extent.

Learners

There is considerable variance in both individual learners' motivations for engaging in a MOOC and the nature of their participation.

- Self-report survey data on learners is collected by a number of MOOCs.
- There are self-report instruments that measure learners' motivations and goals — for example, the Self-regulated Learning MOOC Questionnaire.¹⁵
- Self-report measures of self-regulated learning might include learner data on:
 - motivations for engaging in a MOOC;
 - goals for the MOOC;
 - prior learning experiences;
 - demographic information;
 - contextual information;
 - learning behaviours.
- See, as an example, the evaluation of the Open Learning Design Studio MOOC in 2013,¹⁶ a course offered by The Open University (UK).

Instructional Design

The overall design and structure of a MOOC, including the employment of tools and resources, pedagogical approaches, assessment and feedback opportunities.

- Rubric for Online Instruction, California State University, Chico¹⁷
- iNACOL Standards for Quality Online Courses¹⁸
- OpenupEd quality benchmarks¹⁹ for MOOCs
- Merrill's First Principles of Instruction²⁰

Instructional design frameworks can operate: as course self-evaluation tools for instructors; as road maps for designing a new course; or to retrospectively measure the teaching and learning opportunities offered in a MOOC.

These frameworks can offer instructional designers a checklist of criteria for supporting the design of the MOOC. Whilst they provide dimensions connected to high-quality instructional design, it is up to individuals or institutions to interpret and implement these dimensions.

15 <https://figshare.com/articles/SRLMQ/866774>

16 http://oro.open.ac.uk/37836/1/EvaluationReport_OLDSMOOC_v1.0.pdf

17 <https://www.csuchico.edu/tlp/resources/rubric/rubric.pdf>

18 <http://www.inacol.org/wp-content/uploads/2015/02/national-standards-for-quality-online-courses-v2.pdf>

19 <http://www.enhancementthemes.ac.uk/docs/paper/benchmarks-for-moocs-the-openuped-quality-label.pdf?sfvrsn=6>

20 <https://onlinelearninginsights.wordpress.com/2015/12/12/mooc-quality-comes-down-to-this-effective-course-design/>

VARIABLE/DIMENSIONS	EXISTING INSTRUMENTS/MEASURES
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<p>High-quality Resources and Content</p> <p>High-quality, authentic, relevant resources and content that are aligned with learner needs and pedagogical approaches, and opportunities for quality knowledge creation throughout the course of the MOOC.</p>	<p>Many universities have media quality as part of their overall quality assurance frameworks. Examples include the Ontario Quality Assurance Guide.²¹ Specific instruments to measure media effectiveness include:</p> <ul style="list-style-type: none"> the EU4All guidelines for educational media accessibility;²² the OER TIPS Framework developed by CEMCA.²³ <p>The overview <i>Quality Assurance in the Open: An Evaluation of OER Repositories</i>²⁴ is another useful tool.</p>
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PROCESS VARIABLES

<p>Learning Processes</p> <ul style="list-style-type: none"> It is important to measure how individual learners are engaging and learning throughout their participation in a MOOC. This includes examining individuals' behaviour, patterns of engagement, completion of activities and achievement. 	<p>Formative assessment within the MOOC can give insight into the quality of learning.</p> <p>Also emerging are quality measures related to learner behaviours that can be measured through a combination of background data, clickstream data and discourse analysis. See, for example, the work on semantic analysis by Carolyn Rosé and her research group at Carnegie-Mellon University in the USA. They are developing algorithms to detect positive and negative sentiments about learning in discussion forums. Data gathered can detect, at an early stage, problems with learning, even when massive numbers of learners are participating in a discussion.²⁵</p> <p>Similarly, discourse analysis of learners' actions in discussion forums has been conducted by Gillani and Eynon at the University of Oxford.²⁶ It is hoped that ultimately, these types of analytics can make use of the diversity of the massive number of participants in a MOOC by pairing up, in real time, people with different types of expertise.</p>
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21 <http://oucqa.ca/wp-content/uploads/2016/05/Quality-Assurance-Framework-and-Guide-Updated-May-2016-Compressed.pdf>

22 <http://eu4all-project.atosresearch.eu/content/downloads-guidelines>

23 http://www.cemca.org.in/ckfinder/userfiles/files/TIPS%20Framework_Version%202_0_Low.pdf

24 <https://core.ac.uk/download/files/418/18428463.pdf>

25 Rosé, C. P., & Ferschke, O. (2016, March 1). Technology support for discussion based learning: From computer supported collaborative learning to the future of massive open online courses. *International Journal of Artificial Intelligence in Education*, doi:10.1007/s40593-016-0107-y. Wen, M., Yang, D., Rosé, C.P. (2014a). Linguistic reflections of student engagement in massive open online courses. In *Proceedings of the International Conference on Weblogs and Social Media*. Retrieved from <http://www.cs.cmu.edu/~mwen/papers/icwsm2014-camera-ready.pdf>. Wen, M., Yang, D., & Rosé, C. P. (2014b). Sentiment analysis in MOOC discussion forums: What does it tell us? *Proceedings of Educational Data Mining*. Retrieved from <http://www.cs.cmu.edu/~mwen/papers/edm2014-camera-ready.pdf>.

26 Gillani, N., & Eynon, R. (2014). Communication patterns in massively open online courses. *Internet and Higher Education*, 23, 18–26. Gillani, N., Yasserie, T., Eynon, R., & Hjorth, I. (2014). Structural limitations of learning in a crowd: Communication vulnerability and information diffusion in MOOCs. *Scientific Insights*, 4, 6447.

VARIABLE/DIMENSIONS

EXISTING INSTRUMENTS/MEASURES

Learners and Learning

We require new product or outcome variables that reflect the diverse and contextualised patterns of participation and the range of outcomes in MOOCs.

Several websites are available, which allow MOOC participants to rate courses they have taken.

Coursetalk²⁷ has amalgamated the ratings of individual courses to provide overall ratings of MOOC providers.

There are also self-report measures of:

- goal attainment;
- new job opportunities;
- social capital development;
- engagement in further learning opportunities.

PRODUCT VARIABLES

Completion/Retention and Certification Rates

Completion and certification rates (or degree classifications) are commonly employed metrics for assessing quality in education.

These are measured either through the number of students who complete the MOOC as a percentage of people who register, or as a percentage of the people who start engaging with the course.

Enjoyment and Self-satisfaction

Learners' perceptions of engaging with a MOOC, in varying capacities.

As MOOCs are voluntary, learner perceptions of the learning experience, and their enjoyment of the MOOC, are potentially important measures of quality. Learner rating websites have been established, which allow participants to rate their experience of specific MOOCs — see, for example, Mooctivity²⁸ and Coursetalk.²⁹

Learner ratings could be extended to include:

- students' perceptions of outcomes in relation to their motivations and goals;
- whether learners have gained new employment opportunities, new jobs or promotions, any of which they can trace back to their MOOC experience;
- asking learners whether they have engaged in further learning opportunities as a result of their participation in a MOOC;
- asking learners whether they have connected with and/or stayed in touch with people whom they otherwise would not have met as a result of their participation in a MOOC.

27 <https://www.coursetalk.com/>

28 <http://www.mooctivity.com/>

29 <https://www.coursetalk.com/>

Appendix 2: Checklist for MOOC Accreditation

Adapted in part from *Standards from the QM Higher Education Rubric*³⁰, 5th edition, with permission from MarylandOnline, Inc, © 2014 and from UBC Wiki's Online/Blended Learning Course Quality Checklist,³¹ developed by Afsaneh Sharif.

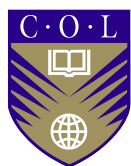
FOCUS	CRITERIA	MET?
1. Course Overview	The purpose of the MOOC is stated clearly.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The structure of the course is explained.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The purpose of the different communication tools (online discussions, email, chat, etc.) is outlined.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The instructors have provided a personal introduction and/or biography.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Prerequisite knowledge and skills are specified.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Minimum technologies and technical skills expected of the learner are indicated.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Links to resources for the course are available.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	
2. Learning Outcomes	The course learning outcomes are described in terms of what the student will be able to achieve upon completion.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The module/unit learning outcomes are consistent with the course-level (conventional) outcomes.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The learning outcomes are at levels appropriate for the course.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	

30 <https://www.qualitymatters.org/node/2305/download/QM%2520Standards%2520with%2520Point%2520Values%2520Fifth%2520Edition.pdf>

31 http://wiki.ubc.ca/images/1/1b/OnlineQualityCheckList_SiteJuly27.pdf

FOCUS	CRITERIA	MET?
3. Assessment	The learning activities and assessment are consistent with the learning outcomes.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The course grading and assignment policy is stated clearly.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Specific and descriptive criteria are provided for the evaluation of students' work and participation.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Assessment and evaluation are integrated throughout the course.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	A mechanism exists to provide students with feedback.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Clear instructions are provided on evaluations and assessments.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	
4. Content Validity	Course content is sequenced and structured in a way that enables students to achieve stated learning outcomes.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The relationship between the instructional materials and the learning activities is clearly explained to the student.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Course materials are presented in a consistent structure and layout.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	
5. The Learner	Instructions on how to get started and where to find various course components are clear and easy to find.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The learning activities promote the achievement of the stated learning outcomes.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The learning activities foster appropriate levels and types of interaction (instructor–student, content–student and student–student).	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The requirements for student interaction and progression through the course are clearly articulated.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	

FOCUS	CRITERIA	MET?
6. Educational Technology	The tools and media support the learning outcomes.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Navigation throughout the online components of the course is logical, consistent and efficient.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Instructions on how to access resources at a distance are sufficient and easy to understand.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The tools used in the course are readily available to students (e.g., free plug-ins if any are needed), and there are instructions to get any additional required tools.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	If synchronous activities are included, they are archived for students to review (e.g., live sessions, podcasts).	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	
7. Course Resources	Appropriate course resources are selected to support the learning outcomes.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	All course resources are clearly written and edited and have a high production quality.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	All resources and materials used in the course are appropriately cited.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Copyright clearance has been obtained where necessary.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Web links are relevant and functional.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The course uses open educational resources.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The course materials and learning resources are available under an open licence.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	
8. Learner Support Resources	The course instructions make it clear how students can access technical support.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The course instructions answer basic questions related to research, writing, technology, etc., or they link to tutorials or other resources that provide the information.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	The course provides guidelines on how to succeed as a student in the MOOC environment.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Comments	



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June 2016

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