The Development of Hybrid-Learning Model Using Etno-Stem Approach for Education Students in Universitas PGRI Semarang

Fine Reffiane[1*], Sudarmin Sudarmin[2], Wiyanto Wiyanto[2], S Saptono[2]

[1]College Students a Postgraduate Program Universitas Negeri Semarang, Indonesia

[2]Lecturer a Postgraduate Program Universitas Negeri Semarang, Indonesia
[*]Corresponding Author : finereffiane@upgris.ac.id

Abstract. In this 21st century, learning process has two choices; online and offline learning. The old learning way (offline) suddenly has to be stopped due to the Covid-19 pandemic and be changed into online as the solution which expectedly bring positive effectiveness on skills of students in this century. According to (1) online learning should be able to make the knowledge and skill balanced.
Hybrid learning model using Etno-STEM offers learning model in an interesting thematic way. The thematic way formed through Etno-STEM approach will be combined with Learning Management System (LMS) to make a dynamic learning. The use of LMS which demands ability of using digital and the unity of local wisdom expectedly helps students balance their knowledge and skills. This is in line with (2) that learning should balance the skill of natural behaviour and knowledge accompanied by local wisdom.
The aim of this study is developing ability of 21st century of education students. It is going to investigate the advantages and disadvantages of Hybrid learning Model using Etno-STEM approach. True experimental design was applied.
The result revealed that the readiness of supporting system was 86,17 % for server while 61.5 % for networking system and grouped into sufficient. Students' interest for offline learning in Universitas PGRI Semarang was high (80, 50%) and grouped into interesting. In conclusion, this study result is matched with the learning system at present.

Keywords: hybrid-learning; etno-stem.

INTRODUCTION

Industrial revolution 4.0 or well-known as digital revolution or technology disruption era. Industry 4.0 is characterized by physical cyber, people communicate using internet. Consequently, to fulfil daily needs, people utilize technology such as online shopping, e-money, e-banking, and online transportation.

Higher educational world should not run over, utilize, and prepare to face phenomenon of industrial revolution 4.0. The ministry of Research, Technology, and Higher Education, (Applebaum et al., 2017) said that higher education in Indonesia should bring a change on "disruptive technology era" and take a role of developing country. How to integrate industrial revolution 4.0 into higher educational world?

The answer is the learning process itself for academics should be able to utilize technology, information, and communication. How is that learning? The ministry of research, technology, and higher eduction responds that challenge by the implementation of online learning to have an easy learning system (Bandyopadhyay & Szostek, 2019).

In the response of the program proposed by the government, University of Maritim Raja Ali Haji has e-learning system named Syarah. E-learning method helps lectures a lot in delivering materials in more practical way and easy to be accessed by students. Furthermore, to bulid an effective learning, lecturers should be able to prepare learning devices (Baguma et al., 2019). This study is going to develop the content of the e-learning for Capita Selecta course.

The e-learning model applied in this study is blended e-learning in which some students will study at home and others do at classroom. In the process of it, both lecturers and students can have an access of online materials, learning video, online discussion, online task, and online test. Accordingly, the research question of this study is as follow: is hybrid learning model effective for the lecturing of educational students?

METHOD

This study applied research and development design through ADDIE model analyse, design, develop, implement, and evaluate.
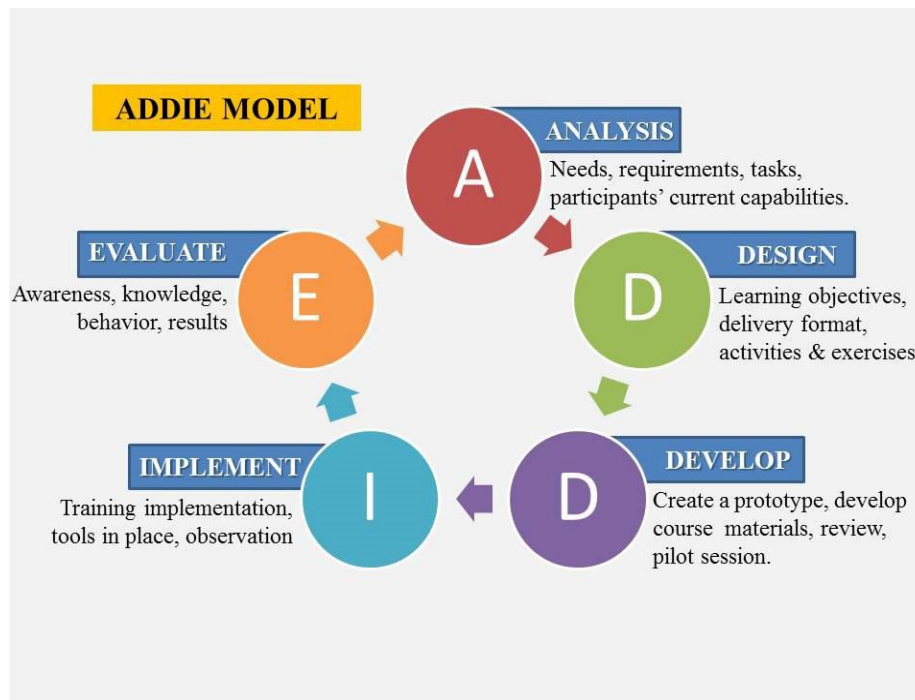
Figure 1. The Addie Model Analyze, Design, Develop, Implement, and Evaluate

The purpose to analyse is to identify problems faced by the researchers. From the problems found, an appropriate design is created to tackle the problems. The next step is develop in which it is functioned to ensure and validate learning materials going to be used. After checking the validity, the learning materials are used in learning process and take an observation of the effects of the validation (Azalia, 2020). Lastly, evaluating the quality of learning materials. Applying ADDIE Model, this study covers:

1. Analysing teaching needs including the analysis of standard of competence and basic competence, and learning sources. Analysis is done towards the availability of suitability and the easiness in the utilization.

2. Designing teaching materials. The steps in designing are designing the outline of the book covering aspects needed to achieve a competence, collect updated and relevant references as writing materials, using a variety of sources which can make the material vary, put attention on the sentences written which should be match with the students' age and experiences.

3. Implementing the teaching materials in the class by asking students to read and give questions as evaluating materials.

4. Developing materials. This step is a product realization. The development process is done based on the design constructed. Afterwards, the teaching materials are validated by experts of materials and experts of media. In the validating process, validators use instruments designed. The validation is done to know the validity of the content and the construction. The teaching materials were assessed based on the aspects of good materials. Some suggestions and comments were also asked to be used as the references during the revision for better materials. Furthermore, the materials are validated until it is good to be implemented. In this step, data analysis on the assessment result was also done to get the score of the validity.

5. Assessing the materials (evaluating and revising). Evaluation was done in order to get proper materials by assuming whether the materials are good or need to have another revision. In this step, the experts are given an evaluation instrument in the form of open ended questionnaire. The result of the evaluation will be used to analyse in descriptive qualitative way as the references during the revising process of teaching materials for online learning.

RESULTS AND DISCUSSION

Teaching materials are all materials designed systematically to help teachers/instructors doing the learning activities and can be used by students for their study (Sudarmin et al., 2020). After the materials of PHI course were assessed by the experts, some suggestions were given related to;

1. Analysis of teaching material needs
2. Designing teaching materials
3. Implementing the design in the class
4. Developing teaching materials

Table 1. The following is the result of the instruments evaluation

No	variable	Indicator	Evaluation Result			
			4	3	2	1
1	Material completion	Material depth	v			
		Material completion	v			
		Material completion	v			
2	Material accuracy	The data and facts accuracy	v			
		Concept and definition accuracy	v			
		Figure and illustration accuracy		v		
		Glossary accuracy		v		
		Example and case accuracy	v			
3	Material compatibility	The material compatibility with science development	v			
4	Material updating	. The updating references	v			
5	Students' motivation improvement	. triggering students' curiosity	v			
		. be able to improve students questioning skill	v			

Based on the table above, for the material accuracy the figure should be attached with illustration. The material compatibility with social science and students' curiosity were not accommodated yet in designing learning media. The efforts to make students' questioning skill improve were also not performed. Hence, the experts said that the contents can be revised based on the suggestion on validation sheet so that the material content can be delivered as the learning goals do.

Table 2. The Experts' Assessment Result

No	variable	Indicator	Evaluation Result			
			4	3	2	1
1	Content Accuracy	Valid	v			
		Aligned with Social Values	v			
		Up-to-date	v			
2	Content Scope Accuracy	The scope fits the instruction goals	v			
		The depth fits the instruction goals	v			
		Concept Integrity		v		
3	Digestibility	Logical	v			
		Sequence	v			
		Enough examples and illustration		v		
		Consistent Format	v			
		The availability of Relevance		v		
		The availability of usage explanation	v			
4	Language Use	Languages are communicative	v			
		The Words are brief and simple	v			

Online media are those used to help lecturers in doing teaching and learning process. Those may be in written or not written (Davis et al., 2019). Lecturers need to develop online media because they should have or use teaching materials which are in line with:

a. Curriculum, in this case the teaching materials produced has followed Nationa Qualification Standard so that teaching goals in Lesson Plans designed matches teaching materials developed.

b. Characteristics of study object, in this case is students.

c. Good online media, one of the produced teaching methods, have at least the adequate quality requirements of materials, learning, or pedagogic, and readability level related to the readers' need and understanding level. So that, the process of designing should take concern on aspects of curriculum, subjects' needs and characteristics. In this case, assessment experts are needed such as

substantial experts, language experts, and pedagogical. Consequently, the worthiness of the teaching materials are accepted.

d. The development of materials during e-learning have fulfilled the material content, pedagogic, and language although imperfect. Overall, the teaching materials of produced are good but still need to be tested to students so that students' responses are known to identify its effectiveness.

The first explanation deals with students' response related to university preparation for e-learning. In term of e-learning facility, lecturers used asyncronous tool during e-learning for university students as discussion forum, email, learning manajemen system, google classroom, zoom, google drive, google meet and whatsapp (Reffiane et al., 2018). The readiness of supporting systems provided by university for e-learning are 56.17% for server and network system categorized into adequate and the rest is adequate enough (unstable). Students' interest in e-learning performance in Universitas PGRI Semarang is high (47, 19%), students were excited and the rest was average (39, 32%).

The second deals with students' motivation in e-learning. One of the students' motivations was shown by students' excitement for online learning (67, 41%) and categorized into excited. Then, 69,33 % of students had got preparation before joining online learning with a few of them had accessed the learning materials. Meanwhile 57, 3 % of students showed their excitement by exploring the course. For the excitement of having online learning, 71% of the students felt motivated. The reason why students join online learning in Universitas PGRI Semarang was due to lecturers' instruction (60, 67%), others were to take advantages of science and technology. And students said that the slides of power point presented by lecturers were interesting (78, 61%).

CONCLUSION

Students' understanding about Science course got improved after interaction between lecturers and students in online learning occurred. The instrument of the study revealed that online learning was supported by university and lecturers where facilities and infrastructure were provided and the lecturers prepared teaching materials based on the learning objectives. Students' motivation increased as learning variation and they prefer online learning as the way of developing and delivering materials.

REFERENCE

Alam, N. A. R. (2021). The Importance of Parent'S Literacy Understanding Towards Children Reading Habits. *Library Philosophy and Practice*, 1–10.

Applebaum, L. R., Vitale, J. M., Gerard, E., & Linn, M. C. (2017). Comparing design constraints to support learning in technology-guided inquiry projects. *Educational Technology and Society*, *20*(4), 179–190.

Azalia, I. (2020). *Pengaruh Penerapan E-Book Bermuatan STEM Terintegrasi Etnosains Terhadap Keterampilan Generik Sains Peserta Didik Pada Materi Kesetimbangan Kimia*. Skripsi.

Baguma, R., Bagarukayo, E., Namubiru, P., Brown, C., & Mayisela, T. (2019). Using WhatsApp in Teaching to Develop Higher Order Thinking Skills-a Literature Review Using the Activity Theory Lens Rehema Baguma and Emily Bagarukayo Proscovia Namubiru Cheryl Brown University of Canterbury , New Zealand Tabisa Mayisela University of C. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT), 15*(2), 98–116.

Bandyopadhyay, S., & Szostek, J. (2019). Thinking critically about critical thinking: Assessing critical thinking of business students using multiple measures. *Journal of Education for Business*, *94*(4), 259–270. https://doi.org/10.1080/08832323.2018.1524355

Davis, A. P., Grondin, C. J., Johnson, R. J., Sciaky, D., McMorran, R., Wiegers, J., Wiegers, T. C., & Mattingly, C. J. (2019). The Comparative Toxicogenomics Database: Update 2019. *Nucleic Acids Research*, *47*(D1), D948–D954.

Onajite, R. (2021). Influence of Information Behaviour on Substance Use of Undergraduates in Universities in Ogun State, Nigeria. *Library Philosophy and Practice*, 1–16.

Reffiane, F., Sudarmin, M., Wiyanto, M., & Prasetyo, A. B. (2018). Blended Learning Analysis in Nature Basic Concept in Elementary School Teacher Education Study Program. *ISET*, *247*, 169–171.

Shute, V. J., Wang, L., Greiff, S., Zhao, W., & Moore, G. (2016). Measuring problem solving skills via stealth assessment in an engaging video game. *Computers in Human Behavior*, *63*, 106–117.

Sudarmin, Sumarni, W., Mursiti, S., & Sumarti, S. S. (2020). Students' innovative and creative thinking skill profile in designing chemical batik after experiencing ethnoscience integrated science technology engineering mathematic integrated ethnoscience (ethno-stem) learnings. *Journal of Physics: Conference Series*, *1567*(2).

Sumarni, W., Sudarmin, Wiyanto, & Supartono. (2016). The reconstruction of society indigenous science into scientific knowledge in the production process of palm sugar. *Journal of Turkish Science Education*, *13*(4), 281–292.

Tabatabaee-Yazdi, M., Motallebzadeh, K., Ashraf, H., & Baghaei, P. (2018). Development and validation of a teacher success questionnaire using the rasch model. *International Journal of Instruction*, *11*(2), 129–144.