Advances in Social Science, Education and Humanities Research, volume 599
Proceedings of the Tenth International Conference on Languages and Arts (ICLA 2021)

Adaptive Assessment Model in Online Teaching Practices for English Teacher Education Programs

Salam Mairi[1*], Nur Rosita[1], Nora Fudhla[1]

[1] *English Department, Universitas Negeri Padang, Padang, Indonesia*
[*] *Corresponding author. Email: salammairi@fbs.unp.ac.id*

ABSTRACT
This study aimed to design an assessment model in response to the enactment of policies regarding the use of E-learning at all educational institutions including English teacher education programs. The policies are considered rather fresh but have a very broad fundamental impact on the quality of teaching and learning, especially at English teacher education programs. The lack of accommodating assessment guidelines is exclusively important to be paid serious attention to as it is directly related to achieving the desired learning outcomes. Therefore, the study and development of an appropriate and practical model like this are needed for an assessment reference or guideline that is not fixated on conventional teaching methods but is adaptive to the use of technological innovations as indicated by policies regarding the employment of E-learning at teacher education programs. This is an effort to improve the quality of teaching and learning that is more applicable and contextual to support the transition of learning modes and styles that adopt technological innovations at teacher education programs, particularly with the presence of Covid-19 which has urged all to transition to online teaching and learning. RCFES (Reflective, Collaborative, Formative, E-Portfolio, Summative) model is expected to contribute further to the development of a more widely usable adaptive assessment model or framework for online teaching and learning.

Keywords: *Assessment, Evaluation, Blended Learning, E-Learning, Teacher Education*

1. INTRODUCTION

The integration of modern Information and Communication Technology (ICT) today has penetrated all aspects of human life including education. Especially with the presence of Covid-19, we have all transformed our teaching into an online mode. Aside from the emergence of formal learning management systems (LMS) at various institutions, some of the examples of ICT integration for informal educational purposes especially in language learning are the creations and innovations through mobile language learning applications that can be accessed via smartphones where they make use of technology for learning foreign languages very close to one's daily activities or routines. This fact evidences the widely known concept that modern ICTs can help minimize learning barriers and obstacles such as distance, time, place, and material availability. Thus, the quality and quantity of learning activities can be optimized accordingly to achieve the expected learning goals.

Pedagogically, some of the advantages of this are that the online learning system supports both blended learning and collaborative learning approaches. While blended learning is a learning model that combines traditional face-to-face classes with virtual classes that have no boundaries on place and time [1], collaborative learning relies on activities where between fellow students or teacher educators and students work together. These allow an optimum process of knowledge transfer during student-teacher communication and interaction within the online teaching and learning process [2]. This is an important transformation in the field of education where education is believed to be an individual routine that has flexibility in its framework [3]. Moreover, the presence of technological devices in every student's daily life such as smartphones and tablets are undisputable and they literally use it for everything. As Tang et al. [4] stated, all students use ICT for both entertainment purposes and academic purposes. Therefore, the incorporation of both enhances learning in learners' daily lives both in quantity and quality [5]. The question now is whether we can help them optimize the use of their gadgets for learning or not.

According to Wijaya [6], the main characteristics of the use of ICT in teaching are the availability of all kinds of learning materials and their delivery methods, which include instruction media, teaching materials, and exercises that can be accessed anytime and anywhere. The digital materials when they are made carefully and

informedly can increase student agency, motivation or willingness in learning, and responsibility in solving problems [7,8,9]. Furthermore, the use of ICT provides personalized learning experiences tailored to the needs, styles, and interests of their individual preferences but still connected. This brings up another advantage of E-learning, it is to enhance the quality of learning in a class with heterogeneous students, where they are all good with the present technology. Accordingly, Jenkins et al. [10] defined that the millennial generation as digital natives or native users of the digital world.

Particularly in English teacher education programs where E-learning has been adopted to improve the quality of learning and to keep up with the current innovations, it has provided a space of flexibility for teacher educators and students in organizing their learning. This is of course significant progress and will continue to grow and advance. Consequently, not only that E-learning facilitates access to learning by minimizing the possibility of having learning barriers but it also provides unlimited learning resources. It trains both teacher educators and students to apply good agency within themselves as well as to be more independent in the teaching and learning process.

The process of adopting E-learning by any program or institution during this Covid-19 period has surely been challenging. At a glance, it is very visible at the practical level that both teacher educators and students face obstacles and confusion. This can occur due to several factors, such as differences in the generation of E-learning users which results in different reactions to this policy. Another factor could be the diversity of beliefs in the concepts and methods of E-learning for the teaching and learning process. Then, there is the variety of models, concepts, and needs in each subject.

The dynamic situations in E-learning present challenges and thus demands creativity from the teacher educators to be able to carry out effective teaching. Some of the challenges include classroom management, materials delivery, maintaining engagement, and last but not least, a proper assessment method. To be able to evaluate and achieve all the expected teaching and learning objectives or outputs of an English teacher education program, it is necessary to have an effective assessment guideline readily available. The availability of practical assessment guidelines in E-learning is as fundamental as providing physical facilities for E-learning itself.

However, this aspect has not been prepared accordingly which then led to confusion in practice. The facilitator must continue to work on developing assessment methods that can provide a fair way to support and evaluate learners' understanding and achievement. Therefore, researchers feel the need for more research particularly on this topic of assessment for online teaching and learning. So that each person has basic guidelines and informed perceptions that are in line with the expectations of the program.

2. LITERATURE REVIEW

2.1. ICT in Language Teaching

Today, the use of the internet has developed very swiftly and is the basis of the globalized modern information and communication technology (ICT). This has changed many things in the structure of human life, including how we communicate, the flow of information delivery, and the process of scientific transfer. Currently, especially with the spread of Covid-19, governments around the world are investing heavily in their technology infrastructures to maintain the educational progress within each country. The educational sector is being hit as hard as other sectors like health or the economy. An overnight transition from the traditional face-to-face or blended learning at best, into the full online mode, has presented some never-before challenges in education everywhere. Therefore, despite the progression of the technology industries that provide various features to enrich the usability of the internet among the global community through sophisticated devices, feature-rich smartphones or wearables, super-software, and artificial intelligence, the educational sector is still trying to figure out what fits best to support both teachers and students.

The advancements in ICT mentioned above should serve educational purposes and allow for new patterns of effective teaching and learning. For example, modes of learning by using computers, tablets, or smartphones have now been widely applied in many countries for various disciplines of knowledge including language learning and teacher education programs. These advancements in modern ICTs provide opportunities for the development of sophisticated and better digital learning concepts. A study mentioned several advantages of digital-based learning such as motivation, creativity, and agency [11].

For its use, ICT has been utilized in education and especially in teaching languages at various levels of education whether at the primary, secondary, or upper levels. Harasim [12] said that the progress of ICT creates an effective new learning concept design where all information that is normally delivered in person is now being presented in digital or virtual form. This provides better learning opportunities that are not limited by place and time.

Moreover, success in the teaching and learning process is also habitually related to student's participation during the teaching and learning process. Digital learning is a concept where obstacles to learning

face-to-face are minimized in such a way that students can still learn and participate even if they are not present in traditional learning spaces. Therefore, they can participate more actively and comfortably to get better quality of learning. Moreover, in its development, many ICT facilities are made for accessibility and portability purposes because it is more practical and has more interesting features to encourage students to be in their learning zone whenever and wherever they are if they wish to [13,14].

2.2. Blended/Hybrid Learning

The use of modern ICT in education is nothing new at this time. Blended or hybrid learning is an example of a learning approach that employs ICT sophistication. According to Williams et al. [15], blended learning is a combination of face-to-face learning with distributed learning. Distributed learning means a learning model where educators, students, and teaching materials can be at different times and places while teaching and learning still take place. The main point of the model is to accommodate the importance of providing a learning environment that is adaptive to the fact that everyone's learning needs are different. Thus, the blended learning model in which the merger between traditional learning models and distributed learning models facilitates students to be able to learn in an interactive and collaborative environment [16,17]. A similar argument comes from Yen & Lee [18], who argue that blended learning unites every best element in traditional classrooms and virtual learning models in depth so that blended learning is believed to be the dominant learning model in this generation Z.

Some research on the key to success for the blended learning model has been carried out by several experts [19,20,21,22]. They argue that the availability of financial resources, support from superiors or the government, and the existence of human resources who mastered ICT adequately are some of the keys to success in applying learning models with a blended learning approach. In line with this, Garrison & Vaughan [1] argue that the best results of the blended learning method can be obtained if this model is applied at the tertiary or university level because the mental level of learners is more accustomed to being independent which greatly helps the learning process with the blended learning approach.

Empirical data about the effectiveness of the application of the blended learning model can be seen in several studies conducted by Rodriguez & Ariza [23] where they found the positive impact of blended learning on student learning achievement. In addition, Owston et al. [24] and Smyth et al. [25] also found that blended learning helps students to be able to control their learning phase so that they can catch up or learn early according to their situations, abilities, and motivations. Furthermore, blended learning also helps students get personal satisfaction in learning because they feel more motivated by their commitment to always interact with the virtual learning model being used [26,27].

It can be concluded that now is the age of generation Z where the use of modern ICT in the world of education is a necessity. Moreover, many studies have proven that this brings dominant positive changes to achieve the expected learning goals. The utilization of modern ICT and the use of a blended learning approach is a very significant combination in the teaching and learning process of today's world because it can enrich learning experiences in quantity and quality and minimize barriers to learning.

2.3. Innovative Assessment in E-Learning

Assessment can be carried out both as part of teaching activities that are ongoing in that year (formative assessment) or at the end of a certain time that has been determined during the academic year (summative assessment). Assessment, as such, is not only a way to measure individual student progress but also a way to measure how well a learning program is running and whether it is successfully meeting instructional goals.

Innovative assessment is needed today due to the unique challenges that are present. Traditional assessments have not been fully successful in producing meaningful results. At their lowest, traditional assessments are simply used to measure learning progress by memorization and have not been of significant help in measuring understanding and achievement. Several studies have shown that traditional assessments through standardized tests prioritize rote learning, inhibit inquiry-based learning, and eliminate content that might not be tested in the current test format. As such, this only tests for a portion of the content. By developing a new, namely adaptive and innovative assessment model in E-learning, teacher educators can evaluate students more proportionately and fairly.

Innovative assessment must focus on student's approaches to learning. So, when designing assessments, teacher educators need to include various ways to evaluate students' understanding into consideration. This can be a challenge because different students have different ways of assimilating and absorbing knowledge. Thus, the assessment must be authentic and allows the possibility to explore learning from various points of view.

2.4. Effective Assessment Design

Assessment designers and teacher educators need to be aware that the nature and type of assessment will influence the way students see the assessment. If the assessment level goes far beyond the student level and is not accommodating, the student's attitude will be negative regarding the assignment for the future. Thus, it will harm learning outcomes. Therefore, assessment must be positive and motivating and aim at helping students develop through self-improvement and encourage students to try harder. Assessment must have high validity and reliability.

Innovative and authentic assessments must focus on contexts that are applicable in real-world settings and are easily understood or relevant for the students. Effective assessment must encourage advanced thinking and contextual application of skills. It must involve all the senses and experience. Through experience (background knowledge), students can learn something new. Assessment must be able to directly target the desired teaching goals and measure desired results clearly and effectively. Thus, the tasks chosen for assessment must be following the objectives.

Formative assessment has been a part of effective assessment. It is considered formative when it occurs while learning takes place. It can be designed in an interesting way - such as the use of quizzes in class, interactive online activities, field activities, and learning through daily life simulation that is close and relevant to students' everyday life. Project assignments and other creative work can also be used to keep students engaged, learn and understand what, how, and how much they learn. Mind mapping and concept mapping can be used to conduct rapid assessments of their understanding. With swift technological advances, and the use of tablets, smartphones, or other ICT devices, more interesting and innovative ways to evaluate students' understanding and learning continue to grow and to be discussed by many.

2.5. Significance of the Research

This research contributes to improving the quality of teaching at English teacher educator programs, particularly in the application of E-learning. In addition, this research also contributes empirically through data that adds up to existing references to scientific studies in the field of assessment in E-learning, which has been adopted by many teacher education institutions in Indonesia. This study then provides an adaptive assessment model in connection with the use of e-learning which will later become an effective assessment reference in English teacher educator programs.

3. METHODOLOGY

This research takes a Research and Development (R&D) approach. According to Sujadi [28], R&D is a process or steps that can be accounted for to develop a new product or improve existing products. Research and development design is recommended for use in education because it involves a close relationship between systematic program evaluation and future program development [29,30].

The method used in this research is mixed methods where qualitative and quantitative approaches are combined. Following the objectives of the study, the sequential explanatory design by Creswell [31] is used. The first stage of the quantitative data collection and analysis was carried out through a questionnaire and then followed by the collection and analysis of qualitative data through semi-structured interviews. This data was interpreted and analyzed through in-depth thematic analysis to achieve predetermined research goals [32,33].

According to Sanjaya [34], the Research and development research model is a product development effort that is well validated. Researchers would try to improve or create a product that has been tested in terms of its effectiveness and efficiency. The design used is the ADDIE model which stands for Analysis, Design, Development, Implementation, Evaluation [35]. The steps in the R&D design can be seen in the following subchapters.

3.1. Analysis

The focus of this stage is the target audience. The analysis is the stage in which the researcher analyses the problem that causes the need for development by defining the problem and instructional objectives, learning objectives and environment, and participants' background knowledge. The analysis phase includes needs analysis, syllabus analysis, and analysis of the characteristics of both students and teacher educators. This was done by analyzing the syllabus of courses in the teacher education program that employs E-learning to determine the appropriateness of the material, the outcomes expected by the subject as well as the type of assessment being used. Then an analysis of the assessment needs was conducted for the course. This was done in such a way so that the assessment development will go in line with the demands of the syllabus itself.

3.2. Design

The next stage is the design stage. At this stage, targeting, assessment instruments, exercises, content, and other components related to teaching material are carried out. This phase is carried out specifically and

systematically. At this stage, the learning materials, assessment, and questionnaire were also arranged as core parts of the research instruments. The instruments were prepared by taking into account the aspects of module assessment, namely aspects of conformity with the conditions of inactivity, construction requirements, technical requirements, and compliance with the model being used. Furthermore, the instruments were validated by experts in teaching material design, media experts, and teacher educators supporting the courses.

3.3. Development

At the development stage, further analysis and merging of previously designed contents was carried out. This stage was the stage of developing the assessment model. Then the assessment model was also validated by experts in teaching material design, media experts, and teacher educators supporting the courses. The model was considered complete when all steps and procedures are conducted and approved accordingly by the pool of experts.

3.4. Implementation

The implementation phase was done when the assessment model was declared valid and approved, the tool was then tested on a limited basis in some courses in an English teacher education program that uses E-learning. At this stage, the questionnaire was filled out by both students and teacher educators. This questionnaire aimed at determining the level of practicality and suitability of the developed assessment model. After obtaining the data from the test of learning outcomes and questionnaire, the data was then analyzed in-depth and thoroughly.

3.5. Evaluation

Each stage of the ADDIE process involved formative evaluation which is a vital component of ADDIE. At this stage, the researcher revised the assessment model based on input obtained from the questionnaire. It is expected that the issues relevant to the assessment of subjects in E-learning at the English teacher education programs are resolved so the model can be used on a broader scale.

4. FINDINGS AND DISCUSSION

This data has been analyzed through a structured procedure. There are at least 5 (five) sections that are presented in this chapter, namely the ADDIE process (Analysis, Design, Development, Implementation, Evaluation) as explained in the methodology chapter. Then the analysis of problems, needs, development, and design of the desired model for the use of E-learning are explained. The research findings are presented and discussed regarding previous empirical studies and expert opinions on the topic.

4.1. E-Learning and Assessment

4.1.1. Teacher Educators' Perception about E-Learning

Because teacher educators are the main actors driving the manifestation of effective teaching and learning, and achieving the expected goals, it is very important to know the teacher educators' perceptions of this particular issue. The followings are the findings regarding teacher educators' perceptions about the use of E-learning and their preferences for the type of assessment being used.

Table 1. Teacher Educators' Attitudes toward E-Learning

TE	Teach Exp (Year)	Assessment Preference	Attitude to E-learning
1	3	Formative	Negative
2	1	Summative	Positive
3	9	Formative	Positive
4	2	Summative	Positive
5	2	Formative	Positive
6	2	Summative	Positive
7	9	Formative	Positive
8	1	Formative	Positive
9	2	Formative	Positive
10	2	Summative	Positive
11	4	Formative	Positive
12	2	Summative	Positive

From the data above, we can see that 11 out of 12 respondents have a positive perception of the use of E-learning. However, in terms of preference, the type of assessment being preferred is quite different where 5 people prefer to do the summative assessment and 7 people choose to do formative assessment. This data is very important where access to provide assessments in the two types (summative and formative) must be provided and fully supported by E-learning facilities at the program. Each individual teacher educator chooses the type of assessment based on the conditions and characteristics of the subjects being taught and the students' group styles. Therefore, the assessment of teacher educators in choosing the type of assessment needs to be respected and fully supported. The followings are some of the questions which teacher educators are also asked about E-learning and assessment found on the platform.

Table 2. Questionnaire about Assessment and E-Learning

No.	Question/Statement	Means
6	Well-designed discussion assignments facilitate meaningful cooperation among students.	3.42
7	Allowing students to choose project topics incorporates diverse views into an online class.	3.08
8	Instructors need to provide feedback.	3.83
9	Formative (during the course) assessment serves as a better approach to using E-Learning.	3.33
10	Summative (end of the course) assessment serves as a better approach to using E-Learning.	2.58
11	I believe that E-Learning can maintain high assessment validity.	2.42
12	I believe that E-Learning can maintain high assessment reliability.	2.33
13	I believe that E-Learning can promote dishonesty if used for assessment.	2.67
14	If the use of E-Learning was optional, I would still prefer to use E-Learning as a supportive tool as it helps my course.	3.08
15	If it was trendier, I would prefer to take my course totally online from home without having to come to the face-to-face lectures.	2.17
16	E-Learning supports interactivity between learners and the system by chat, forums, discussions, etc.	3.17
17	E-Learning is a good educational portal and improves my class.	2.75
18	Abstract concepts (theories, principles, formulas, rules, etc.) and practical tasks can be illustrated with concrete and specific examples.	2.83
19	Exam questions and assignments can be clearly explained in the E-Learning system.	2.83
20	Supporting materials, weblinks, and given examples can be updated, provide real-life examples, which improve learning.	3.00
21	The learning objectives of the module can be stated clearly on E-Learning.	3.17
22	Overall, I am satisfied with E-Learning.	2.75
23	Overall, I find E-Learning successful.	2.75

From the data above we can see that point number 8 has the highest value where the teacher educators believe that assessment should not apply in one direction but instead where the teacher educators are also required to be able to provide constructive and objective feedback to help students develop and become better at learning. Then point number 6 is also very essential about how the tasks are given should have meaningful cooperative or cooperative values. So for assessment, this point must be well accommodated. Furthermore, the teacher educators also gave a significantly high score to the emphasis on the importance of formative assessment aspects as written in point number 9.

4.1.2. Assessment Strategies in E-Learning

Following are the findings regarding the assessment strategies carried out or preferred by the teacher educators in regards to the use of E-learning.

Table 3. Questionnaire about Assessment Strategies

No.	Question/Statement	Means
24	A wide variety of clearly explained assignments are required regularly.	3.25
25	A variety of assessment techniques are used (e.g., quiz, essay, electronic portfolios, etc.) to determine if learning outcomes are being met.	3.33
26	Students obtain immediate feedback through required peer assessment.	3.17
27	Continual, immediate, and detailed feedback is required regarding student perceptions of the course.	3.25
28	I would like to employ Participation Measure where I can examine who has participated and how frequently.	3.42
29	I would like to employ Content Analysis where I can examine topics of discussion, often counting the frequency of occurrence.	3.25
30	I would like to employ a Discussion Platform (synchronous chat room; asynchronous discussion forum).	3.17
31	I would like to employ Q&A Sessions after class hours.	3.42
32	I would like to employ Peer Assessment (peers provide feedback to other peers' work during the course).	3.42
33	I would like to employ Instant Quiz (multiple choice question).	3.08
34	I would like to employ Group Project to promote collaborative learning and assessment.	3.33

35	I would like to employ the Final Term Quiz (online final exams).	3.00
36	I would like to employ Feedback Surveys.	3.17
37	I would like to employ Essay Portfolio Grading (grading of written assignments).	2.92
38	I would like to employ Collective Assessment (instructors provide summative feedback to a small portion of the students).	3.17
39	I think that there is no significant difference in assignment form/model between online and offline class	2.58

The data shows that the highest scores are in points number 28, 31, and 32 where they consider student participation considerably higher in the assessment. Thus, in conducting online lectures teacher educators should not forget about how student participation can be identified and administered in classroom management. Furthermore, online class platform providers must also ensure that facilities to track student participation in online classes must be available and familiarized so that they can be maximally utilized by all parties in the class. Furthermore, at points 31 and 32, the teacher educators also choose to carry out peer assessment and peer learning and conduct a question-and-answer session at the end of the teaching and learning process.

4.1.3. Data Triangulation: Secondary Questionnaire from English Teachers

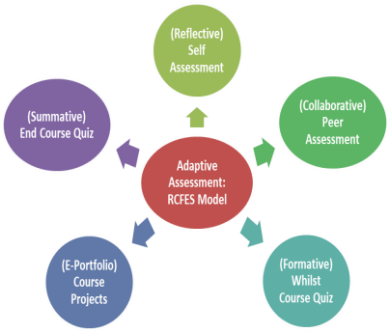
To triangulate the existing data, the researchers also collected English teachers' perceptions from several high schools in a province in Indonesia. From these data, it was found that the respondents believed that the physical role of the teacher would never be replaced and should not be completely replaced by technology. This is based on several reasons which according to them are very strongly related to the teachers' role in fostering character education and motivating students in the classroom. Furthermore, every teacher is aware of the importance of IT skills, especially in an era like today. Then the very important thing here is that they also think the current assessment needs to be improved because it is still too rigid and inaccurate. The ideal assessment, according to them, should be formative and can provide feedback to students so they can improve even better. Their take on using online platforms seems to agree with the necessity to adjust the rating or scoring system. This is strongly related to what is done in one of the English teacher education programs, where they see unique challenges in using E-learning, especially within this Covid-19 time.

4.2. E-Assessment Model in E-Learning

From the above data and based on a comprehensive analysis that has been done by the researchers, an assessment model that is expected to be adopted as a standard assessment standard related to the implementation of E-learning policies at the program was designed. It is called the RCFES model that stands for Reflective, Collaborative, Formative, E-Portfolio, and Summative. With the RCFES model, the needs of each fundamental element in the assessment can be fulfilled. It is expected that it can finally help achieve the objectives of the assessment itself in the non-conventional teaching and learning process by utilizing the E-learning platform that has been provided by the program.

As previously mentioned, this RCFES model includes Reflective for self-assessment, Collaborative for peer assessment, Formative for whilst course quiz, E-Portfolio for course projects, and Summative for end course quiz which can accommodate the ideal assessment needs so that the use of E-learning will not give a negative washback in learning due to the overnight transition from conventional to the use of E-learning. Therefore, it needs re-thinking and re-adjustment for better implementation and practice.

Figure 1. Adaptive Assessment in E-Learning: RCFES Model



The government has initiated the 'order' for online learning in higher education since 2017. However, there has not been sufficient initiative in providing clear guidelines for teacher education programs to switch from traditional to online sessions, let alone the guidelines for proper assessment. "Teaching about teaching requires specific pedagogical approaches that are fundamentally different from teaching subjects in schools" [36]. There is confusion in

the field. The focus has always been on the technicalities so it seems to contradict the very fundamental principle where we should first focus on educational objectives then think of how technology can help [37,38,39]. Education in English teacher education programs should involve a lot more than "simply selecting and using a set of tools and techniques, no matter how 'cool', updated, or resourceful they might be" [40]. As a matter of fact, that seems to be what most people are doing now with ICT, simply transmitting the teaching to online platforms where student teachers are engaged passively [36]. ICT in education is indeed a fast-growing research topic but its success and effectiveness are still lacking in empirical-based evidence. Yet, we are certain that full ICT integration in most things we do including education is the direction we are all heading for in the future. Coming with the Covid-19 emergency situation, a tester for the fully online programs, where everyone has been forced to switch. Therefore, we believe that it could be a rewarding endeavor to study and evaluate the things that have happened and think of something for the future of assessment in English teacher education programs.

5. CONCLUSION AND SUGGESTIONS

5.1. Conclusion

The research shows that there need to be further studies on assessment for online teaching and learning concerning the implementation of policies regarding the use of E-learning at teacher education programs. That this policy is new but has a very broad fundamental impact on the quality of learning at an English teacher education program. Especially when studying aspects of assessment that are directly related to learning outcomes. Therefore, the study and development of an ideal and practical model like this are needed as a reference or standardization assessment guide that is not fixated on conventional teaching methods but is adaptive to technological developments as indicated by policies regarding the implementation of E-Learning at an English teacher education program.

5.2. Suggestion

From the interim research findings above, it is known that there needs to be an adjustment or adaptation of the conventional classroom assessment system for the use of E-learning at an English teacher education program. This is an effort to improve and improve the quality of teaching and learning that is more applicable and contextual. For further research, it is necessary to conduct a deeper and broader study of the use of E-learning at an English teacher education program including the readiness of teacher educators, students, and facilitators to support the transition of learning styles that adopt the development of Evolution 4.0 in higher education institutions.

AUTHORS' CONTRIBUTIONS

The first author is the lead of the research team where he coordinates, organizes, and leads the whole process from funding, research, and writing for publication. The second and the third authors contributed to the whole progress partially including the writing process as research members.

ACKNOWLEDGMENTS

The research and all publication of its reports such as article publishing and conference presentation were funded by Universitas Negeri Padang.

REFERENCES

[1] Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. Jossey-Bass.

[2] Gros, B. (2001). Instructional design for computer-supported collaborative learning in primary and secondary school. Computers in Human Behavior, 17, 439–451.

[3] Collins, A. & Halverson, R. (2009). *Rethinking Education in the Age of Technology: The Digital Revolution and Schooling in America*. Teachers College Press.

[4] Thang, S. M., Najihah, M., & Norizan A. R. (2012). The use of wireless technology in UKM: Challenges faced and its impact on English language learning. 3L: *The Southeast Asian Journal of English Language Studies*, 18(1), 129-143.

[5] Hartoyo. (2008). *Individual Differences in Computer-Assisted Language Learning*. Pelita Insani Semarang.

[6] Wijaya, A. (2012). *Pendidikan Matematika Realistik, Suatu alternative Pendekatan Pembelajaran Matematika*. Graha Ilmu.

[7] Ito, M., Gutiérrez, K., Livingstone, S., Penuel, B., Rhodes, J., Salen, K., Schor, J., Sefton-Green, J., & Watkins, S.C. (2013). "Connected Learning: An Agenda for Research and Design." Irvine, CA: Digital Media and Learning Research Hub. Accessed on January 3, 2019. http://dmlhub.net/publications/connected-learning-agenda-research-anddesign

[8] Dieterle, E. (2009). "Neomillennial Learning Styles and River City." *Children, Youth, and Environments*. Vol. 19, No. 1.

[9] Brown, J.S. & Thomas, D. (2011). *A New Culture of Learning: Cultivating the Imagination for a*

World of Constant Change. CreateSpace Independent Publishing Platform.

[10] Jenkins, H., Clinton, K., Purushotma, R., Robison, A. J., & Weigel, M. (2006). *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*. John D. and Catherine T. MacArthur Foundation.

[11] Lan, Y.J., Sung, Y.T., & Chang, K.E. (2007). A mobile device supported peer assisted learning system for collaborative early EFL reading. *Language Learning and Technology*,11,130–151.

[12] Harasim, L. (2011). *Learning Theory and Online Technologies*. Routledge.

[13] Loch, B., Reushle, S., Jayne, N. & Rowe, S. (2010). *Adopting Synchronous Audiographic Web Conferencing: A tale from two regional universities in Australia*. Dalam S Mukerji & P Tripathi (eds), Cases on technology enhanced learning through collaborative opportunities, IGI Global, Hershey, Pennsylvania, USA, pp. 56-72. ISBN: 9781615207510

[14] Moore, M. & Kearsley, G. (2012), *Distance Education: A system view of online learning*, 3rd ed., Wadsworth Cengage Learning.

[15] Williams, N. A., Bland, W., & Christie, G. (2008). Improving student achievement and satisfaction by adopting a blended learning approach to inorganic chemistry. *Chemistry Education Research and Practice, 9*(1), 43-50. doi:10.1039/B801290N

[16] Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 3-21). Pfeiffer.

[17] Saltzberg, S., & Polyson, S. (1995). Distributed learning on the World Wide Web. *Syllabus, 9*(1), 10-12.

[18] Yen, J.-C., & Lee, C.-Y. (2011). Exploring problem solving patterns and their impact on learning achievement in a blended learning environment. *Computers & Education, 56*(1), 138-145. doi:10.1016/j.compedu.2010.08.012

[19] Baldwin-Evans, K. (2006). Key steps to implementing a successful blended learning strategy. *Industrial and Commercial Training, 38*(3), 156-163. doi:10.1108/00197850610659427

[20] Harris, P., Connolly, J., & Feeney, L. (2009). Blended learning: Overview and recommendations for successful implementation. *Industrial and Commercial Training, 41*(3), 155-163. doi:10.1108/00197850910950961

[21] Mitchell, A., & Honore, S. (2007). Criteria for successful blended learning. *Industrial and Commercial Training, 39*(3), 143-149. doi:10.1108/00197850710742243

[22] Stacey, E., & Gerbic, P. (2008). Success factors for blended learning. In R. Atkinson & C. McBeath (Eds.), *Hello! Where are you in the landscape of educational technology? Proceedings of the 25th ASCILITE Conference* (pp. 964-968). Melbourne, Australia: Deakin University. Retrieved from http://www.ascilite.org.au/conferences/melbourne08/procs/stacey.pdf

[23] Rodriguez & Ariza. (2010). Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & Education* 56(3): 818-826·

[24] Owston, R., Wideman, H., Murphy, J., & Lupshenyuk, D. (2008). Blended teacher professional development: A synthesis of three program evaluations. *The Internet and Higher Education, 11*(3-4), 201-210. doi:10.1016/j.iheduc.2008.07.003

[25] Smyth, S., Houghton, C., Cooney, A., & Casey, D. (2012). Students' experiences of blended learning across a range of postgraduate programmes. *Nurse Education Today, 32*(4), 464-468. doi:10.1016/j.nedt.2011.05.014

[26] Donnelly, R. ((2010). Harmonizing technology with interaction in blended problem-based learning. *Computers & Education, 54*(2), 350-359. doi:10.1016/j.compedu.2009.08.012

[27] Woltering, V., Herrler, A., Spitzer, K., & Spreckelsen, C. (2009). Blended learning positively affects students' satisfaction and the role of the tutor in the problem-based learning process: Results of a mixed-method evaluation. *Advances in Health Sciences Education, 14*(5), 725-738. doi:10.1007/s10459-009-9154-6

[28] Sujadi. (2003). *Metodologi Penelitian Pendidikan*. Rineka cipta

[29] Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational Research: An Introduction* (7th ed.). Allyn-Bacon.

[30] Richey, Rita C. Klein. (2007). *Design and Development Research*. Lawrence Erlbaum Associates. Inc.

[31] Creswell, J. W. (2013). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Fourth edition, international student ed.). Sage.

[32] Robson, C. (2011). *Real World Research: A Resource for Users of Social Research Methods in Applied Settings*. Wiley.

[33] Creswell, J. W. & Plano Clark, V.L. (2007). *Designing and Conducting Mixed Methods Research*. Sage.

[34] Sanjaya, W. (2013). *Penelitian Pendidikan*. Kencana Prenada Media Group.
[35] Branch, RM, & Kopcha, TJ. (2014). Model Desain Pembelajaran. Dalam *Handbook Penelitian tentang Komunikasi Pendidikan dan Teknologi*
[36] Jones, M., & McLean, K. (2018). *Personalising learning in teacher education*. Springer.
[37] British Council South Asia. (2020). Episode 7: Use Of Technology in Education [Podcast]. Retrieved 9 April 2020, from https://soundcloud.com/british-council-southasia/episode-7-use-of-technology-in-education
[38] Danaher, P. A., & Umar, A. (2010). *Teacher education through open and distance learning*. Commonwealth of Learning.
[39] Direktorat Jenderal Pembelajaran dan Kemahasiswaan Kementerian Riset, Teknologi, dan Pendidikan Tinggi. (2019). *Panduan proses pembelajaran daring SPADA 2019*. Kementerian Riset, Teknologi, dan Pendidikan Tinggi.
[40] Azzari, E. F. (2019). Fostering a critical approach to digital technology in graduate language teacher education and postgraduate interdisciplinary. *ICICTE 2019 Proceedings*, 217–227.