



## **Online Assessment as an Alternative Learning Assessment in the Digital Era: A Systematic Literature Review**

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**Abstract:** Education in the digital era is characterized by the rapid flow of information exchange due to the integration of information and communication technology (ICT) in the educational process. In the digital era, learning assessments are carried out with the help of ICT, so the term online assessment is known. This literature study uses a systematic literature review (SLR) method, which consists of 6 stages: planning, literature review, inclusion and exclusion criteria, quality assessment, data collection, and data analysis. This study aims to determine the reasons for implementing online assessments, the types of online assessments, and the advantages of online assessments. The results of data analysis show that in Indonesia, the Covid-19 pandemic and the development of ICT have triggered the implementation of online assessments. There are various online assessments implemented by teachers, ranging from assessments to test knowledge using various applications such as Quizizz and Google Forms to assessments for attitude skills such as online self-assessments. One of the advantages of implementing an online assessment is its ability to provide feedback quickly following the characteristics of education in the digital era.

**Keywords:** online assessment; systematic literature review; digital era.

### **A. Introduction**

Since 1990, the term digital era has begun to sound triggered by the public's massive use of digital technology (Suwatno, 2021). Now more than two decades since the term digital era emerged, digital technology is increasingly widespread. Almost all aspects utilize digital technology, including the field of education. Experts state that to keep up with the times and be part of role in developing the civilization of the educational process, one must integrate information technology/digital technology in the process (Ngongo et al., 2019).

One of the objects of study when discussing the world of education is the learning process. It is known that the learning process consists of various components that are interrelated with each other, starting from the curriculum, learning strategies, learning media, and assessments. In this digital era, as mentioned earlier, integrating information and communication technology (ICT) in every element of learning

implementation is important to improve the quality of the learning implementation. Currently, the implementation of education integrated with digital technology has also been widely implemented. It is evidenced by the many research results related to the application of digital technology in the world of education. Several research results that show the integration of ICT with the learning process include research on the application of blended learning, research on the development and application of ICT-based teaching materials, to research on the application of assessments that utilize ICT.

One of the terms related to the use of ICT in the learning assessment process is an online assessment. The learning assessment is defined as an attempt to obtain data/information about how well the student's performance is compared to specific learning outcomes. So, the online assessment has the same goal but is carried out with the help of the internet and other supporting ICT applications that can be carried out remotely. The implementation of online assessments in Indonesia started in 2008, marked by scientific research articles entitled "*Website Designing Learning Outcomes Assessment of Vocational High School (SMK) Online Using Macromedia Dreamweaver 8 Bakti Idhata on Foundation*". However, it seems that the implementation of the online assessment has not become an alternative to the implementation of the assessment that is of interest to teachers. So, from 2008-2019, few scientific articles were found related to the development or performance of online assessments for learning.

However, in 2019 the Covid-19 pandemic hit almost all parts of the world, including Indonesia, which caused a change in interaction patterns. Likewise, the design of implementing learning which was initially face-to-face has turned into learning carried out remotely or in a network (online). This online learning, of course, also requires teachers to carry out an online assessment process as well. It can be said that the Covid-19 pandemic is one of the factors that led to the implementation of online assessments by teachers. Furthermore, if you search for scientific articles related to trends in the implementation of assessments during the Covid-19 pandemic in the 2019-2022 range, you will find many articles on the application of online assessments assisted various applications.

It has been explained that although online assessment has developed in the last decade in Indonesia, its widespread application has only started in the last two years. However, no research thoroughly discusses the basis for applying online assessment, what types of online assessment can be used in learning if it is associated with each competency that is required to be achieved by students and what are the advantages of implementing the online assessment so that a more in-depth literature review is needed to answer the questions mentioned above. For this reason, a systematic literature review (SLR) research was carried out related to the implementation of this online assessment to find out the basis for implementing online assessments, the types of online assessments associated with the competencies required to be achieved by students, and the advantages of implementing online assessments. This information can be used further as a basis for teachers in selecting, developing, and carrying out online assessments in the future so that the implementation of online assessments has higher quality.

## B. Research Method

This study uses a systematic literature review (SLR) method. SLR is a systematic review activity to identify, select, and critically assess the results of previous studies (Rother, 2007; Xiao & Watson, 2019). There are six stages in the SLR.

### 1. Planning (decide the research object)

Before conducting a review, it is important to determine the research object. In this article, the research object is the implementation of online assessments in education. Then, the research questions (RQ) related to the research object were compiled. In general, the research question is "How is the implementation of online assessment as an alternative assessment in the digital era??"

The questions above are then broken down into three research questions as follows:

- a. RQ1: What is the basis for implementing online assessment in learning?
- b. RQ2: What types of online assessments are applied in learning?
- c. RQ3: What are the advantages of implementing online assessment in learning?

These questions will then be answered through the literature review.

### 2. Literature review

Literature review is done by Garuda portal <https://garuda.kemdikbud.go.id/>. Search results for the keyword "online assessment" obtained 116 related articles. The search was also carried out using the keyword "*penilaian* online", which is the equivalent of the phrase online assessment. The results obtained are 62 articles published in 2008-2022 according to these keywords.

### 3. Assessment of inclusion and exclusion criteria

The third step is checking whether the scientific articles found are suitable for use in research. The criteria used in this study are:

- a. The data are articles published from 2018-2022 (the last five years).
- b. The data used are articles that discuss the implementation of online assessments in primary and secondary schools in Indonesia.

The assessment results of the inclusion and exclusion criteria showed that only 73 articles met the criteria for the online assessment and 14 articles with *penilaian* online keywords.

### 4. Quality assessment

The next stage in the SLR is the study quality assessment (QA) from the literature search results. In this study, the criteria for quality assessment are as follows:

- a. QA1: Does the journal article contain information about the basis for applying online assessment in learning?
- b. QA2: Does the journal article contain information about the types of online assessment applied in learning?
- c. QA3: What are the advantages of implementing online assessment in learning?

From the quality assessment results, 38 articles were obtained from the online assessment keyword search results and five articles from the online assessment keyword search results, which were continued for analysis.

## 5. Data collection

The data collection stage is selecting information from journal articles which will be further analyzed based on the quality assessment results. At this stage, 43 articles that pass the quality assessment will be read thoroughly and selected information appropriate to the research question (R1-R3).

## 6. Data analysis

Data analysis is the process of answering research questions based on the literature that has been collected. The data obtained from reading 43 selected articles will be presented in this section. Data not related to the research question will be reduced, analyzed, and then drawn to conclusions.

## C. Result and Discussion

### 1. The reason the online assessment is applied

More than 50% of the articles analyzed stated that the basis for implementing the online assessment was the Covid-19 pandemic that hit various countries, including Indonesia. The Covid-19 pandemic has changed almost all patterns of human interaction, including the field of formal education, which was initially carried out face-to-face, and shifted to online learning so that assessment/assessment activities are carried out online (Anugrawati & Hermansyah, 2021; Astiandani & Anam, 2021; Darmawan et al., 2020; Dwiyantri & Suwastini, 2021; Kristiyanti et al., 2021; Mahendra et al., 2021; Maryuningsih et al., 2020; Susanti & Watini, 2021; Yulianto & Mujtahid, 2021; Zaitun et al., 2021).

Information and communication technology (ICT) support in implementing online learning during the Covid-19 period is a must. Because online learning can only be done with the help of internet networks, gadgets, various applications, and technology-based learning media, even though it is now known as the new normal period in which people are starting to get used to living with strict health protocols and formal education activities are beginning to be carried out in a hybrid way (a combination of face-to-face and online learning), the implementation of online assessments is still being carried out. So it can be concluded that the advancement of ICT is one of the reasons for implementing online assessments (Bahriah et al., 2021; Kunchayono et al., 2019; Mardiana et al., 2021; Pany et al., 2021; Rinaldi et al., 2022; Zulfa & Ratri, 2022).

Another reason for applying online assessments is the weakness of conventional assessments, such as using paper and pencil tests. Abdul Azis et al. (2022) stated that conventional exams have several weaknesses, including the possibility of non-objective assessments, long correction times, and large costs incurred in administering the exam. Several other articles support this statement, so it can be concluded that

implementing an online assessment is an effort to minimize the weaknesses of the conventional assessment (Cipto & Irfan, 2020; Hasbullah et al., 2020; Yulianto & Mujtahid, 2021).

## 2. Types and forms of online assessments applied in learning

Based on the method of implementation, the assessment can be grouped into formative assessment and summative assessment. Formative assessments are generally carried out throughout the learning process. This assessment is carried out in addition to knowing the achievements of students as well as feedback for designing and planning improvements for the following learning process. While summative assessments are generally carried out at the end of learning activities for a specific competency or time, such as during semester exams, class promotion exams, or national exams. When referring to the competencies trained on students during learning, the assessments can be grouped as assessments for spiritual and social attitude competencies, assessments for knowledge, and assessments for skills.

To access social skills, there are various types of online assessments that teachers apply. Kadek Agus Toni Mahendra stated that online discussion and self-assessment are types of online assessment that can be carried out in learning (Mahendra et al., 2021). For online discussions as a formative test, it can be done with the help of a learning management system (LMS) such as Edmodo, Google Classroom, Moodle, Sevima, and so on. Online discussions can also be carried out in messaging applications such as WhatsApp (Sabiq & Fahmi, 2020). At the same time, the teacher can do self-assessment by providing a self-assessment sheet that must be filled out by students, which includes questions or statements that explore how students follow the learning that has taken place. Generally, self-assessment is used by teachers to assess students' honesty and responsibility (Zaitun et al., 2021). Peer assessment can also be an alternative form of online assessment to determine the attitude competence of students.

For the knowledge aspect, there are several types of online assessments implemented by teachers, such as Quizizz, Kahoot, Plickers, and math games through mathplayground.com, which use games as the basis for their implementation (Astiandani & Anam, 2021; Pany et al., 2021; Wibowo, 2020; Zulfa & Ratri, 2022). The implementation of summative assessments to test students' cognitive competencies can also be done online. Implementing the National Examination with a Computer-Based Test (CBT) is an example of an online summative assessment (Puspitayani et al., 2020). Currently, the simplest form of CBT that teachers often use is the use of Google Forms in conducting exams (Hadianti et al., 2021; Rinaldi et al., 2022). With Google Forms, the teacher creates a form organized into a quiz containing questions that students can answer. Questions can be essays, short answers, or multiple choice. Teachers can also directly create answer keys on the website so that students can immediately find their scores after taking the exam.

Assessment for other knowledge competencies that can be done online is peer assessment. Peer assessment allows students to get scores from their peers regarding

specific tasks or learning outcomes. Mahardhika Pradana, in his research, conducted an online peer assessment to assess students' writing skills. During the implementation, students are asked to analyze and provide comments and scores on the work of their colleagues in translating a narrative (Pradana, 2020).

Performance tests, which are tests to test students' skills, can also be done online. For example, students' science process skills can be assessed by conducting an assessment in the form of a virtual practicum test. The PhET simulation developed by the University of Colorado is one example of a website that provides virtual practicums that teachers can use to conduct online assessments in the form of performance tests. Students' communication skills can be assessed through video conferencing assisted by various video conferencing applications such as Zoom Cloud Meeting, Google Meet, Webex, and so on.

Another type of online assessment commonly applied by teachers based on the analysis results is portfolio assessment (Adinda et al., 2021; Ulwawiyah, 2019; Wibowo, 2020). For the portfolio, it can be used by teachers to assess both social competence, knowledge, and skills.

### **3. The advantages of applying online assessments in learning**

In general, compared to conventional assessments, the advantages of conducting online assessments are their ability to provide fast feedback (Kristiyanti et al., 2021; Permatasari et al., 2019; Yulianto & Mujtahid, 2021). Students can immediately find out their achievements in learning which also directly serves as reflection material for students to improve their performance in the following learning activity. Another common advantage of conducting online assessments is its flexibility, effectiveness, and ability to increase students' confidence in participating in the assessment (Wibowo & Novitasari, 2021).

The following will describe the advantages of online assessment, depending on the teacher's type of assessment. Several articles were analyzed to discuss the use of Quizizz in assessment. The advantage of the Quizizz application, which is like a game, is that it makes students feel that implementing the assessment is more fun. This application is interesting and can trigger the competitive nature of students so that students become more motivated to get high scores (Anugrawati & Hermansyah, 2021; Bahriah et al., 2021; Puspitayani et al., 2020). From the teacher's point of view, this application also has advantages because it is easy to use (user friendly) and easy to access (Puspitayani et al., 2020).

Another type of online assessment that is often applied by teachers is self-assessment. The benefit of implementing this assessment is that it facilitates students to discover their weaknesses and strengths in participating in learning (Pratawati et al., 2021). Self-assessment can also trigger students to carry out independent learning better.

Some teachers who carry out online discussions as a form of formative assessment state that online discussions can increase student motivation, and increase students' confidence to succeed in learning (Mahendra et al., 2021). Especially for

learning English, online discussions can help students to enrich their vocabulary and find out their grammatical errors. (Prastikawati et al., 2020).

#### **4. Online assessment as an alternative assessment in digital era**

The digital era is characterized by a period in which the circulation of information occurs very easily and quickly, affecting the circulation of knowledge in society (Shepherd, 2004). The rapid turnover of data is supported by the development of information and communication technology (ICT). It can be said that the function of technology in this digital era is knowledge-based.

In the digital era, the world of education is challenged to move in line with the acceleration of ICT development. The world of education is required to educate students who can survive and adapt to the pace of information exchange, digitalization, and the development of social media use (Hashim et al., 2022), so the integration of ICT in learning becomes a must.

The integration of ICT in learning can be in the form of implementing hybrid learning, utilizing ICT-based learning media, implementing practicum assisted by communication technology devices, and implementing ICT-based assessments. Furthermore, Ari Wibowo stated that students could use computers, laptops, and cell phones to access learning resources, interactive tutorials, and play games related to learning that can be used as instruments for formative assessments (Wibowo, 2020). In general, integrating ICT and education in this digital era provides unprecedented innovation opportunities for the world of education. The integration of ICT in learning can facilitate the implementation of fair education, bridge differences in the implementation of learning, and improve the quality of the implementation of learning (Triyanto, 2020).

One crucial point about the application of ICT in learning in the digital era that was conveyed earlier is that ICT can facilitate the implementation of fair learning. It is closely related to assessment implementation because one of the principles of the implementation of the assessment is objective and unbiased. Implementing an ICT-based assessment is expected to improve the quality of the assessment in terms of objectivity and the principle of a fair assessment. The forms of use of ICT in the assessment can be the use of various webs, applications/software in the assessment process such as Quizizz, Kahoot, Plickers, math games through mathplayground.com, Google forms, Zoom meetings, Google meet, virtual practicum applications, and so on. In addition to utilizing various existing websites or applications to carry out online assessments, teachers and researchers are currently also starting to develop the online assessments they will use like what Dewi S. A. and R. Mardiana, who developed an online assessment using the proprofs website (Mardiana et al., 2021).

Whether using an existing website or application or developing your program to carry out online assessments, Arief Ardiansyah said that there are several principles in implementing ICT-based assessments to fulfil the demands of learning in the digital era (Ardiansyah et al., 2022):

- a. The assessment applies a student center approach (meaning that in the assessment process, there are self-reflection activities)
- b. The assessment must consist of a clear rubric and assessment criteria
- c. Assessment allows assessing the ability of students to collaborate
- d. The assessment carried out must encourage students to develop skills in providing feedback
- e. The assessment is carried out using a technique or instrument that follows the context and learning objectives
- f. The assessment contains clear and easy-to-understand instructions
- g. At the end of the implementation, it allows students to provide input about the assessment process that has been carried out.

All the principles of ICT-based assessment must be considered by teachers to realize an objective and effective-efficient assessment.

Another thing that makes online assessments is the correct assessment as an alternative in digital era education, namely the advantages of online assessments that can provide fast feedback. In the digital era of learning characterized by the rapid flow of information, an assessment that provides immediate feedback is a must.

Although it has various advantages so that online assessment can be an alternative assessment in digital education, the implementation of this online assessment still has several weaknesses and challenges. The challenge in implementing online assessments is that not all regions have access to information technology, especially the internet. So, for some areas, it is necessary to improve infrastructure first before being able to apply online assessments to the fullest. Several other weaknesses in implementing online assessments are the possibility of students cheating, such as adapting the answers to search results from the internet without following the correct procedure. For this reason, clear regulations are needed when teachers will implement online assessments, such as making rules regarding the provisions on the percentage of similarity (plagiarism) (Dwiyanti & Suwastini, 2021). Flexibility in carrying out exams is also sometimes bad in implementing online assessments because this can cause students to be negligent and undisciplined in taking exams. So clear rules regarding the time of the exam are also a regulation that must exist. For this reason, so that online assessments can be applied optimally and with minimal obstacles to digital-era education in Indonesia, infrastructure support and regulations for implementing online assessments are still clearer, stricter, and firmer.

## **D. Conclusion**

Online assessments have been widely implemented since the Covid-19 pandemic hit Indonesia. It can be said that the Covid-19 pandemic is the reason for implementing online assessments. Furthermore, the implementation of online assessments is supported by the rapid development of information and communication technology (ICT). Online assessments continue to be encouraged to be implemented because teachers realize the weaknesses of implementing conventional



assessments. Many types of online assessments can be applied by teachers, such as by utilizing game-based online test applications such as Quizizz, Kahoot, and so on, or using LMS such as Moodle, Edmodo, or Google Classroom, utilizing messaging applications such as WhatsApp, or it can take advantage of video conferencing applications such as Zoom Cloud Meeting, Google Meet, and so on. The benefits of implementing online assessments, in general, are their ability to increase the motivation and confidence of students to take the assessment and the speed of providing feedback and flexibility in its implementation.

Furthermore, if it is associated with the digital era, online assessment with all its conveniences is the proper assessment to be applied in the digital era. However, in addition to having advantages, there are also weaknesses and obstacles to implementing online assessments. Further research can be done to overcome the challenges in implementing the online assessment.

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