A Utilization of Information Technology on Education in Indonesia (2017-2020): A Systematic Literature Review

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Abstract. This research aims to demonstrate a theoretical review of information technology used on education in Indonesia since 2017 to 2020 and review the areas that have been researched to give an overview of the potential subsequent studies. Areas of study that have been researched to give an overview of the potential subsequent studies. This study used a qualitative methods of systematic literature review of Denyer and Tranfield models which is divided into 5 systematic steps. From the documents found, demonstrated that the utilization of information technology in the field of education in Indonesia throughout the year 2017-2020 has experienced a surge in innovation in the field of development of learning media and education governance facilities. These developments are mostly solutions to solve contextual problems in research approach, dominance of development and survey is inversely proportional to the case study method, action research, phenomenology, and evaluation. In the research object, policy evaluation sector, learning evaluation, and quality assurance have not been lifted as a research object. These sectors have the potential to be objects in future research.

Keywords: Information Technology, Education, research on education, Literature Review

1. Introduction

The millennial Era is characterized by its rapid utilization of information technology and communication in various areas of life. No exception in the field of education, many innovations and implementation of information technology emerging and provide benefits to education itself. The education sector in Indonesia also experienced a surge in the utilization of information technology. The learning and governance Area of education experienced some shifts that pertain to information technology.

These shifts are a form of adaptability of the education sector to the challenges of rapidly growing times. For example, the lack of a centralized database that resulted in an inaccuracy in the target of education policy in Indonesia was addressed by the developing of the principal data system of education (Data Pokok Pendidikan – DAPODIK) in 2006 (Wahyuni, 2018). As well as the challenges of economic and environmental aspects, the government issued a Permendikbud No. 5 year 2015 on student graduation criteria, which became the basis for the implementation of computer-based national examinations as an end-level evaluation tool of every education level. The tendency of adaptability is a challenge, as well as
an entrance for the education community to reach the next level. This is evidenced by some application of information technology in terms of education such as: Variation of learning, accessibility between educational actors, education publications, quality assurance, and the use of learning support tools.

The rapid pace of information has changed the joints of the education sector gradually. In this case, there are a few things to note regarding the readiness of existing shifts. As Simanjuntak's statement (2015), that the availability of information access/technology should also consider the availability, conditions and needs of local people in accessing the information. It is an indicator that the implementation of the utilization of technology and information in the education midwives must consider the readiness and needs of the education community itself as well.

In connection with this, it is necessary to be reviewed from the documentation and research aspects of the utilization of the information technology sector in the field of education in Indonesia. Through the study, it is hoped that the academic documentation about the condition of education in Indonesia is now in this aspect of Information Technology implementation. This research aims to demonstrate a theoretical review of information technology used on education in Indonesia in since 2017 to 2020 and review the areas that have been researched to give an overview of the potential subsequent studies.

2. Methodology

In order to obtain a review of theories that also contain the potential identification of subsequent research on the utilization of IT in the field of education in Indonesia, conducted a theoretical study arrangement based on the systematic review method. This method is done according to the prevailing procedures to ensure the utilization of this method in future research. The systematic review stages used were models developed by Denyer and Tranfield (in Xavier et al., 2017) covering 5 phases:

1. Formulation of research questions
2. Research site determination
3. Selection and evaluation of research found
4. Analysis and synthesis
5. Reporting and utilization of subsequent studies

Referring to the method, the study begins with determining the research question as the first step. Research question that is the basis of this study is the utilization of information technology in the field of education in Indonesia in 2017-2020.

The next step is determining the location of research. In this case, the keyword used in the database search is "Information Technology on Education in Indonesia" with the activation of the filter feature of 2017-2020 to limit the search results. Not done combinations with other related keywords. The databases used are Science Direct and Springer. In connection with the purpose of research and development of the world today, only articles from international databases are used in this study. The first search generates a total of 2576 articles. In the first stage selection, the elimination of the articles is not relevant to the purpose of this research. After the selection is done the remaining around 32 articles that correspond to the purpose of research. These articles will then be a material analysis for later to be interpreted. The last step, the conclusion to the 4th stage will be affirmed as well as exposure to potential future research in the same sphere.

3. Result and Discussion

The search results of articles based on the methods used produce the information presented in the table as follows:
| References  | Research Approach | Core information |
|------------|-------------------|------------------|
| Udjaja, 2017 | Research and Development | A study that is purposed to help students visually blind student to learn typing words, where students at first cannot use the computer. They requires an application to make the learning process to be easier. |
| Haron, 2017 | Systematic Literature Review | This systematic literature review is proposed a conceptual model that highlights the crucial learning interactions and activities to drive engagement in the e-Learning community. |
| Zulfikar, 2019 | Survey | This survey seek out an impact of discussion topics that initiated by the students has more level of participation on the discussion forum. The results show that teacher intervention in discussion forums could affect the level of student participation. To the extent that, a discussion that have a topics from the student itself, teacher intervention does not affect the student participation level. |
| Manuaba, 2017 | Research and Development | This research developed a games that demonstrate potential way to become a media to improve reading behaviour for student |
| Budiharto, 2017 | Action Research - Eksperimen | An action research study that propose the speech recognition using stemming and tokenization for humanoid robot. To make kids became relaxed and focused, fun aspect is given on this robot. At the result, it could give a good impact on student learning process and make better the system. |
| Haryaka, 2017 | Survey | This survey research is purposed to seek out user satisfaction model for e-learning using smartphone, and to produce and give a recommendation about e-learning content for research and e-learning. The model can be considered in developing a future e-learning application. |
| Ivan, 2017 | Survey | This survey aims to know more about a games that helps students make their way to be an active learning. On the process, student leads to interpret an information by themselves, and had a motivations by it process on seeking the knowledge. |
| Cahyaningsih, 2017 | Research and Development | A model that being developed on this research can be implemented to support the government human capital management process and to achieve on developing a professional government human capital. |
| Santoso, 2017 | Research and Development | A research and development paper that seek an opportunity for modern data warehouse which could substitute traditional data warehouse which cannot handle big data in educational system. The approach of this technology will help on reduce difficulties associated with traditional data analysis. |
| Salleh, 2017 | Systematic Literature Review | This systematic literature review shows an increasing in number of researches which focusing on software functionality service development on last five years. |
| Riskinanto, 2017 | Survey | This survey research provide a new perspective on adoption of e-payment process in Indonesian users, included on education. |
| Anggreani, 2017 | Research and development | A research and development paper that proposed a conceptual design to achieve of collaboration effectiveness using information technology. By using this design, an achievement of a world class university can be realized. |
| Kurniawan, 2018 | Research and development | This research and development paper proposed an application that provides a visualization of student learning materials on anatomy subjects. This application also create a better interest in learning. |
| Hendra, 2018 | Survey | a survey that measures student grading information system that based on web. This research using 3 parameters namely benefits (usefulness), ease to use, and ease to learn. |
| References       | Research Approach                  | Summary of articles                                                                                             |
|------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Kusuma, 2018     | Systematic Literature Review       | This paper shows an opportunity of some representative gamification models that could be used as a way to make motivation, achievement, and interest in learning activities be increased. |
| Soewito, 2019    | Research and development           | This attendance system that proposed on this research and development paper designed to reduce or to eliminate potential risks that often occurs on employees absences system. |
| Rabiha, 2019     | Survey                             | The results of this survey will be used as the basis for developing ITEI applications in the future. It hopes can be used as a basis for policies and strategies creation to improve teacher performance. |
| Udajja, 2019     | Research and Development           | A game that is developed on this research can improve one's Japanese language skills on a basic and motivate player on learning Japanese. A fun principle of the game was designed to gain a motivation. |
| Ifada, 2019      | Research and Development           | This result conjectures that Collaborative Filtering method on probabilistic-keyword model can enhance the recommendation performance. This methods also better than the benchmarking methods on dealing with the sparse dataset. |
| Pranoto, 2019    | Case Study                         | A case study that give an information about implementation of augmented reality technology in learning material. It successfully makes the learning process to be more interested. |
| Sari, 2019       | Research and Development           | This research and development paper proposed a learning media application that was able to increase the knowledge and understanding of blind children. |
| Muqtadiroh, 2019 | Survey                             | This survey gains an informations of factors that performs on implementation e-learning system on Institut Teknologi Surabaya (ITS). They discover an aspect that make the lecturers had low interest in using the system, and impact of this situation on the continuous usage of its. |
| Muqtadiroh, 2019 | Survey                             | This is a survey research that gains information on Institut Teknologi Surabaya. Due on the survey that was taken, factors which influence perspective of student on institute’s digital library are: Information Providing Services, Information Organizing Services, Information Retrieval Services, Interaction Services. |
| Romadhon, 2019   | Case Studies                       | This case study gives a field report on blended learning application for learning Tahsin by using social media. They divide the learning methods into two directions, an online learning methods for deliver theory, and face-to-face learning for practices. The offline methods still to be used due to needs of instructor guidance and evaluation. |
| Utami, 2019      | Literature Review                  | This literature review shows a Facial Expressions Recognition (FER) as an important modality in the future Assessing Teaching skill System (ATS). Conclusion of this study proposes a potential for modification on algorithms, appropriate datasets, and research opportunities of FER in ATS on the future. |
| Mantra, 2019     | Evaluation                         | This paper evaluates on college websites. Security issues on websites becomes most of challenging factors to be seen by its usage as media of campus that give an information. This study reports of the security testing on the website by checking on the security vulnerability of the web. The results of this study show that most of website still has a high level of vulnerability. |
| Kardipah, 2020   | Action Research                    | This action research proved that there were significant differences in the Computer Application Course’s performance. Due to the post test that was taken, showed that there an improvement on student motivations due to the treatment of the instructional model. |
| References | Research Approach | Summary of articles |
|------------|------------------|---------------------|
| Patahudin, 2020 | Survey | This survey showed that Facebook Groups (FGs) are used for professional relations across Indonesia. The benefit of FGs on this context are for sharing information/resources about mathematics (as well as education in general), networking and communication with others. It also give an information about opportunities for teacher professional development and to access an up-to-date information. |
| Kidi, 2017 | Research and Development | This paper developing an Android based game, “Merah Putih” that can provide information about the culture of a region in Indonesia to Android users through educational game |
| Kwon, 2019 | Survey | This survey shows the important role of technology in the classrooms. It’s urgent to see how teachers receive the benefit of technology and feel confident to use it. Teachers’ selfefficacy on mobile technology takes a huge part on the integration of the technology in their classes. |
| Marwan, 2019 | Qualitative-Fenomenology | This paper gives a reports based on investigation of three English teachers in a public secondary school in Indonesia on integrating the technology on their classes. There are four major contradictions that are identified:  
- a dilemma related to teachers’ perceived value and use of technology for personal and professional purposes;  
- a conflict focused on the support required for teacher’s technology integration;  
- a conflict related to teacher’s workload; and  
- a critical conflict related to the silencing of teachers in decision making. |
| Sabani, 2019 | Literature Review | The main purpose of this literature review is to review the concept of governance, the situational characteristic of governance in developing countries, and the role of Information Computer Technology on governance sectors to combat corruption in Indonesia. |

Of the total 32 articles on table 1., shows that the use of quantitative survey research methods and research and Development dominates the search results, respectively 11 and 10 articles. The use of literary methods there are 5 articles, which are divided into two types namely using systematic literature review 3 articles namely Haron (2017), Salleh (2017), and Kusuma (2018); As well as 2 articles using traditional document study by Sabani (2019) and Utami (2019). The use of Action Research method is 2 articles, namely experimental research on humanoid robots to understand the speech in education (Budiharto, 2017), as well as research action by Kardipah (2020). 2 Case study articles by Pranoto (2019) and the case study of blended learning in Tahsin learning Institutions by Romadhon (2019). There is also a phenomenology study by Marwan (2019) which examines the experience of teaching English teachers in teaching the theory in class with Information Technology utilization. At last, 1 research article is evaluation by Mantra (2019) which evaluates the feasibility and security of higher education campus websites.

Related to the research object, 15 articles raise strategic issues around the governance of education, include: evaluation and development of personnel/Organization (6 articles), development of higher education governance (2 articles), educational institution website (2 articles), Electronic payment (1 article), library services (2 articles), Government policy area (1 article), and Education Personnel Management (1 article). While the articles are in contact with the learning sector, there are two articles discussing the development of learning Media for disability (Udjaja, 2017 & Sari, 2019); Theoretical study on the concept of electronic education (Haron, 2017); 3 articles on the development of Learning Media (Manuaba,2017, Kurniawan,2018, and Urdaja, 2019); 2 Case Studies (Pranoto, 2019 & Romadhon, 2019); and 9 qualitative research articles on survey and action research related to the learning
sector. Research related to the impression of IT service users are 2 articles (Haryaka, 2017 & Muqtadiroh, 2019). Finally, there are 1 literature study articles that provide affirmation information that the research in the information technology sector in recent years is much related to development, especially software development.

In connection with the potential for future research, most articles found in the 2017-2020 of information technology in Indonesia in the referenced database, many of them related to development research and survey. The situation is inversely proportional to the use of Action Research, case studies, phenomenology, and evaluation methods. It shows that the potential of research with the use of these methods is very possible to do in the future. The use of these methods can be used to test and evaluate innovations in the field of information technology in the education sector in Indonesia. The objects in the learning evaluation sector are also no one that has adopted it as a research area, with a variety of alternative methods. The articles relating to the development found in this study have a purpose to address the growing problems in the community at this time. For example, the development of attendance system (Soewito, 2019) is a solution offering for the stakeholders to monitor the management of government employees, no exception to those who are in the education sector.

Related to the purpose, the results of this study shows the research related to the utilization of information technology on education in Indonesia throughout the year 2017-2020, there is a tendency to develop information technology products that answer the needs of the community of education in Indonesia, both in the teaching and governance sectors. In addition, the majority of existing research has highlighted the development of learning media, governance of personnel/organization, library services, impression of the actors related to the use of information technology, database management, and the management of institutional websites. Research on assessment and education Quality assurance sector, there is absolutely no. In addition to issues concerning problems in the sector of government policy in the field of education, only 1 article was found.

4. Conclusion

The utilization of information technology on education in Indonesia throughout the year 2017-2020 has experienced a surge in innovation in the field of development of learning media and education governance facilities. These developments are mostly solutions to overcome past and present problems. In a research approach, the dominance of development and survey is inversely proportional to the case study method, action research, phenomenology, and evaluation. Similarly, in the research object, policy evaluation sector, learning evaluation, and quality assurance have not been lifted as a research object. These sectors have the potential to be objects in future research.

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