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Development of online basic education courses for the State University of Surabaya students studying educational technology

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Abstract

The COVID-19 pandemic has forced colleges and universities around the world to switch to online teaching and learning (OTL). This research aims to find out, improve, and make sure that all students have the same opportunities to learn and teach well. Because of this, it is important to look into the different ways university teachers adopt and use online teaching. This research belongs to developing Online Learning for Basic Education courses using vi-learning facilities provided by the State University of Surabaya (UNESA) by involving students majoring in Curriculum and Educational Technology at UNESA. It applied the ADDIE development model that consisted of five stages: Analysis, Design, Development, Implementation, and Evaluation. From the development results, expert validation of learning design was carried out to determine the feasibility of online learning. This research also conducted field trial tests for students to determine the effectiveness of the product development. The results of this study showed that online learning in Basic Education courses was feasible.

Keywords: ADDIE model; basic education; online learning; research and development; virtual learning.

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1. Introduction

The worldwide Covid-19 pandemic has changed a lot about how higher education (HE) institutions teach. According to national lockdown rules, students and teachers at all levels and in all fields of study had to switch quickly to online methods of teaching, learning, and grading (Braden, 1996; Lockee, 2021; Johnson et al., 2022; McCullogh et al., 2022; Zhao et al., 2021). This sudden end to face-to-face learning was a big challenge to work-life balance and well-being, and it caused a lot of trouble (Gülbahar & Adnan, 2020; Lo, 2023). Many students and staff felt very alone and cut off from their peers and coworkers with whom they worked and socialized every day before the pandemic (Naidoo et al.,2023). Higher education institutions have to make sure that students can get learning services, which is their right. Along with the development of communication and information technology that is increasingly advanced, the fulfillment of student learning services also requires a touch of technological advances (Hong et al., 2021). UNESA is one of the universities that have organized a vi-learn program, virtual learning, where students can participate in online learning. However, not all courses in every major have online lectures.

Lecturers' general self-efficacy and attitudes regarding Online Teaching-Learning (OTL) are favorably connected to prior teaching experience (Hew et al., 2020). It was found that "online" teachers with more experience are surer of their ability to teach online because they know how to do it. Similarly, Shea (2007) showed that earlier experience (as measured by the frequency of OTL) was key to teachers' motivation to keep doing OTL. This study also found that more experience in online teaching was linked to higher self-efficacy. At the same time, teachers with little experience said they had a lot of trouble communicating and interacting, and they did not know how to use online pedagogy and technology well (Scherer et al., 2021). Martin et al. (2019) did a study on how instructors felt about their readiness for OTL. They found that experience teaching online affects the design and facilitation of online courses, which are parts of teaching practice and presence. However low self-efficacy was linked to not knowing how to teach online. Bolliger et al (2019) study on how faculty members felt about online program communities and what they did to keep them going confirmed these findings. Their results showed that faculty members with less than three years of OTL experience needed to know more about the methods and activities used to help build community in the program. These examples show that OTL experience affects OTL adoption and practice, as well as teachers' sense of their abilities (Kemenristekdikti, 2015; Kemenristekdikti, 2018).

One way to improve the learning process is that lecturers are required to make learning more innovative, encouraging students to learn optimally in independent study and classroom learning. Educational Technology Program, Faculty of Education, State University of Surabaya is an educational institution that aims to produce competent human resources in the field of Educational Technology. The Basic Education course is a theoretical learning course requiring learning resources that can make students more active and independent. Learning that takes place in the Educational Technology Study Program is directed to facilitate the development of potential abilities possessed by students into real abilities that can be used especially to solve educational problems and the learning process.

Students may be able to learn what they need to know for classroom tasks with the help of multimedia materials in OTL. Also, many universities, like the Massachusetts Institute of Technology

and Carnegie Mellon University, let people all over the world access their course materials and lecture recordings through the Internet. People are signing up for more and more massive open online courses (MOOCs) that are made and taught by well-known professors and teachers at major universities. The growth of information and communication technologies, especially smart devices, is what makes these movements happen. Innovative practices in higher education require educational scholars to come up with new ideas and theoretical frameworks to explain how new things happen in OTLs (Hill & Cynthia, 1984; Cho et al., 2015). New technologies, activities, and learners have led to the creation of new words, such as Web 2.0, MOOCs, and "digital natives."

The concepts of focused pedagogic discourse, independence and autonomy, transactional distance, and contact have all been the subject of academic research (Arends, 1997; Gunawardena & Mclsaac, 2004). The social presence and sociocultural settings of online learning have captured the attention of academics, who are also fascinated by 3D virtual worlds and cell phones and even inducing humor to boost students' engagement (Erdoğdu & Çakıroğlu 2021; Huang et al., 2023). Even though researchers are interested in finding ways to better online higher education, more attention should be paid to developing a comprehensive conceptual framework for online learning and teaching (Sukirman & Setiawan, 2022). "missing" is the conceptualizing, restructuring, and remaking of the teaching and learning transaction," write Cleveland-Innes and Carrison (2012). A large number of higher education institutions has adopted blended and online learning, which makes use of modern technology, but very few have conducted study on OLE paradigms (Fathurrohman, 2014; Basuki & Haryanto, 2016).

Based on the description above, the Basic Education course is one of the courses that have not used the Vi-Learn UNESA online lecture facility. At this time, lecture activities are still conventional face-to-face, using various references and other relevant sources according to the competencies to be achieved. Students' success in each course is a provision to realize their expertise. Understanding conceptual competence in the Basic Education course needs to be considered to achieve the success of learning objectives that are not only on learning outcomes. According to the course description for Basic Education, topics covered in this course include the following: human nature and its development; the fundamentals of education; education as a system; the national education system; teaching as a profession; educational issues; educational innovation in Indonesia; and character education both inside and outside of the classroom. The goal of the learning outcomes is to provide prospective teachers and teachers already in positions with knowledge about the fundamental ideas of education, human nature, and its development, the foundation of education, and education as a system. It also covers; the national education system, teaching as a profession, educational problems, educational innovation in Indonesia, and character education both inside and outside of the classroom. Based on the description of the course and learning outcomes, it is expected that students will be able to learn independently so that they can have skills after learning. Therefore, students need to be facilitated with online learning that can facilitate independent learning by the subject's learning outcomes. In other words, online learning is expected to make learning basic education subjects easier and more effective (Nasution, 1992).

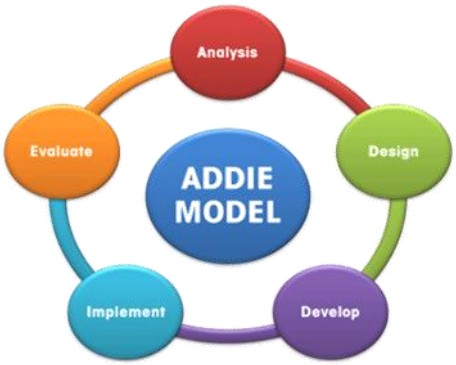
1.1. Purpose of study

Therefore, in the Basic Education course, a learning design is needed that follows the course description, learning outcomes, student characteristics, technology and information developments, and the latest reference sources relevant to learning outcomes. This research aims to produce online learning for Basic Education Courses with Vi-Learn UNESA (Vinesa) facilities based on this explanation.

2. Materials and Methods

The ADDIE (Analysis, Design, Develop, Implement, and Evaluate) methodology was employed throughout the process of designing this module as the development model. This model was selected because the ADDIE model is frequently used to describe a methodical strategy for the development of educational programs (Dick et al., 2001; Dick et al., 2009). The visualization of the ADDIE model is as follows (figure 1):

Figure 1
Model ADDIE



Source: Dick et al., 2009

2.1. Instruments

In this data collection instrument, we use questionnaires and tests. The questionnaire data analysis technique uses the Guttman scale with a firm answer, namely "yes-no", with the decomposition scale, as follows (Sugiyono, 2010):

Score 1 = for the answer "yes."

Score 0 = for the answer "no".

2.2. Data analysis

It is calculated using the formula in Figure 2.

Figure 2
The analysis technique formula

$$P = \frac{Total\ answer\ score}{number\ of\ questions \times highest\ score \times n} \times 100\%$$

Source: Sugiyono, 2010

Notes:

P = Percentage

n = Number of Respondents

To give meaning to the percentage number, the formula's calculation results are related to determining the level of success of online learning (Sudjana & Rivai, 2001; Sudjana & Ibrahim, 2009). The eligibility level of the revision criteria is as follows (Table 1):

Table 1

Eligibility level of product revision criteria

Percentage	Criteria	Note
81% - 100%	Very Good	No revision
61% - 80%	Good	No revision
41% - 60%	Fair	Revision
21% - 40%	Poor	Revision
0% - 20%	Very Poor	Revision

Source: Sudjana & Ibrahim, 2009

The data analysis technique uses the t-test formula as follows (figure 3):

Figure 3

Data analysis technique

$$t = \frac{x1 - x2}{\sqrt{\frac{s^2}{n1} + \frac{s^2}{n2}}}$$

Source: Sudjana & Rivai, 2001

Notes:

t = Sought coefficient

x1 = The average value of the control group

x2 = The average value of the experimental group

n = Number of subjects

s^2 = Estimated variance

a. Test significance:

b. a. If t < 0.05, H0 is rejected, which suggests an independent variable affects the dependent variable.

c. b. If t > 0.05, H0 is accepted, implying no significant effect between independent and dependent variables.

3. Results

3.1. Analysis stage

This initial stage is the first step for a preliminary study. In this stage, a needs analysis is carried out to find out the root of the problem by conducting interviews. Furthermore, based on the results of interviews that have been carried out, several problems were found, that is, during the pandemic. COVID-19, according to a circular from the Ministry of Education and Culture, the governor of East Java, and the Chancellor of UNESA, stated that learning was carried out online to minimize the occurrence of massive COVID-19 transmission, especially in educational institutions. An online learning model is needed that can be accessed by students and facilitates interaction between lecturers and students, students and students, and students with learning resources. Based on the problems faced, online learning is needed in the Basics Education course for undergraduate students of Educational Technology, Faculty of Education, the State University of Surabaya during the pandemic of Covid-19.

3.2. Design stage

The second stage is design. This stage is also known as the planning stage. The planning in question is the development of online learning by using synchronous and asynchronous interactions through LMS Vinesa. Asynchronous can be in the form of discussion forums, collection of assignments, quizzes, sharing of materials, media, and learning resources. While synchronous is through eye contact in real time. The outline of the material that will be included in this lesson is as follows (Table 2);

Table 2

Outline of the materials

No	**Outline of the Materials to be Presented**
1	Basic Concepts of Education
2	Human Nature and Its Development
3	The Nature of Education
4	Education as a System
5	National Education System
6	Educational Foundation
7	The Concept of Teacher as a Profession
8	Educational Problems
9	Educational Innovation in Indonesia
10	Character Building

Source: Dick et al., 2001

3.3. Development stage

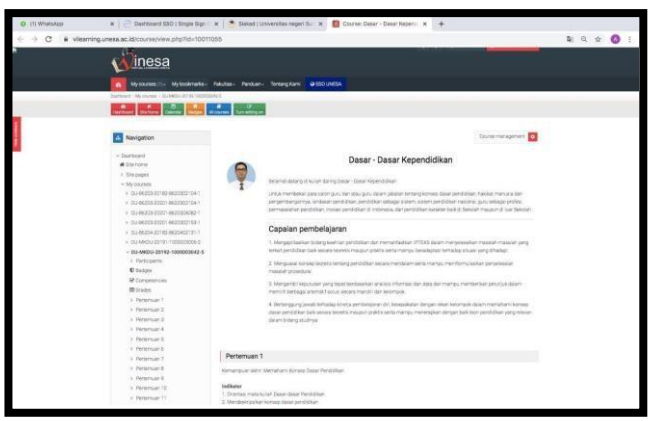
The third stage is the production stage. It is the process of making a blueprint, aka design, a reality. This means that everything that is needed or will support the learning process must be prepared at this stage. The process stages are individual trials with three students as test subjects and a score of 90% in the "very good" category. Small group trials with six students got an average score of 95% in the "very good" category.

3.4. Implementation stage

The implementation of online learning involves approximately 90 parallel class students that are class A and class B of the Education Technology Study Program who are taking basic education courses in the odd semester of 2020/2021. The lecturer in this course is Dr. Lamijan Hadi Susarno, M. Pd, and Dr. Andi Kristanto, M.Pd. Until this report was made, online learning for basic education courses has been going on for three weeks using synchronous and asynchronous interactions developed through *Vinesa*. The screenshot of online learning in *Vinesa* is shown in the image below (Figure 4);

Figure 4

Application of Basic Education Online Course Teaching Materials in Vinesa



3.5. Evaluation stage

The fifth stage is evaluation, and this is the last stage. This stage is carried out after online learning is given to students for testing. The developer gives pupils pre-and post-tests to measure their abilities. Using IBM SPSS Statistics Data Editor, the t-test is used to measure the effectiveness of learning material. Based on data analysis, the experimental class had significantly higher student learning outcomes than the control class (3.558 < 5.610). Online basic education courses for Educational Technology undergraduates provide better learning outcomes.

4. Discussion

Instruction in higher education has been characterized by elements including online and blended learning for nearly twenty years (Bates & Bates, 2007; Singh & Thurman, 2019). The actual

implementation and adoption of these forms of teaching and learning in universities has been inconsistent, resulting in large degrees of heterogeneity in the educational experiences of students throughout a variety of institutions, fields, and even programs. However, even though colleges have always offered these modes of instruction and learning, there has been a lack of consistency in both their actual execution and adoption (Joyce & Marsha, 2008; Joyce et al., 2009; Bernard et al., 2014). It is necessary to investigate a wide range of factors related to the adoption and use of online teaching by university teachers to assist institutions in better supporting teaching and learning in online spaces, as well as to guarantee that all students have equal access to high-quality teaching and learning. This is essential to guarantee that all students have the same opportunities to learn from and be taught by professionals of the highest caliber (Stokes, 2002; Kebritchi et al., 2017; Arifin & Setiawan, 2022).

The COVID-19 epidemic and the subsequent implementation of social distancing rules resulted in a rapid transition to OTL (Online Teaching and Learning) for the majority of higher education institutions around the world between March and April of 2020, regardless of whether or not teachers were prepared for the change. Because of the sudden change in the format of all instruction, there is a once-in-a-lifetime chance to investigate the degree to which instructors believed they were ready for OTL (Amri & Ahmadi, 2010; Brooks & Grajek, 2020). It is of the utmost importance to acknowledge the multifaceted nature of the perspectives held by higher education teachers regarding their level of readiness for OTL (Martin et al., 2019). This shift signified substantial changes in the way that teaching is practiced, particularly in light of the quick transition to training that is delivered entirely online. These alterations in practice, or the desire to engage in change at any level, are the outcome of a complex structure consisting of the influences exerted by individuals, institutions, and cultures (Juwah., 2006; Smalldino, 2011; Kukulska-Hulme, 2012).

It is essential to investigate the connections that exist between these components to acquire a deeper comprehension of the preparations that instructors make for OTL (Hung, 2016). In addition, these factors may have a unique impact on particular educators in a variety of ways. Teachers in higher education are not a homogenous group; the multiple crucial relationships that may have an impact on one group may have a dramatically different effect on another group, given the wide variety of backgrounds, OTL experiences, and academic fields that teachers come from. It is essential, to provide appropriate support, and to have an understanding of the reasons behind why instructors accept or do not adopt new OTL techniques (Boaler, 1997; Faramarz, 2012; Bruggeman et al., 2020).

Institutional support for OTL teachers in higher education was stressed (Mudlofar, 2012; Naylor & Nyanjom, 2020). Several studies have linked online teaching to technological and academic assistance (Bao, 2020; Rapanta et al., 2020). A unifying target of incorporating online- digital technology into the instructional process can push them for innovation, whereas less organizational values may demotivate teachers and hamper progress (AECT, 2008; Riyanto, 2007; Arikunto, 2005; Arikunto, 2013).

As a consequence of the COVID-19 pandemic, the movement to OTL was hastened. This was done while taking into account a wide range of important institutional support issues, such as encouraging lectures to be more familiar and frequently applying online content and media for

facilitating and supporting their students in completing their learning goals and also could be supported in their efforts to learn online, and so on. However, instructors in higher education require additional assistance to plan, carry out, and maintain online teaching programs (Bolliger et al., 2019). Because of this, it is extremely important to study both the instructors' appraisals of their knowledge and skills, as well as their thoughts regarding the level of preparation provided by their school. In this study, we looked at teachers' perceptions of institutional support for OTL in general and specifically during the COVID-19 outbreak (Seels, 1994; Munoz Carril et al., 2013; Rahman & Sofan, 2013; Mustaji, 2017).

The rapid adoption of online learning meant that schools frequently required additional preparation time to give digital material, technical infrastructure, and crucial help in online and blended learning (OTL) (Little et al., 2010; Clark & Mayer, 2010; Bao, 2020). Evaluation from teachers shows the quality of OTL in some aspects covering; target, management, content/ material in academic to support the success of OTL in the public [Cause and effect] [OTL] (Heinich & Molenda, 1985; Borg et al., 2003; Majid., 2007; Jannuszewsky & Molenda., 2008).

This development research is field research that applies online learning for Basic Education courses for undergraduate students of Educational Technology. Based on the results of the development research data discussion, it is obtained suggestions that are expected to provide research benefits, including utilization suggestions where the use of online learning. It can be expanded again in terms of material, namely the development of online learning in various courses taught by other lecturers, to be able to reach other students remotely and in a short time, and dissemination of suggestions (spreading). The development of online learning for learning design courses is expected to be developed and used by other majors. However, it is necessary to identify students, the campus environment, and others to reach the maximum in its development.

5. Conclusion

From the results of research using the ADDIE development model procedure, the research "Development of Online Learning for Basic Education Courses for Undergraduate Students of Educational Technology" produces conclusions according to the data obtained as follows:

Media Eligibility: An expert on learning design material expert, Dr. Fajar Arianto, has tested the development of online learning for Basic Education courses for undergraduate students of Educational Technology, M. Pd gets a percentage of 90%, which is included in the "very good" category. Furthermore, in the individual trial, the percentage was 90% with the "very good" category, then in the small group trial, it was 95% with the "very good" category. Based on the results of the data analysis, online learning for the Basic Education course is suitable for teaching and learning activities for undergraduate students of Educational Technology.

Media Effectiveness: Online learning for Basic Education courses is beneficial, according to data. This is shown by the reduced control class t-count value (3,558 < 5,610). Online learning for basic education courses for Educational Technology undergraduates in the experimental class increases learning results.

6. Recommendations

Future research should discover what students and staff have learned from doing or teaching practical parts of postgraduate programs. In the same way, it would be good to compare face-to-face instruction with online teaching with the current study's pupils. People have distinct learning and teaching preferences. When you know how students at different levels learn and think, you can better satisfy each learner's needs.

Future research should also examine how staff and students see things differently. The current study was only meant to get both sides' points of view to get a full picture, but it found that students liked how interactive online learning sessions were, while some staff did not like how interactive their teaching was.

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