

Thai Undergraduate Students' Awareness of the Benefits of Massive Open Online Courses

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Abstract

This study discusses the benefits and limitations of Massive Open Online Courses. The study also examines Thai undergraduate students' awareness levels of the benefits of MOOCs and their providers. The participants of this study were 51 Thai 3rd year undergraduate English major students. The participants were chosen as they were nearing the end of their degree program and were taking elective business related courses. The study used a 5-point scale questionnaire to obtain data on student awareness levels of MOOCs benefits and their providers. Although the students were interested in learning skills outside of their chosen major, few were aware of the benefits of taking online courses. The results of this study found that students generally had low levels of awareness in regard to MOOCs.

Keywords: MOOCs, student awareness, Thai students

Introduction

MOOCs (Massive Open Online Courses) are free online open courses aimed at unlimited participation numbers. Many of the available MOOCs provide interactive user forums for supporting community interactions between the students and lecturers. Educational content is provided through media such as filmed lectures, readings and quizzes. MOOCs can offer various types of education. Some courses offer badges and "soft certification" (non-accredited certificates) for finishing courses or sections and are viewed as a form of non-formal education. Other courses though, may offer degree credits and recognised certificates. These courses are more formal in nature (Management Association, 2014, Oxford Brookes University, 2015). This paper discusses MOOCs and examines students' awareness of their existence and potential benefits.

In today's society, employers demand more specialized skills and knowledge from their workforce. Ever changing technology also requires staff to upskill and retrain on a regular basis. The 21st century is the era of the lifelong learner. MOOCs have been around for a number of years. Unfortunately, there is still a shortage of research on university students' awareness MOOCs and how participating in a MOOC can provide benefits.

The study aims to answer the following research questions: What are the levels of awareness of the benefits of MOOCs among undergraduate students studying at a Thai public university? What are the levels of awareness of MOOC providers among undergraduate students studying at a Thai public university?

The objectives of the study are as follows: To examine the levels of awareness of the benefits of MOOCs among undergraduate students studying at a Thai public university. To investigate the levels of awareness of MOOC providers among undergraduate students studying at a Thai public university.

This study provides data on undergraduate student awareness of MOOCs in a Thai context. This information may prove useful for providers of MOOCs within Thailand.

Literature Review

History has many examples of people who never went to university or lacked a formal education that went on to be highly successful. For example, Steve Jobs was worth \$7 billion; Richard Branson is worth \$4.2 billion, neither of these individuals needed a university degree to make a success of their lives (Steed, 2013). John Harrison a clockmaker and carpenter invented the marine chronometer without receiving a formal education (Wilford, n.d). In the field of sport, Sir Alex Ferguson won 49 major trophies and various personal accolades including 10 honorary degrees in his 39 years in football management. Sir Alex Ferguson acquired much of his footballing education through experience and informal channels. These examples though, seem to be the exception rather than the rule. Formal and recognised qualifications gained through accredited institutions are often a prerequisite for gaining employment in many fields (Elberse, 2013).

Formal and recognised qualifications are often required in order to gain well paid employment. For example, in the UK (United Kingdom) half of all employees aged 25-29 with no or low qualifications were found to be in low paid employment ("Impact of Qualifications", n.d; Labour Force Survey, 2010). These figures though only refer to those that are actually employed and do not take into account those not working. Furthermore, children from poorer backgrounds are half as likely to get five good GCSEs (General Certificates in Secondary Education) and are also less likely to go onto higher education (Perry & Francis, 2010; Sharples, Slavin, Chambers, & Sharp, 2011). A lack of a formal education or qualifications often results in social issues. In the UK, 52% of male offenders and 71% of female offenders have no qualifications (Natale, 2010).

Debates regarding informal and formal education have been confused due to the various different understandings of their meanings. During the early 1970's UNESCO (United Nations Educational, Scientific and Cultural Organization) attempted to promote the concept of lifelong learning (Smith, 2002). What came from this were three definitions by Coombs, Prosser and Ahmed (1973). The authors proposed that the term formal education relates to a structured, chronologically graded 'education system' from primary school through to university. This can include a variety of specialised programmes and institutions for full-time technical and professional training. Formal education results in accredited certification. Non-formal education is deemed to be any organised educational activity outside the established formal system. Non-formal education can offer some form of non-accredited certification. Both formal and non-formal-education have learning objectives. Informal education (self-education) covers what is left. This can comprise of interactions with friends, family, work colleagues and media such as books, newspapers and the World Wide Web. There is no structure to the learning and no certification is offered. MOOCs can be both formal and non-formal in their nature (Coombs, Prosser & Ahmed, 1973; Radaković, & Antonijević, 2013).

People today are living in an information age and it has never been easier to take an online course or program or become self-educated. In the past the only real practical options for learning were through attending a formal class at school, college or university or by being taught or trained by another person. In the modern world there are no longer guardians of knowledge. Libraries and the printed word began to open up another form of learning that did not require a teacher. Other forms of technology such as the television and computer have created further options for learning outside of the classroom. This has led to some people believing that qualifications are unimportant and skills and knowledge can be

acquired from sources such as books and the World Wide Web. Whether this is true though is open to debate. For many years, Thailand has had issues with unqualified English teachers working in their schools. The ability to speak English was seen as being adequate to become a teacher in the language (Fairfield, 2014). Most people could search the World Wide Web for information on education and get a broad overview of the subject. This knowledge could be backed up by reading a few books and watching a few videos. In many cases though, those that are self-taught either have vastly inadequate skills or are lacking in certain areas of knowledge within their field. Those that are self-taught often lack a deeper understanding of a subject. For example, an online source of information may not provide the answers why the learning game that worked so successfully in the Thai classroom failed in the British classroom. Books, Websites and videos will often provide basic information that can be applied to generic situations. Without a deeper understanding the teacher is left with a one-size-fits-all approach that may or may not work. Informal learning and self-education do have an important role to play in education. Much knowledge can be and is acquired from informal sources and through interacting with other people. Unlike formally gained knowledge though, the learner may be exposed to factually incorrect information and out of date information.

Online learning and free and open content has transformed self-education. Nowadays, the unemployed, the elderly and retired can learn new skills for pleasure and for career enhancement. Those that are employed can keep their skills relevant and up-to-date. It has been noted that self-educators tend to be curious, are willing to try new things, view problems as challenges and have a desire to change. The self-educated are quite often persistent, self-disciplined, independent, self-confident and goal oriented and enjoy learning. In the 21st century there are an endless array of open educational resources (OER) and MOOCs available to assist the self-educator in obtaining a quality learning experience (Sheu, Bonk, & Kou, 2013).

In most occupations and fields, the sign of success is not whether a person can regurgitate factual knowledge but whether a person can analyse, criticise and use that knowledge to solve problems and create new knowledge. In addition, expert feedback is often needed in order to highlight a learner's areas of weakness. This type of education can be costly and classes may be difficult to attend if the person works full-time or is not close to a college or university. In this respect on-line MOOCs may provide the self-learner an opportunity to gain an education similar to a formally recognised one without having to attend a formal course. Many of these courses are provided by the world's best universities and are a cheaper alternative to full-time education. Often, course content can be accessed free but no feedback or certification is provided. Students can also learn from their peers in open forums in a rather less formal manner (Coursera, 2021). Education continues to change with the development of technology. MOOCs may provide a cost effective solution to those seeking a quality education with proof of learning such as a certificate or digital badge. They can also be a valuable resource for the lifelong learner or for those updating their skills and knowledge.

There have been some major changes in the world of higher education over the past twenty years. It is now possible for people in remote parts of the world to receive lectures from well-known professors at Princeton, Rice, Harvard, and MIT (Massachusetts Institute of Technology). Many of these lectures are usually provided free if no proof of learning is required. Millions of individuals across the world are now engaged in self-directed learning. This large group of learners also have the opportunity of collaborating with their global peers who have also signed up for the same courses. These experiences are now resulting in some people questioning whether a university degree still has the same value as in the past or whether it is still even necessary. The factory model of education is quickly being replaced

or at least being challenged by various alternative learning networks (Sheu, Bonk, & Kou, 2013).

On April 4, 2001, Charles Vest, the then president of MIT set a goal of having the majority of the university's courses freely available on the Web within a decade. Since early 2009, MIT's entire curriculum of 1,800 courses, have been available online. MIT's curriculum of courses, are available for self-educators to explore, download, use, and share. Any learner with an internet connection can watch, listen to or read these resources. Initiatives such as MIT's open up concerns about the sustainability of the content, intellectual property rights, resource preservation, content quality and enhancement. Online education may not be suitable for all learners and measuring the impact of its effectiveness is becoming of great importance (Sheu, Bonk, & Kou, 2013).

An argument exists, that on-line, open and free courses could help solve many of the problems associated with a lack of education and qualifications. For instance, MOOCs may provide an opportunity for everyone to gain some form of education. Learners would be free to study when and where they like and so could potentially improve their skills and knowledge later in life. In regard to MOOCs, there is a risk of being caught up in the enthusiasm of online learning without considering some of the harsh realities. Powell and Yuan (2013) suggest that the current enthusiasm is being driven by a group of highly educated, IT (Information Technology) literate individuals that are comfortable navigating the intimidating nature of online learning (Powell, & Yuan, 2013). These suggestions are backed up with evidence from several universities that suggest that around 60-70 per cent of those who register for MOOCs already have degrees (Laurillard, 2014; Nelson, 2014). Therefore, a large majority of students registered on these courses are already capable learners that have made a long term commitment to education in the past. These are not the forgotten millions that lack a decent education and any form of formal qualification.

Sheu, Bonk, and Kou's (2013) study explored the learning experiences of self-directed online learners. Data was collected through a 43-item survey of 2 large online learning communities. The sample included 1,429 newsletter subscribers to the MIT, OCW (Open Course Ware) initiative, and 159 participants enrolled in a MOOC hosted by Blackboard using CourseSites. The preliminary findings found that people going online to learn are generally perpetual learners. These learners are amassing skills in various fields and are learning for various reasons. On-line learning resources and self-education gives these learners a sense of control over their lives. The learners were found to be looking for career progression and professional development. Some just wanted to learn something new. Obstacles to learning, included a lack of time and a lack of understanding of how to use the course technologies. In addition, two of the major issues related to MOOCs concerned participant retention and the motivation levels of students. Although, it has been found that tens or hundreds of thousands of people around the world often enrol in a single MOOC course, a study at Duke University indicated that the retention rate is often quite low (Sheu, Bonk, & Kou, 2013).

Aboshady et al. (2015). assessed the prevalence of awareness and use of (MOOCs) among 2106 undergraduate medical students in Egypt. The results of the study showed that 21.7% had knowledge of MOOCs. Furthermore, the results showed that 136 students had enrolled in at least one course. However, only 25 students completed their enrolled courses. The study found that Coursera was the most commonly used website among those enrolled (72.8%), followed by Edx (10.3%). Sahoo et al. (2019) study revealed a below average awareness of the MOOC (SWAYAM) programmes among regular university students. The study found higher awareness levels of the MOOC (SWAYAM) courses among Post Graduate and professional course students. The results showed significant differences between levels of awareness between undergraduate and post graduate level students

towards the MOOC (SWAYAM) courses. The mean scores for the Post Graduate students was found to be 42.53%. Adebayo & Babalola (2020) study of 356 Nigerian undergraduate law students found a low level of awareness of MOOCs and the different providers of MOOCs.

There are a number of commentators that suggest that MOOCs are not the answer for those that lack a university degree or a formal education. It is suggested that to run a university course successfully the ratio should be around 1:25. The course format of MOOCs, cope with large numbers by relying on peer to peer support and assessment (Laurillard, 2014; Nelson, 2014). A good education usually requires good feedback from expert lecturers. Education is not a mass customer, factory produced industry. Higher education often needs to be personalised to meet the students' needs and requirements. To be successful the self-educators needs to spend much time evaluating their own weaknesses and strengths. They need to know where to improve and how to improve. Unqualified peer to peer feedback and assessment may not be the answer to these issues. Higher education is fundamentally about learning concepts and skills that are not acquire naturally or easily. To learn the skills and knowledge that is required to succeed at a higher level requires personalised, expert guidance (Laurillard, 2014; Nelson, 2014; Powell, & Yuan, 2013).

The ALISON MOOC model may provide a more realistic compromise. ALISON courses are free and can be completed at the leisure of the learner. The level of learning is below an undergraduate certificate so is ideal for the novice and for gaining vocational skills. There is no peer to peer assessments or feedback. The courses offer certificates and knowledge of a subject can be proven by re-taking the final assessment in the presence of a prospective employer (ALISON, 2023).

MOOCs provide a wide range of qualifications and certificates. These can be confusing for both the learner and future/present employer to understand. Micro-credentials are now becoming a serious source of income for MOOC providers. Qualifications that are accredited and approved are important for employers and other institutions that require proof of learning. The National Skills Development Handbook suggests that qualifications are genuine proof that learning has occurred and that the learner has not just regurgitated factual knowledge (Stuart, 2011). A certificate of completion is not the same as a certificate that has been granted after the completion of assessed assignments and formal written exams. The learner therefore must be aware of what qualifications or certificates are granted before taking a course. Recognition of qualifications may also vary between employers and other institutions.

Online courses are useful for lifelong learners and people who want to progress in their established careers. They appear to work better for professionals who are already in a career or for people that want to improve their existing skills and knowledge. The cost of running online courses or MOOCs does not appear to be its greatest issue. The significant initial investment required in the preparation of educational resources can be distributed over a very large student numbers. Advertising and students that take a formal degree can bear the brunt of the costs. Course content can also be re-used a number of times. The recognition of qualifications and certificates may prove an issue for the learner. A knowledge of the benefits and issues in relation to MOOCs may prove useful for the lifelong learner (Laurillard, 2014; Nelson, 2014; Powell, & Yuan, 2013).

Methodology

The study used a questionnaire survey to obtain data on student awareness levels of MOOCs and their benefits. The questionnaire had previously been checked for validity by experts. The questionnaire was translated from English to Thai and then back translated from

Thai to English by 2 Thai university lecturers proficient in both languages. The translation was deemed to be accurate and clear. The reliability was checked using a group of students not involved in the main study. The questionnaire was checked for reliability and all Alphas were found to be above .60 (.97) which is seen as reliable for data collection. Data were collected through a 5-point questionnaire that measured the levels of awareness as follows: Mean: 1.0-1.80 = Very Low Level of Awareness, Mean: 1.81-2.60 = Low Level of Awareness, Mean: 2.61-3.40 = Average Level of Awareness, Mean: 3.41-4.20 = High Level of Awareness, Mean: 4.21-5.0 = Very High Level of Awareness. The data were analysed through descriptive statistics namely the mean and standard deviation. The questionnaire was based on Adebayo & Babalola's (2020) model (Cronbach's alpha reliability coefficient of 0.92).

The study surveyed 51 mixed gender, English major students studying in 3rd year undergraduate programs at a Thai public university. The students were chosen to participate in this study as they possessed the required characteristics and were available. The students were studying business related courses in order to improve their employability.

Results and Discussion

The following section provides the results from the questionnaire survey (Table 1). MOOCs was written in full on the original questionnaire.

Table 1. The following table shows the mean value obtained from the 5-point Likert scale questionnaire and the standard deviation.

Statement	N	Mean	S D
1) Participating in MOOCs can increase your knowledge in your major subject	51	2.39	.98
2) Participating in MOOCs can improve your skills in your major subject	51	2.59	1.00
3) Participating in MOOCs can increase your knowledge in specialized subjects	51	2.47	1.12
4) Participating in MOOCs can increase your skills in specialized subjects	51	2.47	1.06
5) Participating in MOOCs is a cheap/free method for studying university level courses	51	2.59	1.15
6) Participating in MOOCs is a cheap/free method for studying vocational level courses	51	2.59	1.13
7) Participating in MOOCs can earn you a certificate	51	2.73	1.33
8) Participating in MOOCs can earn you university credits	51	2.45	1.24
9) Participating in MOOCs can enhance your resume/CV	51	3.02	1.17
10) Participating in MOOCs can boost your career growth	51	2.86	1.23
11) Rate your awareness of Coursera online MOOCs	51	2.22	1.08
12) Rate your awareness of edX online MOOCs	51	2.04	1.00
13) Rate your awareness of Open Edx online MOOCs	51	2.02	.93
14) Rate your awareness of Future Learn online MOOCs	51	2.27	1.22
15) Rate your awareness of Udemy online MOOCs	51	2.08	.98
16) Rate your awareness of Canvas Network online MOOCs	51	2.37	1.23
17) Rate your awareness of Udacity online MOOCs	51	2.04	.94
18) Rate your awareness of Iversity online MOOCs	51	2.02	.99

The study aimed to measure undergraduate students' levels of awareness of MOOCs (Massive Open Online Courses) based on a 5-point questionnaire. The results were categorized into five levels of awareness: Very Low, Low, Average, High, and Very High, based on the mean scores.

Overall, the awareness of MOOCs among students appears to be low. The majority of the questions regarding the general benefits of MOOCs—such as increasing knowledge and skills in both major and specialized subjects, being a cost-effective method of learning, and earning certificates—yielded mean scores between 2.39 and 2.73. According to the interpretation scale, these results fall within the Low to Average Level of Awareness range. None of the questions scored in the Very Low Level of Awareness range, indicating that students are somewhat familiar with MOOCs, but their awareness is not high. The results for items like improving knowledge and skills in the major subject (mean = 2.39) and the affordability of MOOCs for university-level courses (mean = 2.59) fall into the Low Level of Awareness category. These scores suggest that while students recognize the potential benefits of MOOCs, they may not be highly familiar with their specific advantages or may have limited exposure to them. On the other hand, the item on enhancing the resume or CV (mean = 3.02) indicates that students are more aware of how MOOCs might positively affect their professional prospects. However, this is still an Average Level of Awareness, suggesting that while some benefits of MOOCs are recognized, the students may not fully grasp the broader opportunities these courses offer.

The perceptions about how MOOCs can impact students' academic and professional lives reflect moderate awareness. For instance, students rated the potential for MOOCs to improve skills and knowledge in their major and specialized subjects with mean scores ranging from 2.47 to 2.59. These results suggest that students have some awareness of MOOCs' potential for enhancing their academic learning, but their awareness remains relatively low. Similarly, when asked whether MOOCs could enhance a resume or career, students gave these items slightly higher ratings, indicating some recognition of MOOCs as an affordable way to add credentials. However, these scores remain in the Average Level of Awareness category, showing that students acknowledge MOOCs' potential but may not fully understand the extent of their benefits.

The final set of questions focused on students' awareness of specific MOOC providers, and the results indicate low awareness across various platforms. For example, the awareness of Coursera (mean = 2.22), edX (mean = 2.04), Udemy (mean = 2.08), and FutureLearn (mean = 2.27) all fell within the Low Level of Awareness range. Awareness of other platforms, such as Open Edx, Canvas Network, Udacity, and Iversity, yielded even lower mean scores, indicating that students have limited knowledge of these online learning platforms. These results suggest that while students may have heard of some MOOC providers, their familiarity with the specific platforms remains quite weak. None of the platforms reached the Average or High levels of awareness, further supporting the conclusion that students' awareness of MOOCs is generally low.

The results highlight a generally low awareness of MOOCs among undergraduate students. Despite recognizing some advantages of MOOCs, such as their affordability and potential to enhance resumes or provide certificates, students demonstrate limited familiarity with these platforms. This suggests a need for greater exposure to and education about the opportunities MOOCs offer. The findings also emphasize a gap in students' knowledge about specific MOOC providers, which may be due to insufficient marketing or a lack of outreach about these platforms at the university level. Given the growing importance of online education, institutions could benefit from increasing awareness and promoting these platforms as viable resources for supplementary learning.

Several factors could explain the students' low awareness levels. One possibility is a lack of exposure, where students may not have been sufficiently introduced to MOOCs through formal channels such as university courses or orientation programs. Another reason could be the perceived relevance of MOOCs. Some students may perceive MOOCs as less relevant to their degree programs or career paths, especially when compared to traditional methods of education. Additionally, limited personal engagement may play a role, with students not actively seeking additional educational resources beyond their formal coursework.

Conclusion and Suggestions

Gaining micro-credentials through open online courses may be an affordable method to boost employability. In an ever more competitive job market for graduates, additional skills and certification may prove a deciding factor when aiming to gain employment. Therefore, it is important that students are fully aware of the benefits and options available for gaining further skills. While students show some awareness of MOOCs and their potential benefits, their general understanding remains at a relatively low level. Institutions and MOOC platforms may need to work together to improve outreach and engagement strategies, ultimately helping students make more informed decisions about leveraging MOOCs for both academic and professional growth.

Self-education and non-formal forms of education have an important role to play in learning. Societies though have also recognized the need for a more structured, public system of education. Formal education is central to the development of a nation and society as a whole. It is through the implementation of a formal system of education that a nation can develop and progress towards the achievement of societal goals. It appears that everyone can self-learn but it is only the most driven that excel. The majority of learners appear to need guidance and encouragement that can only be provided within the classroom. In today's technology rich modern era a rethink is needed on how learning is attained, assessed and certified. Online MOOCs offered through universities have their place but may not necessarily be the answer to everyone's learning needs. MOOCs appear to be better suited for upgrading skills and knowledge and the attainment of the basic facts of a subject. These courses may therefore be better suited to lower level learning, up skilling and specialized skills. In regard to this study, students could benefit from university level courses in areas such as business English and business related skills.

Further research could explore how universities and educators can better integrate MOOCs into curricula or create awareness campaigns to inform students about these valuable resources. Understanding the barriers to student participation in MOOCs, such as time constraints or a lack of technological access, would be useful for developing strategies to encourage broader engagement.

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References

- Adebayo, E. A., & Babalola, Y. T. (2020). Awareness and intention to use massive open online courses by law students in Osun State, Nigeria. *Information Impact: Journal of Information and Knowledge Management*, 11(4), 37-47.
- Aboshady, O. A., Radwan, A. E., Eltaweel, A. R., Azzam, A., Aboelnaga, A. A., Hashem, H. A., ... & Hassouna, A. (2015). Perception and use of massive open online courses among

- medical students in a developing country: Multicentre cross-sectional study. *BMJ Open*, 5(1), e006804. <https://doi.org/10.1136/bmjopen-2014-006804>
- ALISON (Advance Learning Interactive Systems Online). (2023). Learning on Alison. Retrieved from <https://alison.com/company/how-it-works/>
- Coombs, P. H., Prosser, C., & Ahmed, M. (1973). *New paths to learning for rural children and youth*. International Council for Educational Development.
- Coursera. (2021). *Coursera impact report: Serving the world through learning*. Retrieved from <https://about.coursera.org/press/wp-content/uploads/2021/11/2021-Coursera-Impact-Report.pdf>
- Elberse, A. (2013). Ferguson's formula. *Harvard Business Review*. Retrieved from <https://hbr.org/2013/10/fergusons-formula>
- Fairfield, J. (2014). Visa crackdown: Is this the end of the road for unqualified ESL teachers in Thailand? *Thai Visa Forum*. Retrieved from <http://www.thaivisa.com/forum/topic/743467-visa-crackdown-is-this-the-end-of-the-road-for-unqualified-esl-teachers-in-thailand/>
- Impact of Qualifications on Work. (n.d.). Retrieved from <http://www.poverty.org.uk/31/index.shtml>
- Labour Force Survey. (2010). Retrieved from <http://www.ons.gov.uk/ons/search/index.html?newquery=Labour%20Force%20Survey>
- Laurillard, D. (2014). Five myths about MOOCs. *Times Higher Education*. Retrieved from <https://www.timeshighereducation.com/comment/opinion/five-myths-about-moocs/2010480.article>
- Management Association. (2014). *Open source technology: Concepts, methodologies, tools, and applications: Concepts, methodologies, tools, and applications*. IGI Global. Retrieved from <https://books.google.co.uk/books?id=OCcdBgAAQBAJ&pg=PA707&lpg=PA707&dq=are+moocs+informal+or+non+formal&source=bl&ots=CvGMchlFLI&sig=2O3ejbjBIA71xobMyF2aiOf6xoM&hl=en&sa=X&ved=0CEAQ6AEwBWovChMlxriOo9iMyAIVCYqUCH3RcAB6#v=onepage&q=are%20moocs%20informal%20or%20non%20formal&f=false>
- Natale, L. (2010). *Education in prisons*. Institute for the Study of Civil Society Report. Retrieved from <http://www.civitas.org.uk/crime/factsheet-EducationinPrisons.pdf>
- Nelson, S. (2014). MOOCs, and the man leading the UK's charge. *The Guardian Higher Education*. Retrieved from <http://www.theguardian.com/education/2014/aug/19/moocs-man-leading-uk-foray-simon-nelson-futurelearn>
- Oxford Brookes University. (2015). What are MOOCs? Retrieved from <https://www.brookes.ac.uk/Studying-at-Brookes/courses/Open-Online/What-are-MOOCs/>
- Perry, E., & Francis, B. (2010). *The social class gap for educational achievement*. Royal Society of Arts Report. Retrieved from <https://www.thersa.org/discover/publications-and-articles/reports/the-social-class-gap-for-educational-achievement-a-review-of-the-literature/Download>
- Powell, S., & Yuan, L. (2013). *MOOCs and open education: Implications for higher education*. CETIS. Retrieved from <http://publications.cetis.ac.uk/wp-content/uploads/2013/03/MOOCs-and-Open-Education.pdf>
- Radaković, M., & Antonijević, S. (2013). Balance between formal and informal learning - Experience and challenges of civil servants training in Serbia. *NISPACEE Conference, 2013*. Retrieved from http://www.nispa.org/files/conferences/2013/papers/201304151202190.Paper_Radakovic.pdf?fs_papersPage=4

Sahoo, P. K., Sahoo, N., & Devi, U. (2019). A study of higher education students' awareness of MOOC (SWAYAM) programme and usefulness of a teacher education course offered through SWAYAM.

Sheu, F. R., Bonk, C. J., & Kou, X. (2013). A mixed methods look at self-directed online learning: MOOCs, open education, and beyond. In *25th Annual Ethnographic & Qualitative Research Conference*. Cedarville, OH. Retrieved from [http://www.publicationsshare.com/EQRC_OER_fsheu_Lee_Bonk_Kou_V6-APA-Single_sided.htm](http://www.publicationshare.com/EQRC_OER_fsheu_Lee_Bonk_Kou_V6-APA-Single_sided.htm)

Sharples, J., Slavin, R., Chambers, B., & Sharp, C. (2011). Effective classroom strategies for closing the gap in educational achievement for children and young people living in poverty, including white working-class boys. *Schools and Communities Research Review*, 4, 1-67. Retrieved from <http://archive.c4eo.org.uk/pdfs/3/Schools%20and%20Communities%20RR%20P4.pdf>

Smith, M. K. (2002). *Informal, non-formal and formal education: A brief overview of different approaches*. The Encyclopaedia of Informal Education. Retrieved from http://www.infed.org/foundations/informal_nonformal.htm

Steed, M. S. (2013). What does it mean to be an educated person? *Independent Head Blog*. Retrieved from <http://independenthead.blogspot.com/2013/03/what-does-it-mean-to-be-educated-person.html>

Stuart, M. S. (2011). *The national skills development handbook*. RainbowSA Publishing.

Wilford, J. N. (n.d.). Time and navigation: John Harrison's masterpiece. Retrieved from http://www.surveyhistory.org/john_harrison%27s_timepiece1.htm