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The accessible IT for the courses on the special education undergraduate program

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Abstract

Students can learn through printed teaching materials, audio and video programs, weblogs, and or other media based on ICT (Information and Communication Technology). Yet, educators still play an essenstial role in designing every learning activity. This research aims to produce a prototype of the product development of accessible IT teaching materials for Special Education undergarduate program students. This research applied the ADDEM design model (Analyze, Design, Develop, Deliver, Evaluate, and Maintenance). Results were gathered by examining the feasibility on aspectts of efficacy and practicality of the develped product. Data were analyzed quantitatively by looking at the results of the validity and practicality test. The results of the validity test from the validators showed that all of the assesment items got a good rating of 3.0, in contrast the results of the practicality test, which was done by undergraduate students showed that there was an improvement on the score of the end-of-term test compared to the score of the mid-term test.

Keywords: learning materials, accessible learning.

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1. Introduction

Learning is defined as a several activities formatted to support the learning activities to occur among students (Wilson, 2018). Learning is used to show the events of educators and students. Likewise, education shows the interaction of students, which is not limited by the presence of educators physically. Students can learn through printed teaching materials, audio and video programs, television, radio, and other media based on ICT (Information and Communication Technology) (Balakrishnan & Gan, 2016; Hollins, 2015; Simpson, 2018). But of course, educators still have an essential role in designing every learning process in the classroom.

Learning design can be interpreted into different kind of perspectives, for example, as a discipline, as a science, as a system, and as a process (Hernandez, 2019; Stracke, 2019). As a discipline, learning design discusses various research and theories about strategies and the process of learning development and its implementation. As a science, learning design is science for creating development, implementation, assessment, and situation management specifications that provide learning services facilities at the macro and micro scales for various subjects at various levels of complexity. As a system, learning design is the development of a learning system and its implementation system, including the means and procedures to improve the quality of learning. Moreover, in learning design, there are some big theories which underlined, it such as behavioristic theory, cognitive theory and constructivist theory (Pritchard, 2017).

Affirmation of learning as an effort for students to learn, and the learning process as a linking of new knowledge to the cognitive structure that has been owned by the learners (Bada & Olusegun, 2015). However, learning is a systematic and systemic effort to initiate, facilitate, and improve the learning process. Learning activities are closely connected to the type of nature and kind of learning and learning outcomes (Illeris, 2018; Taylor, 2017). However, learning results in learning; not all learning processes occur because of knowledge. But this learning is in the context of formal education, namely education in universities or institutions and happening in the classroom. The basic concept of learning in article 1 point 20 of Law Number 20 of 2003 on Indonesia's National Education System mentioned that "Learning is the process of interaction of learners with educators and learning resources in the learning environment." In this concept contained five concepts, including interaction, learners, educators, learning resources, and learning environment.

The implementation of those previous learning concepts shows that the main characteristics of learning are the initiation, facilitation, and improvement of the learner's learning process (Eid & Al-Jabri, 2016; Mezirow, 2018). This shows that learning has the element of deliberate outsiders who do the learning process. It is individual educators or collective in a system as the main characteristic of the concept of learning (Akers & Jennings, 2015). (Trianto, 2011) and (Masika & Jones, 2016) suggest that useful knowledge is a lesson that emphasizes the full involvement of learners and educators so that it will create conditions in which all processes can achieve the desired quality.

The realization is affirmed in Indonesia's Government Regulation No. 19 the Year 2005 on the National Standards of Education, especially in Chapter IV Article 19 which suggests that the learning process schools is held in interactive ways, inspiring, challenging, enjoyable, and also inspire learners to participate actively, and equip appropriate chance for the innovation, independence and also creativity in line with talent, interest and physical development and psychological conditions of students. The embodiment as a form of inspiration in the way of developing accessible IT teaching materials for the students of the Special Education undergraduate program. The innovation of learning as a demand for a conventional nature of information and communication technology in line with the demands of the global era.

Form the design of devices/ equipment which can be illustrated and sounded that is formated through the developemnt of learning materials based on the information and communication technology or ICT (Horrigan, 2016; Lai, Shum, & Tian, 2016). Therefore, the development of accessible IT teaching materials for the Special Education undergraduate program students was chosen because it has the uniqueness of various characteristics during the learning process.

They contended through the discoveries of available learning openings to move the worldview of routine learning into the data and communication innovation in creating unused information, abilities, and conduct for learners. Accessible learning as a prepare, instruction, and educating exercises require a assortment of strategies, models, and directions media connected to realize most extreme comes about and quality (Faisal, 2011). It is Suggested that learning creates unused information, abilities, and practices that are person intelligent with data and the environment (Lowther, Russell, & Smaldino, 2011). The powers of data innovation and communications require not as it were specialized aptitudes but too requests mental development and problem-solving capacities. Additionally, learning and the classroom, which is utilizing the data and communication innovation with media bundling that conceivably is visualized and sounded the procurement of successful learning practices (Nithia, Yusop, & Razak, 2016; SĂMĂRESCU, 2016). Educators or lecturers who control, lead, and direct teaching events. (Degeng, 2000) explained that the three components in describing the delivery strategy in learning, consist of a) learning media, b) student interaction with media, and c) form of teaching and learning. Emphasis the lies on the classroom learning system view learners in heterogeneous groups with their various characteristics and learning materials. The other side of the courses at Special Education undergraduate program, facilities to support online procurement, has been developed, yet in its implementation, it is still not adequate.

Especially in courses at the Special Education undergraduate program, the foundation needs an knowledge that is not only fixed on the specific type of learning media (no multimedia). The other side of the course is there are some subjects that require a whole understanding re of the condition of various disabilities of different characteristics and needs. The problems mentioned above require the development of accessible IT teaching materials for the Special Education undergraduate program students, so the aim of this study is to develop ts the production of accessible IT teaching materials for the students of Special Education undergraduate program through several steps. So the objectives of this study are a) Testing the validity of the product of the accessible IT teaching materials for the Special Education undergraduate program students,, b) It is testing the practicality of the outcome of the available IT teaching materials for the Special Education undergraduate program students learning material.

2. Method

2.1. Research Design

As for developing this learning material by adapting the model of ADDDEM through 6 stages, namely, Analyze, Design, Develop, Deliver, Evaluate, and Maintenance (Pramono, 2015). Development of ADDDEM as one type of event to design models of accessible IT teaching materials for Special Education undergraduate program students. In this research, it implemented 6 step cycles as the basis for producing products packed through dictate and e-material book forms. The design of this study is shown in figure 1.

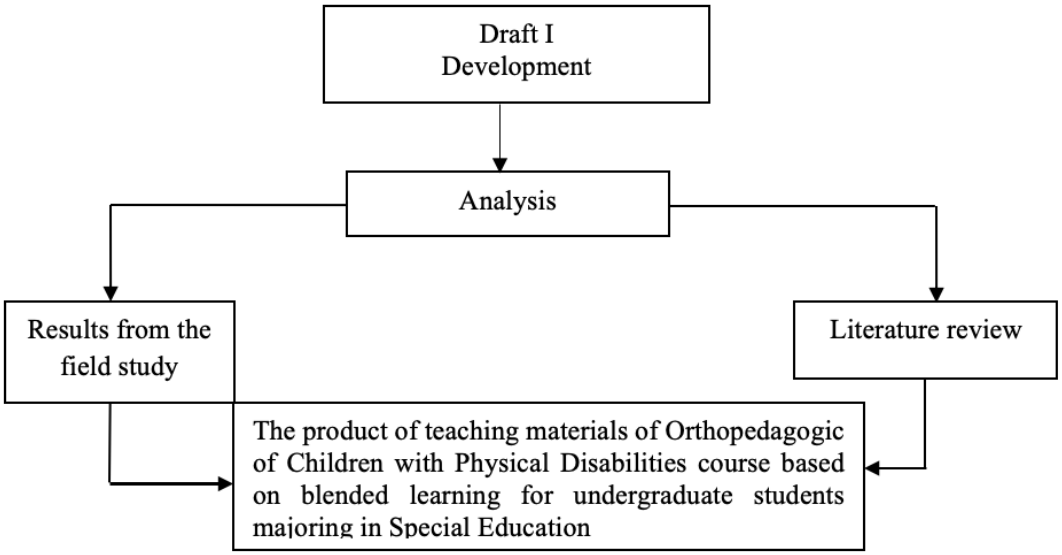

Figure 1. Design of the study.

The trial of the product of the accessible IT teaching materials for the Special Education undergraduate program students was implemented through two steps including the evaluation from experts (content experts and design experts) also from the prospective users.

2.2. Participants

Participants on this study consisted of eleven students from the Special Education Department. The latter took the Orto pedagogic of Students with Physical Disabilities course and one expert on the Special Education field. They were chosen purposively for this study.

2.3 Data Collection

Data gained from experts' evaluation and prospective users' evaluation are 1) Quantitative data, this data is obtained using an assessment questionnaire given to each expert and prospective product user, 2) Qualitative data, this data is obtained by interviewing and discussing with an expert. Besides, data can also be obtained from notes, criticisms, suggestions from experts on the content and plans for the implementation of the accessible IT teaching materials for the Special Education undergraduate program students.

2.4 Data Analysis

Data that were colleted previously o the accessible IT teaching materials for the Special Education undergraduate program students were analyzed based on the criteria provided by experts and prospective users with four categories of answers as listed in the questionnaire (score of 1, 2, 3, and 4), which were then changed in percentage form. Conversion results are based on opinions by (Cronbach, 1990):

- 0% - 64% = 1, very less precise / less obvious / less appropriate, revised.
- 65% - 79% = 2, less precise / less obvious / less appropriate, revised.
- 80% - 89% = 3, exact / clear / appropriate, unrevised.

- 90% - 100% = 4, very precise / very clear / very appropriate, not revised.

3. Results

On the implementation of the accessible IT teaching materials for the Special Education undergraduate program students refer to the Research and Development (R&D) model of ADDDEM (Analyze, Design, Develop, Deliver, Evaluate, and Maintenance), which was explained as follows:

3.1 Analyze

At this stage, as a initial execution for discovering and gathering of information was done through analyzing the competence of the course by considering the principle of reuse and repurpose, so it can be described as loose objects (learning objects) that are shareable and reusable.

3.2 Design

The development of accessible IT teaching materials for the students of Special Education undergraduate program starting with determining and then followed by (1) defines the learning object (LO) at each level (2) defines the requirements and competencies of every learning goal (LO) (3) defines the relation of each learning object (LO) (4)designing learning object's (LO) metadata (5) designing the object learning strategy (LO) (6) Designing LO learning media (7) Enhance competence, training, and assessment. The cover of the accessible IT teaching materials for the Special Education undergraduate program students is shown in figure 2.

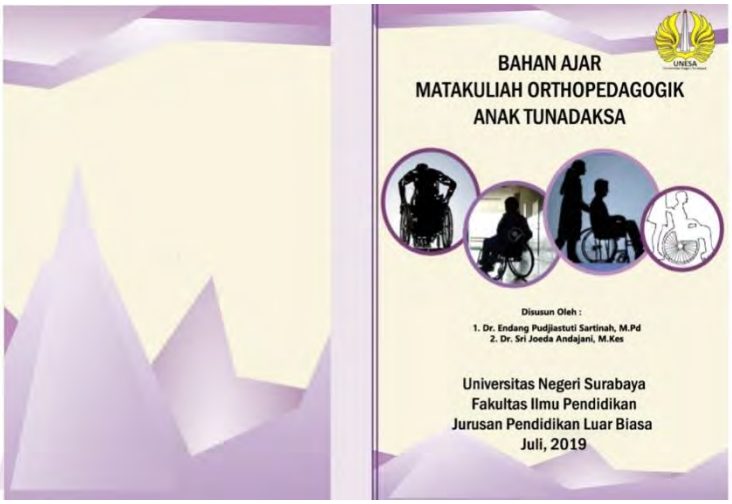

Figure 2.Teaching Materials' Cover.

3.3 Develop

- Develop e-materials by implementing repurpose and reuse LO at different level, also reuse and repurpose the object of information and digital components (evaluating new content and existing content).
- It is developing e-materials using technologies that are neutral to the delivery method.
- It is developing e-materials using a technology that is easy to use.
- Packaging e-materials follows the e-learning standard specification.

3.4 Deliver

- Apply internet technology to e-mail items with various formats.
- Implement mobile technology to e-materials.

3.5 Evaluate

At this stage is done at each stage at up and function like feedback to correct any possible errors. Content validity can be seen from how the suitability of the product with various teaching materials, while the validation of the construct is seen from the accuracy of the use of theories that are used as a handle in the formulation or preparation of the product. Practicality can be seen from whether or not the product is applied by supporting lecturers to students. Below are the results of expert and user validation tests, as follows.

- The validity of learning materials of accessible IT teaching materials for Special Education undergraduate program students. The results of the acquisition of the validator (material expert of Special Education) validation level shows that the score of the feasibility from the experts (content expert of Special Education expert) on all assessment items got "good" results. Therefore, the product of the accessible IT teaching materials for Special Education undergraduate program students is suitable for use in lectures. Some comments from the validators are as follows:
- In general, the results of validators showed a positive response regarding the components of teaching material according to indicators and descriptions.
- Teaching material products that are developed according to measurement aspects are related to content validity and construct
- Teaching material products are arranged in accordance with the developmental demands of children with physical disabilities who studied at special schools.
- Learning materials are interactive and are developed according to the needs of children with physical disabilities.
- Teaching materials are prepared by taking into account the needs of field conditions in accordance with aspects of disability.
- The practicality of the accessible IT teaching materials for the Special Education undergraduate program students . The results of the acquisition of users on all items of assessment on learning materials of accessible IT teaching materials for Special Education undergraduate program students refers to how the acquisition of learning outcomes can meet the target of students majoring in Special Education on the mid-term and end-of-term tests. Practicality test results, as shown in table 1, reported that all students experienced an increase in the mid-term and end-of-term scores.

Table 1
The Results of Mid-Term and End-of-Term Exam

No.	Students' Name	Mid-Term Exam Score	End-of-Term Exam Score
1.	AH	78	82
2.	NNI	78	80
3.	EM	82	86
4.	A	80	82
5.	SJ	82	83
6.	YAP	78	84
7.	VVS	80	85
8.	FA	77	80

9.	MSD	75	82
10.	AHK	82	83
11.	ARB	80	82

4 Maintenance

This stage is done to maintain the relevance of e-material in the accessible IT teaching materials for Special Education undergraduate program students, steps that were taken explained as follows:

a. Keeping e-content content always relevant,
b. Keeping the e-material content is always up-to-date,
c. Utilizing evaluation data for material repair or Maintenance of e-material content.

4. Discussion

In the development of the learning materials of accessible IT teaching materials for the Special Education undergraduate program students are packaged through offline and online. In the yearI produced a prototype product based on theoretical study studies, and field findings of the learning conditions in the Special Education undergraduate program courses need to be updated in its material content. This conditioning impacts the needs of the field, especially users, on human resources, especially in special schools. Special education market needs for qualified alumni need to be prepared or a review of lecture material that fits the user's field conditions so that graduates of the Special Education program meet the standards expected by the community, specifically institutions that provide services for children with special needs.

The effectiveness of the aspect of learning is usually evaluated based on the student's level of achievement at more determining studying goals (Moody & Sindre, 2003; Wai & Seng, 2015). Efficiency is usually evaluated by comparing the ratio between effectiveness and the number of time and or cost spent, while the attractiveness of learning is mostly evaluated by exploring the tendency of students to keep learning (Shafipoor, Sarayloo, & Shafipoor, 2016; Takači, Stankov, & Milanovic, 2015). (Degeng, 2000) said that learning outcomes usually follow certain lessons that must be linked to the accomplishment of the learning objectives which have been designed. In line with this, effective learning emphasizes the importance of learning as a personal process and contains learning strategies that can accommodate a variety of contexts, students with various backgrounds, needs, and problems.

Based on this reality, the development of the product as a solution to learning cognitive understanding and practice and attitudes for learning innovation. This product development referred to the ADDEM (Analyze, Design, Develop, Deliver, Evaluate, and Maintenance) development model (Pramono, 2015) with five stages. The suitability of the ADDEM development model chosen in this study was used to develop a product of accessible IT teaching materials for Special Education undergraduate program students . The process in developing the accessible IT teaching materials for Special Education undergraduate program students was supported by a theory put forward by (Heinich, Molenda, Russell, & Smaldino, 2005) product development was not only limited about teaching and learning media but also in the form of procedures, learning activities and instruments. The implementation of the accessible IT teaching materials for the Special Education undergraduate program students on target, so that they can overcome the problems faced by lecturers who have found various references and field data.

Moreover, free learning through E-learning gives openings for understudies to require control of the victory of learning for each (Arkorful & Abaidoo, 2015; Harandi, 2015; Yanuschik, Pakhomova, & Batbold, 2015). This implies that learners are given the flexibility to decide when they will begin when they wrap up, and what parts of the material they need to memorize to begin with (O'Donnell, Untamed, Sharp, & Swim, 2015b, 2015a; Parkes, Stein, & Perusing, 2015). Learners can begin from subjects or pages that intrigued them to begin with or can fair skip the parts that they think they have

aced (Caputi & Garrido, 2015). In case the undergrad understudies of the Extraordinary Instruction Program have trouble understanding separated, they can rehash it once more until he feels able to get it. On the off chance that, after rehashed, there are still things that are not caught on, understudies can contact the instructor/resource individual through email or intuitively exchange at certain times. E-learning, as communicated by (Rusman, 2015) was clarified as learners and understudies may communicate successfully through web offices or anytime the communication handle is happened without being constrained by time and put. Understudies and learners might utilize guidelines learning or guidelines materials, which is internet-structured (Bashir, Mahmood, & Shafique, 2016; Camargo et al., 2014; Dwyer, 2016). Additionally, Wedemeyer (Rusman, 2015) attested that the autonomy of learning with e-learning programs requires understudies to memorize autonomously and independently.

With respect to the instructive strategy of open learning, the relationship between understudies and learners is closely central to instruction (Hung & Chou, 2015; Okaz, 2015; Y. Wang, Han, & Yang, 2015). With this strategy, it can create great quality instruction, and not as it were make understudies shrewd but moreover taught with fitting conduct. Moreover, the affect of the conditions of framework and learners that are not suitable, and the expanding number of understudies, the routine strategy isn't accomplishing most extreme comes about. The comes about of learning considers that coordinated learning utilizing computers (i.e., web) with conventional strategies state that the accomplishments gotten are superior with computers (i.e., web) (M. Wang, Kirschner, & Bridges, 2016; Zheng, 2016). Learning is best for understudies in case it is orchestrated methodicallly, which can motivate, be fun, and persuade so that they can learn autonomously and are planned agreeing to their review or level.

5. Conclusion

The implementation of the accessible IT teaching materials for the Special Education undergraduate program students has been developed based on the ADDDEM model. In the stages of the process of applying the accessible IT teaching materials for the Special Education undergraduate program students. The results were gathered by examining the feasibility on aspectts of efficacy and practicality of the develped product. The results from the validator on the validity test showed that all items got a good score of 3.0. Moreover, this study has shown that the accessible IT teaching materials for the Special Education undergraduate program students were impactful in increasing the students' mastery level on the courses. It can be seen from the remarkable improvement results from the mid-term exam to the end-of-term exam.

6. Recommendations

Based on the results of the study, several recommendations are drawn as follows:

a. Further study may include wider participants.
b. Further study may examine other types of courses for higher education students to provide another view on the use of accessible IT.
c. The other model of development besides ADDEM is also worthy of being explored more.

7. References

Akers, R. L., & Jennings, W. G. (2015). Social Learning Theory. *The Handbook of Criminological Theory*, pp. 230–240. https://doi.org/10.1002/9781118512449.ch12

Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. *International Journal of Instructional Technology and Distance Learning*, *12*(1), 29–42.

Bada, S. O., & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research & Method in Education*, *5*(6), 66–70.

Balakrishnan, V., & Gan, C. L. (2016). Students' learning styles and their effects on the use of social media technology for learning. *Telematics and Informatics*, *33*(3), 808–821. https://doi.org/10.1016/j.tele.2015.12.004

Bashir, S., Mahmood, K., & Shafique, F. (2016). Internet use among university students: a survey in University of the Punjab, Lahore. *Pakistan Journal of Information Management and Libraries*, *9*(1).

Camargo, S. P. H., Rispoli, M., Ganz, J., Hong, E. R., Davis, H., & Mason, R. (2014). A Review of the Quality of Behaviorally-Based Intervention Research to Improve Social Interaction Skills of Children with ASD in Inclusive Settings. *Journal of Autism and Developmental Disorders*, *44*(9), 2096–2116. https://doi.org/10.1007/s10803-014-2060-7

Caputi, V., & Garrido, A. (2015). Student-oriented planning of e-learning contents for Moodle. *Journal of Network and Computer Applications*, *53*, 115–127. https://doi.org/10.1016/j.jnca.2015.04.001

Cronbach, L. J. (1990). *Essentials of Psychological Testing . New York, NY: HarperCollinsPublishers*. Inc.

Degeng, I. N. S. (2000). Teori belajar dan strategi Pembelajaran. *Surabaya: Citra Raya*.

Dwyer, B. (2016). Engaging all students in internet research and inquiry. *The Reading Teacher*, *69*(4), 383–389.

Eid, M. I. M., & Al-Jabri, I. M. (2016). Social networking, knowledge sharing, and student learning: The case of university students. *Computers & Education*, *99*, 14–27. https://doi.org/10.1016/j.compedu.2016.04.007

Faisal, A. (2011). *Efforts to Increase Student Activity through Implementation of Blended Learning at Biology Learning Class XI SMAIT Nur Hidayah Kartasura*. Thesis: FKIP UNS.

Harandi, S. R. (2015). Effects of e-learning on Students' Motivation. *Procedia - Social and Behavioral Sciences*, *181*, 423–430. https://doi.org/10.1016/j.sbspro.2015.04.905

Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (2005). Instructional technology and media for learning. *New Jersey, Columbus. MULTI MEDIA PEMBELAJARAN*, *141*.

Hernández-Leo, D., Martinez-Maldonado, R., Pardo, A., Muñoz-Cristóbal, J. A., & Rodríguez-Triana, M. J. (2019). Analytics for learning design: A layered framework and tools. British Journal of Educational Technology, 50(1), 139-152.

Hollins, E. R. (2015). *Culture in school learning: Revealing the deep meaning*. Routledge.

Horrigan, J. B. (2016). Lifelong learning and technology. *Pew Research Center*, *22*.

Hung, M.-L., & Chou, C. (2015). Students' perceptions of instructors' roles in blended and online learning environments: A comparative study. *Computers & Education*, *81*, 315–325. https://doi.org/10.1016/j.compedu.2014.10.022

Illeris, K. (2018). *Contemporary theories of learning: learning theorists... in their own words*. Routledge.

Lai, C., Shum, M., & Tian, Y. (2016). Enhancing learners' self-directed use of technology for language learning: the effectiveness of an online training platform. *Computer Assisted Language Learning*, *29*(1), 40–60.

Lowther, D. L., Russell, J. D., & Smaldino, S. E. (2011). Instructional Technology & Media For Learning Teknologi Pembelajaran dan Media untuk Belajar (Terjemahan. Edisi Kesembilan). *Jakarta: Kencana Prenada Media Group*.

Masika, R., & Jones, J. (2016). Building student belonging and engagement: insights into higher education students' experiences of participating and learning together. *Teaching in Higher Education*, *21*(2), 138–150.

Mezirow, J. (2018). Transformative learning theory. *Contemporary Theories of Learning*, pp. 114–128. https://doi.org/10.4324/9781315147277-8

Moody, D. L., & Sindre, G. (2003). *Evaluating the effectiveness of learning interventions: an information systems case study*.

Nithia, K., Yusop, F. D., & Razak, R. A. (2016). Mobile learning for teaching and learning Science, Technology, Engineering and Mathematics (STEM): a review of literature. *ECONOMICS, SOCIAL SCIENCES*.

O'Donnell, E., Lawless, S., Sharp, M., & Wade, V. P. (2015a). A review of personalised e-learning: Towards supporting learner diversity. *International Journal of Distance Education Technologies (IJDET)*, *13*(1), 22–47.

O'Donnell, E., Lawless, S., Sharp, M., & Wade, V. P. (2015b). A Review of Personalised E-Learning. *International Journal of Distance Education Technologies*, *13*(1), 22–47. https://doi.org/10.4018/ijdet.2015010102

Okaz, A. A. (2015). Integrating Blended Learning in Higher Education. *Procedia - Social and Behavioral Sciences*, *186*, 600–603. https://doi.org/10.1016/j.sbspro.2015.04.086

Parkes, M., Stein, S., & Reading, C. (2015). Student preparedness for university e-learning environments. *The Internet and Higher Education*, *25*, 1–10. https://doi.org/10.1016/j.iheduc.2014.10.002

Pramono, M. (2015). *The Development of E-Content of Virtual Learning*. Surabaya: Unesa University Press.

Pritchard, A. (2017). Ways of learning: Learning theories for the classroom. Routledge.

Rusman. (2015). *Pembelajaran tematik terpadu teori praktik dan penilaian*. Jakarta: Rajawali Press.

SĂMĂRESCU, N. (2016). The teacher's role in blended learning and teaching. *Conference Proceedings Of» ELearning and Software for Education «(ELSE)*, (03), 620–622. " Carol I" National Defence University Publishing House.

Shafipoor, M., Sarayloo, R., & Shafipoor, A. (2016). Infographic (information graphic); a tool for increasing the efficiency of teaching and learning processes. *International Academic Journal of Innovative Research*, *3*(4), 39–45.

Simpson, O. (2018). *Supporting students in online, open and distance learning*. Routledge.

Stracke, C. M. (2019). Quality frameworks and learning design for open education. The International Review of Research in Open and Distributed Learning, 20(2).

Takači, D., Stankov, G., & Milanovic, I. (2015). Efficiency of learning environment using GeoGebra when calculus contents are learned in collaborative groups. *Computers & Education*, *82*, 421–431. https://doi.org/10.1016/j.compedu.2014.12.002

Taylor, E. W. (2017). Transformative Learning Theory. *Transformative Learning Meets Bildung*, pp. 17–29. https://doi.org/10.1007/978-94-6300-797-9_2

Trianto. (2011). *Model-Model Pembelajaran Inovatif Berorientasi Konstruktivistik*. Jakarta: Prestasi Pustaka Publisher.

Wai, C. C., & Seng, E. L. K. (2015). Measuring the effectiveness of blended learning environment: A case study in Malaysia. *Education and Information Technologies*, *20*(3), 429–443.

Wang, M., Kirschner, P. A., & Bridges, S. M. (2016). Computer-based learning environments for deep learning in inquiry and problem-solving contexts. *Proceedings of the 12th International Conference of the Learning Sciences (ICLS)*.

Wang, Y., Han, X., & Yang, J. (2015). Revisiting the blended learning literature: Using a complex adaptive systems framework. *Journal of Educational Technology & Society*, *18*(2), 380–393.

Wilson, J. L. (2018). Models of Student Learning. *Student Learning in Higher Education*, pp. 150–165. https://doi.org/10.4324/9780429445569-10

Yanuschik, O. V, Pakhomova, E. G., & Batbold, K. (2015). E-learning as a Way to Improve the Quality of Educational for International Students. *Procedia - Social and Behavioral Sciences*, *215*, 147–155. https://doi.org/10.1016/j.sbspro.2015.11.607

Zheng, L. (2016). The effectiveness of self-regulated learning scaffolds on academic performance in computer-based learning environments: a meta-analysis. *Asia Pacific Education Review*, *17*(2), 187–202. https://doi.org/10.1007/s12564-016-9426-9