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Completion factor in massive open online course in developing countries: A literature review in 2015-2021

Liliana Liliana [a] *, Universitas Gadjah Mada, Department of Electrical Engineering and Information Technology, Jl. Grafika No.2, Daerah Istimewa Yogyakarta 55281, Indonesia / Universitas Surabaya, Department of Informatics Engineering, Jl. Raya Kalirungkut, Surabaya 60293, Indonesia. https://orcid.org/0000-0002-6550-0845

Paulus Insap Santosa [b], Universitas Gadjah Mada, Department of Electrical Engineering and Information Technology, Jl. Grafika No.2, Daerah Istimewa Yogyakarta 55281, Indonesia

Sri Suning Kusumawardani [c], Universitas Gadjah Mada, Department of Electrical Engineering and Information Technology, Jl. Grafika No.2, Daerah Istimewa Yogyakarta 55281, Indonesia

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Abstract

Massive Open Online Course (MOOCs) has helped develop the education sector since the Covid-19 pandemic, though it causes low retention. This study used a systematic literature review method to analyze the factors affecting the retention level of MOOCs participants in developing countries and worldwide. A total of 89 publications in the Scopus journal during 2015-2021 and 26 published in developing countries were examined. The results showed that the factors affecting the retention level of MOOCs' participants include perceived ease of use, usefulness, social influence, and self-efficacy. However, motivation was an insignificant factor in developing countries despite being significant worldwide. Infrastructure was an internal factor for the retention level among participants, though this study can be further expanded using better methods.

Keywords: massive open online course; retention; dropout; completion; literature review; developing country

* ADDRESS FOR CORRESPONDENCE: Liliana Liliana, Departement of Electrical Engineering and Information Technology, Universitas Gadjah Mada, Jl. Grafika No.2, Daerah Istimewa Yogyakarta 55281, Indonesia; Department of Informatics Engineering, Universitas Surabaya, Jl. Raya Kalirungkut, Surabaya 60293, Indonesia.
E-mail address: liliana@mail.ugm.ac.id, lili@staff.ubaya.ac.id / Tel.: +62 811-3101-718

1. Introduction

The COVID 19 pandemic has changed different social lives, including education (Yang & Lee, 2021). Restrictions, such as social distancing and the weakening of global economic conditions, prevented some people from accessing lectures with a complete curriculum. Therefore, the Massive Open Online Course (MOOCs) concept allows studies without face-to-face lecturers. This gives the participants a flexible selection of materials and the study time (Rawat et al., 2021), making it the best solution for the pandemic (Adamopoulos, 2013; AU Khan et al., 2021; Liyanagunawardena et al., 2013).

MOOCs is a platform developed by George Siemens and Stephen Downes in 2008 that uses the basic concept of e-learning (Baturay, 2015) to ease the access to education and learn at their base for free (Adamopoulos, 2013; Hew & Cheung, 2014). This platform has developed from delivery methods to financing education and informal learning to a recognized certification (Bozkurt et al., 2017). This is indicated by increased digital-based education service systems (Kumar et al., 2019). Various studies showed that two groups of MOOCs had been developed to date (Al-Emran et al., 2018); cMOOC and xMOOC (Bozkurt et al., 2017; Hew & Cheung, 2014). The concept comprises an online community with a common interest in a given content area using personal interactions and social media to learn and share collective knowledge. Furthermore, the learning process can change according to the participants' needs, moderated by an instructor (Hew & Cheung, 2014; Rodriguez, 2012). However, the concept has encountered several obstacles, such as formally assessing the participants' work in cases where they are not at the same phase (Rodriguez, 2012). MOOCs are derived from the word extended and are similar to conventional learning. In this case, a tutor is the center of education, and the participants choose the material without committing to the curriculum flow. This concept is widely applied to current MOOCs, such as Coursera and EduX (Hew & Cheung, 2014; Khalil & Ebner, 2014).

These platforms face significant problems, including low retention value, reaching 5-10% (Fririksdóttir, 2021; Goopio & Cheung, 2021). The pass rate is used to measure the course's quality, which lowers the retention rate (Jingjing Zhang et al., 2021). However, there is an increasing trend of studies focusing on MOOCs issues, indicated by the number of publications. Figure 1 shows a significant increase in publications with the keyword "retention MOOC" from Google Scholar in 2016-2021. This indicates that these problems are continuously experienced, with low retention rates (AU Khan et al., 2021).

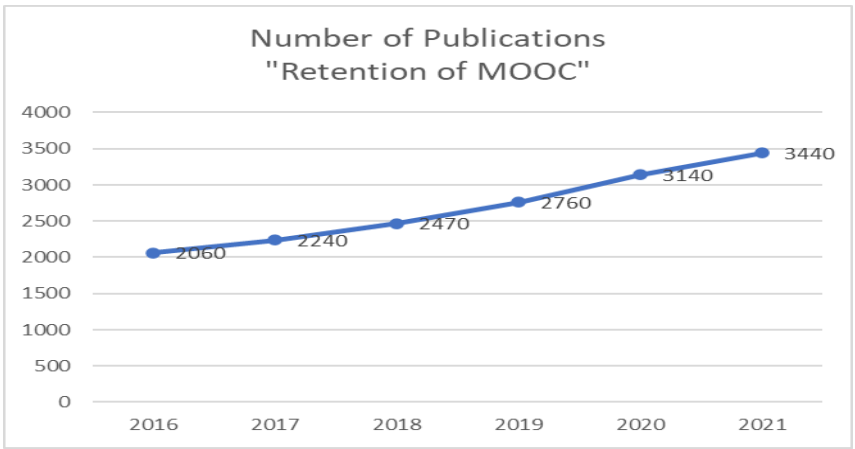

Figure 1. Retention of MOOCs' Trend

Various studies have examined the factors that increase retention rates in students taking MOOCs sessions (Abdullah & Ward, 2016; Al-Emran et al., 2018; Hew & Cheung, 2014; Kumar et al., 2019; Panigrahi et al., al., 2018; Paton et al., 2018), to improve its structure (de Barba et al., 2020). Several factors determine low retention rates in MOOCs (Deshpande & Chukhlomin, 2017), including internal (de Barba et al., 2020; Shukor & Abdullah, 2019) and external (Fririksdóttir, 2021). Several studies aimed to identify the determinants that increase the retention of MOOCs. Paton et al. (2018) stated that the experience factors of participants, materials, and interactions determine one's intention to complete the study. Furthermore, Badali et al. (2022) indicated that motivation is essential in increasing retention. Another study used a predictor algorithm to determine the dropout tendency in students at MOOCs (Greene et al., 2015; Panagiotakopoulos et al., 2021).

Most of these studies were conducted in developed countries because they have effectively used MOOCs and have a sound support system (Deng et al., 2019). In contrast, it is unpopular in developing countries due to unmet fundamental needs, such as inadequate infrastructure (Alhazzani, 2020; IU Khan et al., 2018), unstable financial conditions (Arhin & Wang'Eri, 2018; Khalil & Ebner, 2014), insecurity in the use of foreign languages (C. Liu et al., 2021; Ruipérez-Valiente et al., 2020a), and mastery of new technologies (Hong et al., 2021). This limits the use of MOOCs in developing countries than in developed ones (Lambert, 2020; Lubis et al., 2020; Van De Oudeweetering & Agirdag, 2018).

This study aimed to identify factors that influence participants' acceptance of MOOCs and their intentions to complete their studies, using the systematic literature review method (Bruette & Fitzig, 1993). There was a further exploration by sorting the research locations from each publication and collecting data in developing countries. Understanding the factors that influence retention rates on MOOCs worldwide and in developing countries will create new insights on its development and use without referencing developed countries, hence can be adapted to their needs (Bonk et al., 2018; Ruipérez-Valiente et al., 2020b).

The research questions included the following:

RQ1: What methods are commonly used in these studies?

RQ2: Which countries conduct most of these studies?

RQ3: What factors affect retention in MOOCs worldwide?

RQ4: What factors affect retention in MOOCs in developing countries?

Overall, this study had three main sections, including discussing the publications' selection method used as a reference, literature studies with supporting data, and presenting the conclusions.

2. Research Method

The following steps were applied: (1) formulating the research questions, (2) determining the criteria, (3) developing searching strategies, (4) assessments, (5) extracting data, (6) analyzing the results, and (7) stating the findings (Lockwood & Oh, 2017). Figure 2 shows the flow of the literature study.

2.1. Search Strategy and Exclusion Criteria

This study was conducted by collecting various papers on MOOCs, with the keywords (MOOC or MOOCs or distance learning) and (retention or dropout or completion rate or Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT) or TAM2) and Higher Education. This process obtained 205 papers from various publications drawn from multiple sources, such as Elsevier, Emerald, SAGE, Springer, Taylor and Francis, Wiley, ScienceDirect, and Google Scholar.

The papers that did not meet the criteria were excluded, including those not written in English, published before 2015, without full-text version, not in the form of a published journal, and unregistered with Scimago.

2.2. Data Collection Process

Data were extracted from 205 publications according to the predetermined criteria, reducing the number to 131, limited to Scopus indexed journals. The proportion was 86% Q1, such as Journal of Economic Perspectives, Computers and Education, Computers in Human Behavior, Information and Management, American Educational Research Journal, Future Generation Computer Systems, and International Journal of Information Management. Furthermore, 10% Q2 included Information Economics and Policy, Information Systems and e-Business Management, Electronics (Switzerland), and Asia Pacific Education Review. In comparison, 4% Q3 had Studies in Health Technology & Informatics, International Journal of Lifelong Education, and Turkish Online Journal of Distance Education.

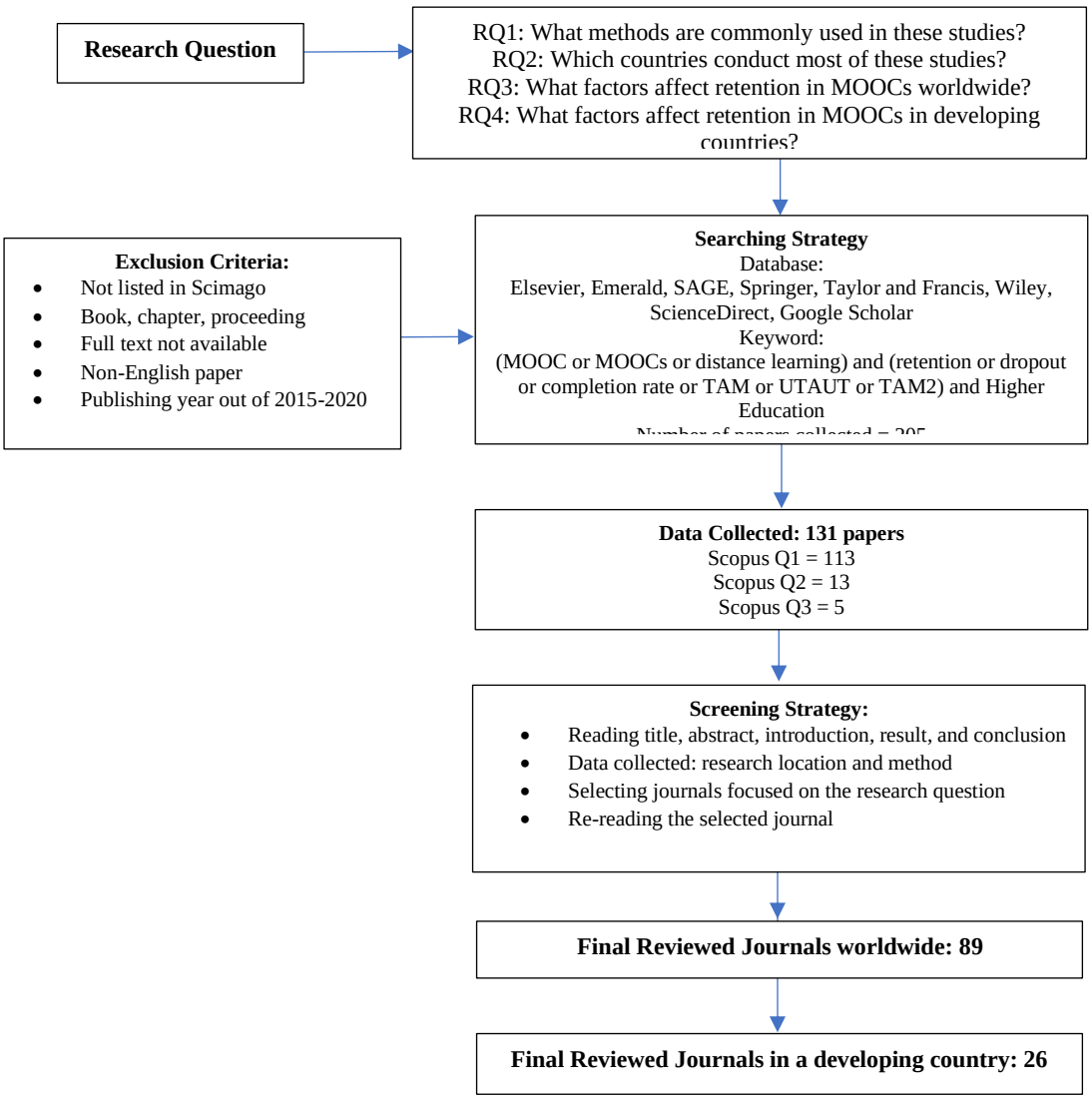

Figure 2. Flow diagram of the systematic literature review process

2.3. Data Analysis

The analysis was conducted by researchers with a teaching background in technology. The strategies used included (1) reading the title, abstraction, background, and conclusions on each paper, and (2) collecting information on the form, location, and the research methods. The screening process was conducted in 2 stages, (1) sorting 131 papers into 89, which followed the research question. This captured the dominant factors influencing MOOCs' retention worldwide. The next step involved pre-separating the papers into 26 based on the research location. Furthermore, the research locations in developing countries were considered in the second phase (QI2021, 2020). The second phase captured the dominant factors influencing MOOCs retention in developing countries.

3. Results

3.1. RQ1: The spread of method

A total of 33% of the 89 papers used the TAM method, which is considered highly qualified and worthy in similar studies. Another widely used method in research on retention in MOOCs is users observation, considering the factors in the TAM method (Hone & El Said, 2016; Howarth et al., 2016; Jingjing Zhang et al., 2021). These numbers are presented in Table 1.

Table 1. Methods used in research

No	Research Methodology	Number of Publications
1	TAM	29
2	Observation	24
3	Literature Review	17
4	Survey	16
5	Predictor	3
	Total	89

3.2. RQ2: The spread of research location countries

Up to 38% of the research was conducted in Asia, 20% in Europe, America with 15%, and 27% in the rest of the world. Table 2 shows the distribution of research locations, with 26 publications conducted in developing countries represented with an asterisk (*) (QI2021, 2020). However, there were insufficient studies on the retention of MOOCs in developing countries. As a result, the Asian region dominates 52% of similar publications in developing countries.

Table 2. Research locations

No	Country	Area	Num of Publications	No	Country	Area	Num of Publications
1	USA	America	11	**16**	Azerbaijan*	Asia	1
2	China	Asia	10	**17**	Bangladesh*	Asia	1
3	Worldwide	-	9	**18**	Chile*	America	1
4	Pakistan*	Asia	5	**19**	Estonia*	Europe	1
5	Europe	Europe	4	**20**	Indonesia*	Asia	1
6	Espanyol	Europe	4	**21**	Iceland	Europe	1
7	developing countries*	-	4	**22**	Israel	Middle East	1
8	Taiwan	Asia	3	**23**	Laos*	Asia	1
9	UK	Europe	3	**24**	Egypt*	Africa	1

10	Australia	Australia	2	**25**	Palestine*	Asia	1
11	Iran*	Asia	2	**26**	Russia*	Europe	1
12	Malaysia*	Asia	2	**27**	Saudi Arabia*	Middle East	1
13	Portugal	Europe	2	**28**	Turkey*	Middle East	1
14	South Korea	Asia	2	**29**	Vietnam*	Asia	1
15	Africa*	Africa	1	**30**	Jordanian*	Middle East	1

3.3. RQ3: The factors that affect retention in MOOC worldwide

The findings for each study were mapped and grouped, dividing them into external and internal factors influenced by user conditions and system quality, respectively. The external factors affecting retention at MOOCs worldwide are shown in Table 3, including motivation, perceived usefulness, and social influence. In contrast, the internal factors were presented in Table 4, covering content, perceived enjoyment, and infrastructure.

The UTAUT concept consists of several demographic factors, such as age, gender, and experience (Venkatesh et al., 2003). In addition, demographic conditions influence the characteristics of digital learners (Witt & Baird, 2018). This study included some demographic factors found in surveys conducted in various publications, as exhibited in Table 5. In line with the UTAUT concept, age and sex were the most used demographic factors. Furthermore, participants' experience and education were considered demographic factors in the retention of a MOOC system.

3.4. RQ4: The factors that affect retention in MOOC in developing countries

Digital learning is a significant portion of education (Alvi, 2018; Hussein, 2017). Therefore, education technology investments should be prioritized, especially in developing countries worldwide (Hongthong & Temdee, 2018; C. Liu et al., 2021; Ngampornchai & Adams, 2016). Tables 6 and 7 showed external and internal factors mapping, respectively.

There are significant differences in factors that affect retention rates at MOOCs worldwide and in developing countries, namely the perceived ease of use and motivation. Additionally, developing countries consider education as crucial than experience in using MOOCs because this approach is relatively new (Ngampornchai & Adams, 2016). In most cases, it is assumed that higher education level enhances the retention rate of the MOOC.

4. Discussion

This study aimed to examine the factors determining the retention rate of MOOCs in developing countries. The results showed that perceived ease of use had a significant influence. This was in line with Hossein's research, which stated that eastern cultural areas valued perceived ease of use more than usefulness (Mohammadi, 2015b). Generally, learners benefit more from an easy-to-use system (Mohammadi, 2015b; Tarhini et al., 2013).

The social influence shows the level of environmental impact on a person (Cacciamani, 2017). For example, when certain items have more users, the higher the desire to possess them. Additionally, learners emulate various social influences, including the willingness of parents, respected individuals in the society (Briz-Ponce et al., 2017; Ngampornchai & Adams, 2016; Poong et al., 2017), or the view of peers, recommending certain MOOCs (Sabah, 2016; Wu & Chen, 2017; Zhao et al., 2020).

Table 3. External factor

No	Factors	Publications	Number of Publications
1	Motivation	(Badali et al., 2022; Briz-Ponce et al., 2017; Dai, Teo, Rappa, et al., 2020; Fririksdóttir, 2021; Goopio & Cheung, 2021; Greene et al., 2015; Gregori et al., 2018; Hood et al., 2015; Joo et al., 2018; E. Jung et al., 2019; B. Li et al., 2018; Q. Li & Baker, 2018; S. Li et al., 2020; Littlejohn et al., 2016; Lung-Guang, 2019; Martin et al., 2020; Mohammadi, 2015b, 2015a; Ortega-Arranz et al., 2019; Panigrahi et al., 2018; Pozón-López et al., 2021; Rawat et al., 2021; Reparaz et al., 2020; Shapiro et al., 2017; Stich & Reeves, 2017; Tsai et al., 2018; Veletsianos & Shepherdson, 2016; Watted & Barak, 2018; Williams et al., 2018; Wu & Chen, 2017; Jie Zhang, 2016; Q. Zhang et al., 2019; Zhou, 2016; Zhu et al., 2018)	34
2	Perceived Usefulness	(Abdullah & Ward, 2016; Al-Emran et al., 2018; Al-Fraihat et al., 2020; Almaiah, 2018; Alraimi et al., 2015; Briz-Ponce et al., 2017; Cheng, 2015; Ching-Ter et al., 2017; Dai, Teo, Rappa, et al., 2020; Dai, Teo, & Rappa, 2020; Hoi, 2020; Hone & El Said, 2016; Howarth et al., 2016; Joo et al., 2018; Y. Jung & Lee, 2018; D. Liu & Guo, 2017; Mohammadi, 2015b, 2015a; Nadlifatin et al., 2020; Nikou & Economides, 2017a, 2017b; Panigrahi et al., 2018; Poong et al., 2017; Pozón-López et al., 2021; Raza et al., 2017; Reparaz et al., 2020; Sabah, 2016; Wanted & Barak, 2018; Wu & Chen, 2017; Jingjing Zhang et al., 2021)	30
3	Social Influence	(Abdullah & Ward, 2016; Briz-Ponce et al., 2017; Ching-Ter et al., 2017; Dewberry & Jackson, 2018; Fang et al., 2019; Hoi, 2020; Iqbal & Bhatti, 2016; A. U. Khan et al., 2021; I. U. Khan et al., 2018; K. Li, 2019; Q. Li & Baker, 2018; Lung-Guang, 2019; Mohammadi, 2015b; Nadlifatin et al., 2020; Nikou & Economides, 2017a; Panigrahi et al., 2018; Poong et al., 2017; Raza et al., 2017; Sabah, 2016; Van De Oudeweetering & Agirdag, 2018; Veletsianos & Shepherdson, 2016; Wu & Chen, 2017; Yang & Lee, 2021; Zhao et al., 2020; Zhou, 2016)	25
4	Perceived Ease of Use	(Abdullah & Ward, 2016; Al-Emran et al., 2018; Almaiah, 2018; Briz-Ponce et al., 2017; Cheng, 2015; Ching-Ter et al., 2017; Hoi, 2020; Hone & El Said, 2016; Howarth et al., 2016; Joo et al., 2018; Y. Jung & Lee, 2018; Koç et al., 2016; D. Liu & Guo, 2017; Mohammadi, 2015a, 2015b; Nadlifatin et al., 2020; Nikou & Economides, 2017b, 2017a; Panigrahi et al., 2018; Poong et al., 2017; Pozón-López et al., 2021; Raza et al., 2017; Sabah, 2016; Wu & Chen, 2017)	24
5	Self-Efficacy	(Abdullah & Ward, 2016; Bakhsh et al., 2017; Bozkurt et al., 2017; Briz-Ponce et al., 2017; Ching-Ter et al., 2017; Dewberry & Jackson, 2018; Fatima et al., 2017; Jaggars & Xu, 2016; Lambert, 2020; Littlejohn et al., 2016; C. Liu et al., 2021; Lung-Guang, 2019; Mohammadi, 2015b; Nikou & Economides, 2017b, 2017a; Panigrahi et al., 2018; Poong et al., 2017; Raza et al., 2017; Rõõm et al., 2021; Ruipérez-Valiente et al., 2020; Tsai et al., 2018)	21
6	Satisfaction	(Al-Fraihat et al., 2020; Alraimi et al., 2015; Aparicio et al., 2019; Dai, Teo, & Rappa, 2020; Dai, Teo, Rappa, et al., 2020; Fang et al., 2019; Joo et al., 2018; Littlejohn et al., 2016; Mohammadi, 2015b, 2015a; Navío-Marco & Solórzano-García, 2021; Ortega-Arranz et al., 2019; Panigrahi et al., 2018; Pozón-López et al., 2021)	14

No	Factors	Publications	Number of Publications
7	Time Commitment	(Fririksdóttir, 2021; Goopio & Cheung, 2021; Y. Jung & Lee, 2018; I. U. Khan et al., 2018; Kizilcec et al., 2017; B. Li et al., 2018; D. Liu & Guo, 2017; Martinez-Lopez et al., 2017; Sabah, 2016; Shapiro et al., 2017; Wu & Chen, 2017; Zhao et al., 2020)	12
8	Perceived Enjoyment	(Abdullah & Ward, 2016; Alraimi et al., 2015; Ching-Ter et al., 2017; Iqbal & Bhatti, 2016; Poong et al., 2017; Yang & Lee, 2021)	6
9	Trust	(Almaiah, 2018; Koç et al., 2016; D. Liu & Guo, 2017; Nikou & Economides, 2017a; Panigrahi et al., 2018)	5
10	Cost	(Lambert, 2020; D. Liu & Guo, 2017; McPherson & Bacow, 2015; Van De Oudeweetering & Agirdag, 2018)	4

Tabel 4. Internal Factor

No	Factors	Publications	Num of Publications
1	Content	(Almaiah, 2018; C. J. Chung et al., 2019; de Barba et al., 2020; Goopio & Cheung, 2021; Hone & El-Said, 2016; Hood et al., 2015; Jaggars & Xu, 2016; A. U. Khan et al., 2021; Q. Li & Baker, 2018; C. Liu et al., 2021; Mohammadi, 2015a; Nikou & Economides, 2017b, 2017a; Panagiotakopoulos et al., 2021; Paton et al., 2018; Pozón-López et al., 2021; Pursel et al., 2016; Rawat et al., 2021; Rõõm et al., 2021; Shukor & Abdullah, 2019; Wang et al., 2020; Jingjing Zhang et al., 2021; Zhu et al., 2018)	23
2	Interaction	(Bonk et al., 2018; Goopio & Cheung, 2021; Gregori et al., 2018; Hone & El Said, 2016; A. U. Khan et al., 2021; C. Liu et al., 2021; Navío-Marco & Solórzano-García, 2021; Nikou & Economides, 2017b; Panigrahi et al., 2018; Paton et al., 2018; Pozón-López et al., 2021; Pursel et al., 2016; Reparaz et al., 2020; Shukor & Abdullah, 2019; Wang et al., 2020; Yang & Lee, 2021; Zhao et al., 2020)	17
3	Infrastructure	(Al-Fraihat et al., 2020; Bakhsh et al., 2017; Briz-Ponce et al., 2017; Deng et al., 2019; Hoi, 2020; Koç et al., 2016; Lambert, 2020; Mohammadi, 2015a; Nikou & Economides, 2017a; Panigrahi et al., 2018; Poong et al., 2017; Sabah, 2016; Shapiro et al., 2017; Van De Oudeweetering & Agirdag, 2018)	14

Table 5. Demographic factors

Demographic Info	Number of Publications
Experience	26
Age	24
Gender	24
Education Level	20
Type of Work	7

Table 6. External factors in developing countries

No	Factors	Number of Publications	No	Factors	Number of Publications
1	Perceived Ease of Use	13	6	Motivation	3
2	Perceived Usefulness	12	7	Perceived Enjoyment	3
3	Social Influence	11	8	Trust	3
4	Self-Efficacy	9	9	Satisfaction	2
5	Time Commitment	6	10	Cost	2

Table 7. Internal factors in developing countries

No	Factors	Number of Publications
1	Infrastructure	13
2	Content	12
3	Interaction	2

Self-efficacy shows one's confidence level when dealing with specific tasks (Ajzen, 2002). This is measured by how one perceives the importance of MOOCs (Park et al., 2012), their level of courage in learning new things through an unfamiliar system due to lack of gadgets (Hsiao & Chen, 2015; Park et al., 2012), user experience (Briz-Ponce et al., 2017; Mohammadi, 2015b), or language used (H.-H. Chung et al., 2015). Language is one of the problems MOOCs face in developing countries (C. Liu et al., 2021; Ruipérez-Valiente et al., 2020a). This is because English is their second language, which most reputable MOOCs use in instructions.

The abovementioned factors are closely related to motivation (Davis et al., 1992; Douglas et al., 2020; Rowley, 2005; Seemiller, 2017). Supportive social influence and high self-efficacy increase the motivation to complete any task, considering one's level of confidence that the MOOC used is good for them (B. Li et al., 2018). Additionally, motivation is affected by curiosity (Douglas et al., 2020; Thompson & Gregory, 2012), the need to learn (Littlejohn et al., 2016), and advanced career (Douglas et al., 2020; Littlejohn et al., 2016). However, motivational factors are not dominant in developing countries because some participants study to fulfill their work obligations (Van De Oudeweetering & Agirdag, 2018).

Physical infrastructure and supporting regulations influence MOOC's retention rate in most countries (Antonelli, 2017). Inequality in infrastructure development causes differences in access to basic needs between regions (Chotia & Rao, 2017), such as the internet. For instance, inconsistent internet interferes with access to the MOOC (Shapiro et al., 2017), affecting system satisfaction (Al-Fraihat et al., 2020).

Besides the discussed factors, there are no significant differences between other parts of the world and developing countries. This excludes the order between perceived ease of use and usefulness, similar to previous research, which showed that developing countries focus on perceived ease of use (Mohammadi, 2015b).

5. Conclusion

MOOC has the potential for equal distribution of education in developing countries. However, the problem of low retention rate lacks a suitable solution. This has increased the number of studies

attempting to identify various factors to develop strategies in increasing MOOC retention. They focus on internal and external factors influenced by the system design and users, respectively. This study explored 89 publications worldwide, then filtered into 26 items for developing countries. The results found that the most important external factors in the retention rate of the MOOC system in developing countries included the perceived ease of use, usefulness, social influence, and self-efficacy. In contrast, the internal factors included the infrastructure and course content. The Scopus journals limited the number of publications in developing countries, making the results incomplete. Additionally, there may be studies in conference proceedings reports, books, thesis, and other articles. Future studies can consider more factors and structured statistical tests to achieve more significant results.

6. Author's Note

The authors declare no conflict of interest in the publication of this article and confirm that it is free of plagiarism.

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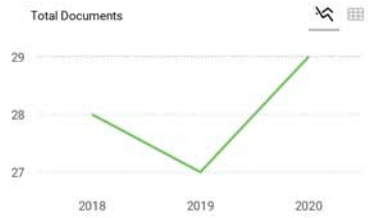

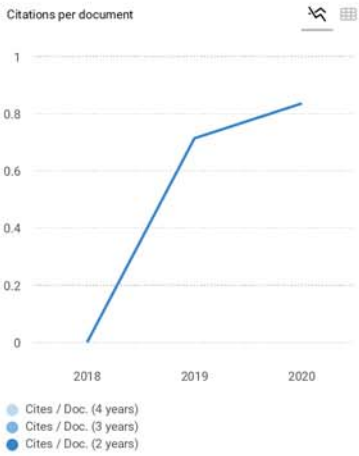

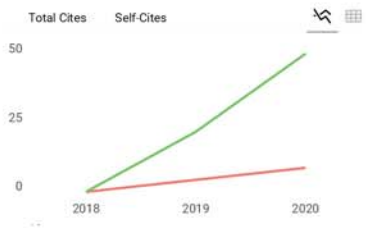

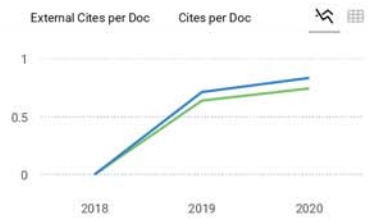

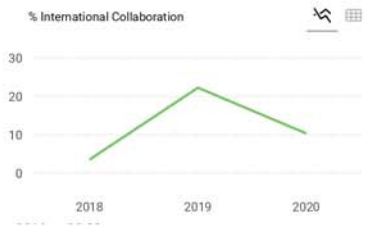

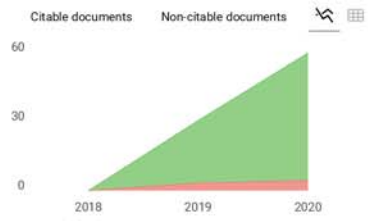

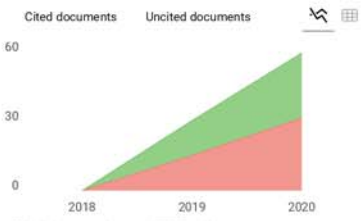

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Intakhab khan 2 years ago

Is Q1 Q2 etc a level of journal assigned scopus indexed or any other journals such as Clarivate indexed also ?

reply

SCImago Team

Melanie Ortiz 2 years ago

Dear Intakhab,

thank you very much for your comment.

SCImago Journal and Country Rank uses Scopus data as a source and our impact indicator is the SJR. The Journal Citation Report (JCR) is based on the Web of Science (WOS) journal's collection. Therefore, the Source and the Methodology used by SJR are different from the JCR.
It is also different for the Quartile's data.
In the case of SCImago, for every journal, the annual value of the SJR is integrated into the distribution of SJR values of all the thematic categories to which the journal belongs. There are more than 300 thematic categories. The position of each journal is different in any category and depends on the performance of the category, in general, and the journal, in particular . The distribution by Quartiles can not be considered over the journals' total amount within a Category. In the case of SCImago, the distribution has to be considered with the formula Highest-SJR minus Lowest-SJR divided into four.

Best Regards, SCImago Team

Syaiputra 2 years ago

Hello, Scimagojr Team.
I,m Syaiputra. I want to ask you that how long it takes to make the quartile rank appears from this journal? Thank you.

reply

Source details

World Journal on Educational Technology: Current Issues

Scopus coverage years: from 2018 to Present

Publisher: Birlesik Dunya Yenilik Arastirma ve Yayıncilik Merkezi

ISSN: 1309-1506 E-ISSN: 1309-0348

Subject area: Social Sciences: Education | Business, Management and Accounting: Management of Technology and Innovation | Computer Science: Computer Science (miscellaneous)

Source type: Journal

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0.199

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Category	Rank	Percentile
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Business, Management and Accounting — Management of Technology and Innovation	#150/248	39th

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