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**A Systematic Review: Student Focus on Online Learning Trends
in Indonesia 2015-2020**

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Abstract

In 2020, Indonesia, through MOEC, has declared the utilization of online learning as one of the critical factors in the process of modern education transformation. This study aimed to review the research development related to online learning in Indonesia to realize the potentials of online learning in improving the quality of education. The study focus on online learning chosen is those emphasizing the student's side. With data and information in this study, educators, policymakers, and researchers can make plans, predictions, and agendas of the policies that support the utilization of online learning for the development of education. The systematic review was conducted using secondary data taken from the Scopus database. The documents were filtered gradually to obtain a more comprehensive and in-depth study. Particularly in the higher education of educational institutions for educators and educational personnel, there are still a few studies on online learning that focus on students. However, there is optimism about the significant increase in related research from year to year. The result of the analysis can describe online learning implemented in Indonesia, particularly on the emphasis on the significance of students expected to get the most benefits from online learning. The issues related to the learning platform, outcome, learning management, teachers' competencies, subjects, and media will continuously develop and change dynamically and quickly, along with the development of other sciences.

Keywords: online learning, student-centered learning, Indonesia, education transformation, learning management

1. Introduction

The use of online learning in various countries increases from year to year. This phenomenon is related to the rapid development of the technology of the internet that integrates various devices used by human beings [1-5]. The utilization of this technology is also experienced by educators, students, and policymakers in education. In 2020 Indonesia, through Ministry of Education and Culture (MOEC), has declared the utilization of online learning as one of the critical factors in the process of modern education transformation. Studies on the development of online learning in Indonesia can be considered as fundamentals in making policies on the implementation of this technology. These studies can show supporting factors that need to be strengthened to adapt this technology in learning and obstructing factors that need solutions so they will not obstruct learning. This kind of study is essential, considering Indonesia as an archipelago country where each region has different characteristics and levels of readiness.

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In the implementation of online learning in Indonesia, educators tend to see online learning from various perspectives. All activities carried out without face-to-face meetings or by using the internet can be considered as online learning. The variations can be related to learning media. The use of social media such as FB, Twitter, Line, IG, and Whatsapp can be categorized as online learning. The use of email and mailing lists also includes in this category. Services from online learning providers such as Quipper, Ruang Guru, and Rumah Belajar are also categorized as online learning. Many others also use learning management systems (LMS) such as Moodle, Edmodo, Schoology, Google Classroom, and Socrative in order to manage learning activity well. Besides the applications used as learning facilities, online learning in Indonesia also run with some approaches such as full learning, blended learning, and flipped classroom, either synchronous or asynchronous.

Online learning requires users to be more independent. The independency of students in choosing learning resources they need and building learning networks with others will determine the success of online learning. The issue of student-centered learning becomes an essential issue in this type of learning. There are many studies about student-centered learning in online learning. With various characteristics of students in Indonesia, previous studies focusing on students can support the success of learning management to develop students' competencies and achievements at school. Studies on online learning that focus on students should not only consider one class studies but more massive on wider scopes. The scopes are related to the characteristics of online learning that can reach anywhere, anytime, and anyone [6].

Online learning that focuses on students can lead to the success of students' learning performances [7-8]. There are many success determinants of learning focusing on students. These are learning strategies [9-11], platforms [12, 13], learning outcomes [14, 15], learning management [16, 17], teacher' characteristics and competencies [18], subjects, and tools or applications that support learning objects [19-21].

It is essential to realize the potentials of online learning in improving the quality of education to meet the needs of modern education in this era. Therefore, this study aimed to review the research development related to online learning in Indonesia. The focus of studies was emphasizing on the student's side. With data and information in this review, educators, policymakers, and researchers can arrange plans, predictions, and agenda of policies that support the utilization of online learning for the development of education.

2. Methods

The systematic review was carried out by using secondary data from the Scopus database. The most relevant keywords in this review were 'online learning' and 'Indonesia'. In detail, Figure 1 shows the review process, including those related to inclusive and exclusive criteria. There are two phases done in the review process. Those are a general phase and a specific phase.

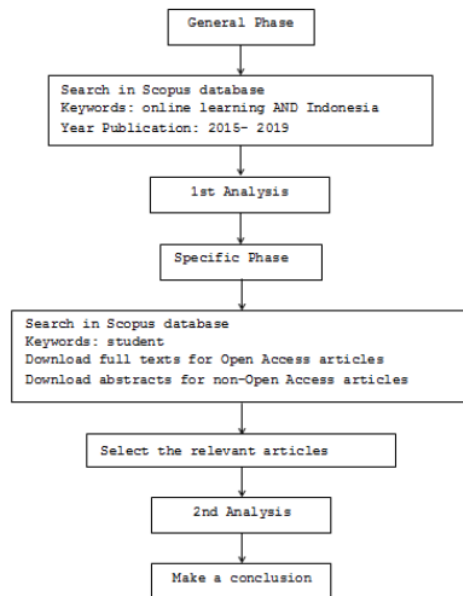


Figure 1. The systematic review process

3. Results

3.1. General Phase

In this phase, the search in the Scopus database was run by selecting all articles with the keywords 'online learning' and 'Indonesia'. The limitation was those published within the last five years. Articles of 2020 indexed on the database were not included in the consideration since there were only a few articles (20 articles), and 2020 is still ongoing. Therefore, the data used was only from 2015 to 2019. Two hundred seventy-three articles met the criteria. The article categorization used the feature available on the Scopus portal based on

1. documents by year,
2. documents per year by source,

3. documents by author, documents by subject area,
4. documents by type, and
5. documents by affiliation.

The following Figures 2 to 7 show the result.

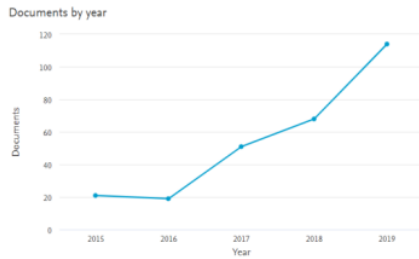


Figure 2. Documents by year

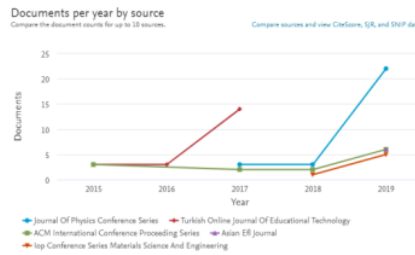


Figure 3. Documents per year by source

There is a definite improvement related to research on online learning in Indonesia. Figure 2 shows this phenomenon. There is a common tendency that research in this field has significantly increased exponentially since 2016. The more research in this field, the more fundamental for improvement, innovation, and advancement of education quality in Indonesia through online learning. However, the emphasis on the research result publication competencies needs to be balanced between outcomes in journal and proceeding (Figure 3).

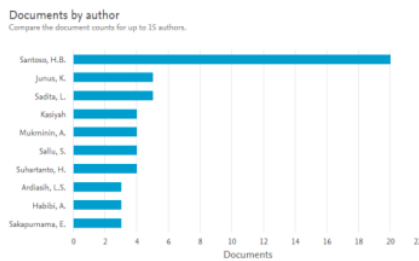


Figure 4. Documents by author

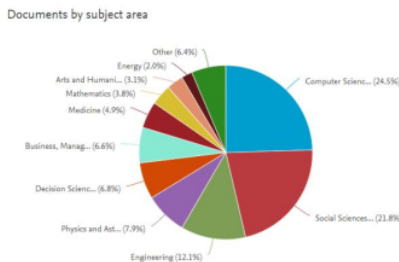


Figure 5. Documents by subject

Distribution (productivity) of authors has not been good enough. Figure 4 shows that particular researchers still dominate the studies on online learning. Studies on online learning expected to transform education have been done a lot in the field of Social Science (21.8%) even though the highest is in the field of Computer Science (24.5%).

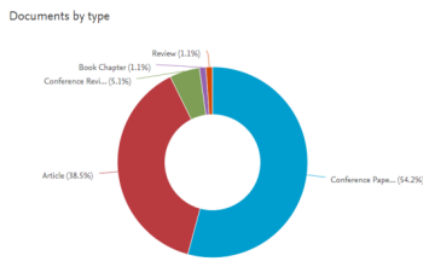


Figure 6. Documents by type

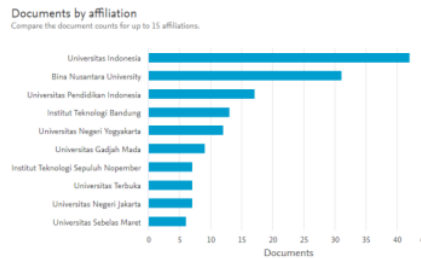


Figure 7. Documents by affiliation

For documents by type, most documents are from conferences (54.2%), as shown in Figure 6. This information completes in Figure 3. Even though the issue is about education, research on online learning is written a lot by non-educational and teacher training institutions (University of Indonesia, Bina Nusantara University). Indonesia University of Education (UPI) is on the third rank with less than 20 articles.

3.2. Specific Phase

In this phase, the search in the Scopus database was done by limiting the result of the previous search by using the keyword ‘student’. This keyword choice was to ensure the articles to be analyzed in the next phase have a study focus on students. The filtered articles will lead to various studies related to students in online learning in Indonesia. Several articles chosen would probably relate to learning strategies, online platforms, learning outcomes, learning management, teacher, learning subjects, and learning media. The result of the filtering process obtained 60 articles. Next, as in the previous phase, these articles were categorized based on the features available on the Scopus portal by categorizing based on documents by year, documents per year by source, document by author, documents by subject area, documents by type, documents by affiliation. In this filtering, it appears that the keyword “student” (60) is related to several keywords together or alone with the following keywords: E-learning (36), Teaching (23), Social Networking (online) (19), Education (16), Computer-Aided Instruction (13), Learning Systems (13), Education Computing (12), Surveys (12), and Online Learning (10). With the document filtering result of 60, Figure 8 to figure 13 show the result of the categorization.

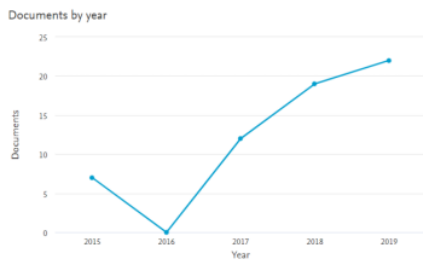


Figure 8. Documents per year

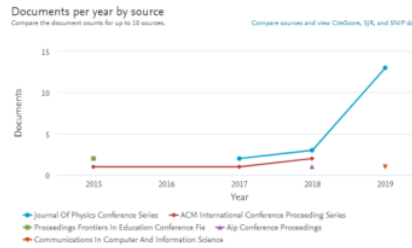


Figure 9. Documents per year by source

Figure 8 shows the common tendency that research focusing on students increases significantly even though in 2016, there was no result of related research. There is a possibility that the issue of Covid-19 spreading at the end of 2019 will decrease the result of research on online learning in Indonesia. However, it will probably increase in the research result in 2020 after the mitigation of Covid-19 because at this period, almost all schools implement online learning as recommended by MOEC. Even though numbers of articles increase (Figure 8), it appears that almost all article sources are from proceeding. It shows that researchers in this field are relatively not able to pass the international journal (Scopus-indexed). The assumption is that publication through conferences is more accessible than through journals.

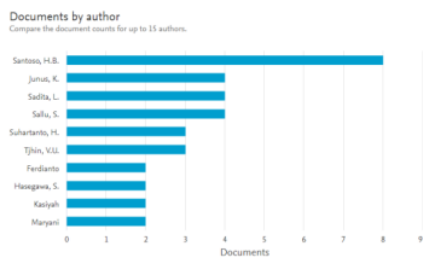


Figure 10. Documents per author

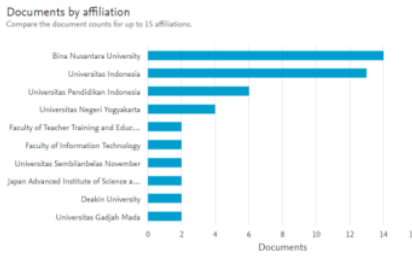


Figure 11. Documents by affiliation

There are only a few authors writing studies on online learning that focuses on students. From 60 articles, there eight articles written by Santoso [22-24], four articles by Junus [25-27], Sadita [25-27], Sallu [28-30], and other authors: Suhartanto [25], Ferdianto [31, 32], Kasiyah [33, 34], and Maryani [35, 36]. However, the number of articles does not relate to the number of author. It should be addressed.

Even though the issues discussed are about education, much research was written a lot by non-educational and teacher training institutions in the first and second rank. The two higher educational institutions for educators and educational

personnel that research a lot on the issues are Indonesia University of Education (6 articles) and State University of Yogyakarta (4 articles).

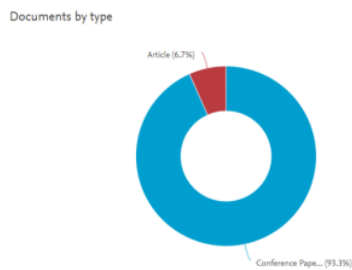


Figure 12. Documents by type

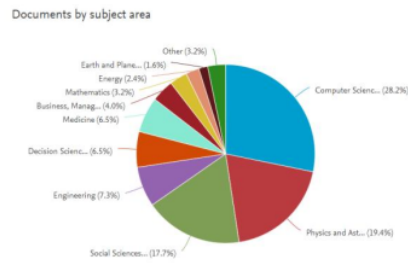


Figure 13. Documents by subject area

Figure 12 completes Figure 9, showing that the result of conferences (93.3%) have dominated documents. In comparison, subject areas that research a lot on the issues are Computer Science (28.2%), Physics and Astronomy (19.4%), Social Science (17.7%); the rests spread on other subject areas. →

Next, the 60 data were searched through full texts. Two available categories are Open Access and non-Open Access documents. For Open Access, documents were downloaded from the download manager menu, while non-Open Access documents are only from abstracts. The results are 23 Open Access documents and 37 non-Open Access (others) documents. Documents that could not be downloaded for their full texts become the limitation of this systematic review. They could not give complete information related to online learning that focuses on students in Indonesia. The analysis was applied using Open Access documents as primary sources.

4. Discussion

From data search in the Scopus database, full texts and abstracts obtained were then used for in-depth analysis. The document analysis was related to the learning strategies, online platforms, learning outcomes, learning management, teacher, learning subjects, and learning media. Generally, research on online learning in Indonesia uses standard research methods, both qualitative and quantitative. There is no new method found, and it becomes an opportunity for future research. The high commitment of MOEC on online learning will direct online learning as MOOC (Massive Open Online Course). This platform will be a new basis for educational service in the industrial revolution 4.0 nowadays. Research methods obtained from the document review are In-depth Interviews [28, 29, 37, 38], survey research [28, 29, 38-43], waterfall method [28, 29, 38], research and

development method [44], action research [45, 46], mixed method [44, 47, 48], experiment research [37, 49], literature review [50], Others including New method [30, 51-53]. Table 1 shows the review summary from Open Access.

Table 1. Filtering Result

Author(s)	Research Components							Research Methods
	Lear ning strate gy	Learni ng platfor m	Studen ts' outco me	Learni ng manag ement	Teac her Com pete ncies	Learni ng subject s	Learni ng media	
Setiadi & Ganda [37]	blend ed learn ing	YouTu be	studen t's attitud es, opinio ns, and percep tions	NA	NA	NA	pdf, ppt, doc, video s	observ ations, intervi ews, and test scores
Sari PK. et al. [38]	NA	Websit e	studen ts' compe tence	online learnin g needs analysis	NA	NA	NA	in- depth intervi ew, survey , waterf all metho d
Bahrani et al. [28]	NA	NA	NA	online learnin g design	NA	NA	NA	in- depth intervi ew, survey , waterf all metho

Author(s)	Research Components							Research Methods
	Lear ning strate gy	Learni ng platfor m	Studen ts' outco me	Learni ng manag ement	Teac her Com pete ncies	Learni ng subject s	Learni ng media	
								d
Kartiko & Sfenrianto [53]	NA	Twitter	opinio ns of studen ts in using social media	NA	NA	NA	Mess aging Text	naive Bayes algorit hm
Hamuddin & Dahler [39]	NA	Blog	studen ts' percep tion to blog, langua ge skills (readin g, writin g), studen ts' motiva tion	NA	NA	Englis h	NA	multi ple choice online questi onnair e
Firdausa & Istiyono [44]	NA	Googl e form	NA	assessi ng student collabo ration instru ment	NA	NA	NA	resear ch and the develo pment metho d, quanti

Author(s)	Research Components							Research Methods
	Learning strategy	Learning platform	Students' outcome	Learning management	Teacher Competencies	Learning subject	Learning media	tative statistical analysis (KMO, factor analysis)
Hariadi et al. [48]	hybrid learning	Brilian App.	science management understanding	NA	NA	Information System	NA	Wilcoxon test; calculation of normalized gain, the Mann-Whitney U test
Saddhono et al. [45]	blended learning	Facebook	students' independency	NA	NA	Teaching Indonesian to Speakers of Other Languages	language learning media (text, photo, link, video)	qualitative research, Individual action research began

Author(s)	Research Components							Research Methods
	Learning strategy	Learning platform	Students' outcome	Learning management	Teacher Competencies	Learning subject	Learning media	by conducting survey, observation, practice and direct evaluation
Meyliana et al. [51]	NA	LINE, Facebook, Twitter, Wiki, Blog, Instagram, YouTube, Path, LinkedIn, Podcast	students' social media preference	service quality	NA	NA	NA	hierarchy analysis, entropy and TOPSIS method
Retnowati et al. [46]	blended learning	e-learning portal (Moodle)	pedagogic competence	NA	NA	Mathematics Education	text (articles), video	classroom action research

Author(s)	Research Components							Research Methods
	Lear- ning strate- gy	Learni- ng platfor- m	Studen- ts' outco- me	Learni- ng manag- ement	Teac- her Com- pete- ncies	Learni- ng subject s	Learni- ng media	
		le?)						ch
Permana et al. [52]	NA	Twitter	NA	student's satisfaction analysis	NA	NA	text	text mining and naive Bayes method
Aeni et al. [54]	NA	Transp- ortatio- n app.	NA	NA	NA	NA	NA	qualita- tive descri- ptive with survey
Angraini et al. [55]	NA	power manag- ement app	NA	NA	NA	NA	NA	resear- ch and develo- pment
Farikah et al. [29]	NA	Websit- e	NA	integra- tion of innova- tion		NA	NA	direct intervi- ew, online survey , waterf- all metho- d
Kusmaryani et al. [47]	blend- ed learn	mobile- assis- te d	studen- ts' speaki- ng	NA	NA	Englis- h	text, voice, video, and	conver- gent paralle- l

Author(s)	Research Components							Research Methods
	Learning strategy	Learning platform	Students' outcome	Learning management	Teacher Competencies	Learning subject	Learning media	others mixed method (pretest-posttest, observation, interview)
Sari R. et al. [49]	blended learning	Internet	students' analytical thinking skill	NA	NA	Physics	simulation	one group pre-test post-test design
Sudrajat et al. [30]	NA	Website	NA	innovation management	NA	NA	NA	waterfall method
Fitri & Zahari [40]	blended learning	Moodle	student activity, understanding concepts	NA	opinions of teachers regarding the application	Mathematics	Multimedia	qualitative method (literature study, observation, interview)

Author(s)	Research Components							Research Methods
	Lear ning strate gy	Learn ing platfor m	Studen ts' outco me	Learn ing manag ement	Teac her Com pete ncies	Learn ing subject s	Learn ing media	
					n			ews)
Yunus et al. [36]	NA	Websit e (touris m)	NA	NA	NA	NA	NA	descri ptive qualita tive metho d
Sudarsana et al. [50]	NA	Googl e Classr oom	NA	activit y manag ement	NA	NA	NA	literat ure review
Sriadhi et al. [3]	NA	Googl e, YouTu be, Whats App, Faceb ook, Twitte r, Instagr am, WeCh at and Telegr am	studen t behavi or (social relatio ns, enterta inment , impro ving knowl edge	NA	NA	NA	NA	questi onnair es, intervi ew, observ ation
Bali & Liu [42]	blend ed learn ing	NA	studen t percep tion (stude	NA	NA	Manag ement, Englis h	NA	survey using questi onnair

Author(s)	Research Components							Research Methods
	Learning strategy	Learning platform	Students' outcome	Learning management	Teacher Competencies	Learning subject	Learning media	
			nt engage ment, studen t satisfa ction, and percei ved learnin g)			Literat ure and Comm uni- cation	e	
Erlin et al. [41]	NA	Faceb ook	studen t percep tions	NA	teach er perc eptio ns	inform atics engine ering, inform ation system s	Multi media	a survey using a questi onnair e

Remark: NA (Not Available) means that information do not be mentioned explicitly/ specifically

Next, from Table 1, the issues related to research components in the documents can be calculated. From the review, there are three invalid documents because they are neither related to learning nor education. They are [36], [55], and [54]. Figure 14 shows the result of the calculation.

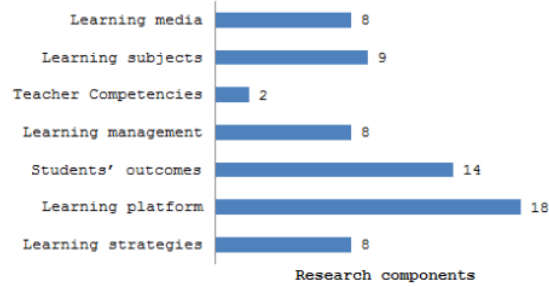


Figure 14. Filtering summary

4.1. Online learning strategies

Learning strategies in this study are divided into two. Those are fully online learning and blended learning. The term 'online learning' is used in a similar meaning with e-learning, internet-based learning, and social media-based learning. Blended learning has the similar meaning with a flipped classroom and asynchronous learning. From 21 articles, eight studies used blended learning as learning strategies. No other strategies were researched [37, 40, 42, 45-49].

The absence of fully online learning strategies because there is no government regulation through MOEC that gives opportunities to schools or higher education institutions to implement it. There are certain rules related to the implementation of online learning that requires certain qualifications for higher education institutions. Based on these reasons, educational management tends to use online learning only as complementary in the forms of blended learning. However, in the mitigation period of Covid-19 since early March 2020, MOEC released regulations that all learning activities in Indonesia should be carried out via online by using available platforms. The regulations automatically cause the quick transformation in the process towards online learning. In the future implementation, with slow level of education practitioners and the government regulation, learning will probably return as previous implementation. Essential aspects to keep online learning going are regulations and performance incentives for educational managements. Research that studies the implementation of fully online learning will be sufficiently high in the future.

4.2. Online learning platform

The utilization of online learning in Indonesia uses various platforms. There are several reasons in choosing online learning platforms. The primary aspect is

students or teacher's acceptance towards the platform. Considering the general tendency, people are now connected each other on social media. Therefore, trend of research using social media platforms is relatively dominant. From the document review, all research (18 articles) discusses the platforms. The detail of research related to learning platforms are as followings: YouTube [37, 43, 51], Website or blog [29, 30, 38, 39, 49, 51], Twitter [43, 51, 52, 53], Moodle [30, 46], Google [43, 44, 50], Facebook [41, 43, 45, 51], Others [43, 47, 48, 51].

This information shows that online learning researchers in Indonesia study social media platforms the most. Standard learning management system platforms such as Google Classroom, Moodle, Edmodo, Schoology require system operation skills that are more complicated than social media. These LMSs have many features for managing histories of learning activities well, but these features make the LMSs more complicated and the users (teachers and students) reluctant to use them. This situation becomes opportunities for researchers on the utilization of LMS. The features provided and the abilities to record learning activities are beneficial in monitoring the learning improvement. These facilities are not available on social media.

4.3. Online learning outcomes

If the polarization of learning theories can be done, there are two learning theories as references those are behaviorism theories and constructivist theories. Learning theories used in this study are theories. From data, there is a tendency that the most discussed theories that determine online learning are constructivist theories. This finding is relevant to the demand of the 21st century learning that the existence of information and communication technology makes people more independent in decision making in learning. The achievement of learning performance is the main objective of learning itself. Educators carry out various attempts to make students able to achieve the competencies.

In this review, there are relatively many research articles (14 from 19 documents) measuring online learning performances. Several research in this review conducted online learning research related to student's attitudes and behavior [37, 40, 45], students' motivation [39, 43], opinions and perceptions [37, 39, 41, 42, 53], students' general and specific competence [38, 46], language skills [39, 37], students' social media preference [51], student's thinking skill [37, 49], understanding concepts [40, 43, 48]. Findings that reveal the effectiveness of online learning to achieve student's competencies will motivate educators and educational management to implement online learning. A lot of research in this aspect becomes optimism in the implementation of online learning in Indonesia in the future.

4.4. Online learning management

Good learning management will create conducive online learning environment for teachers and students. This good environment will motivate for high competency achievements. Research on the field of learning management covers those related to planning, organizing, controlling, and actuating. In the complete learning management system platforms, these activities can be generally organized in the available features. However, with a comprehensive need analysis, researchers can also develop customized features both on the LMS available in the market or independently developed LMS.

The documents related to these kinds of research in Indonesia in this review are not many. Several issues on learning management include online learning needs analysis and design [28, 38], student assessment [44], service quality and satisfaction [51, 52]; system integration and innovation [29, 30, 50]. Research on this aspect will be probably related to software and application development research. The search with other keywords is highly recommended. Besides, research related to online learning management in the forms of applications or software can not be immediately implemented by educators because time to market and the tight competition of applications in the market make research on this topic less interesting.

4.5. Online learning teachers' competencies

Shifting from teacher-centered learning to student-centered learning as the implication of the development of science and technology in education does not mean teachers become less essential. The roles of teachers are still essential to provide a good learning environment. Teacher's competencies in this era are not only competency of pedagogy, competency of knowledge, but also competency of technology. Studies on the level of technology readiness, technology acceptance, and teacher's professional development in the utilization of online learning will determine the teacher's success in facilitating students. Unfortunately, in this review, there are still a few research that study this topic. There are only two research documents discussing teacher's perception on online learning [40, 41]. This scarcity is an opportunity in research related to online learning and will give significant impacts in the implementation of massive online learning when teachers have met the qualifications for the implementation of online learning.

4.6. Online learning subjects

Some educators believe that characteristics of knowledge being learnt will determine the feasibility of the implementation of online learning. Some subjects in the fields of science, engineering, and technology need laboratory activities. In

certain cases, simulations or online demonstrations can replace these activities; including by using internet of things (IoT) technology. However, not all activities can be carried out via online particularly considering the procedural knowledge and skills. A lot of sciences in various fields have studied the feasibility, but this review obtained not much information about the fields of studies. Some of them are in the field of Language [39, 40, 42, 45, 47]; Information System and engineering [41, 48]; Mathematics [40, 46]; Physics [49]; Management [40]; Literature and Communication [42].

4.7. Online learning media

With the development of information and communication technology, various forms of media have been serviced by applications available in the market in the forms of text, voice, video, and picture that can be easily saved, shared, and edited. Media in online learning functions as learning objects. Learning object management that is user-friendly in accordance with the student's learning needs will engage students to knowledge being learnt. The variety of media in providing learning objects becomes interesting studies in terms of the development and the utilization. Several formats of media in this review cover Text (pdf, ppt, doc, text messaging [37, 45-47, 53], Video [45-47], picture [45]; voice [47]; simulation [49]; multimedia [40, 41].

5. Conclusions

Online learning has big opportunities for Indonesia in the transformation process for better education. Many countries have or are formulating online learning policies in the ministry level involving the results of relevant research studies in order to give good direction nationally in addition to preparing hardware, software, network and technical supports for the implementation of online learning. The expectations are the policies can produce reformative education system, the improvement of social justice, and the development of economy. More specifically, the implementation of online learning will support students in facing highly competitive global economy. The systematic review shows that in the national level, particularly in the higher education of educational institutions for educators and educational personnel, there are still a few studies on online learning focusing on students. Even though this systematic review has limitedness on the scope of articles reviewed, the result of analysis can give description about online learning in Indonesia particularly on the emphasis on students that are expected to get the most benefits from online learning. The issues related to learning platforms, outcomes, learning management, teachers' competencies, subjects, and media will continuously develop and change

dynamically and quickly along with the development of other sciences. Trend at this time can change in the future.

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