



# Development of Web-based Assessment Applications to Improve Teacher Performance in the COVID-19 Period

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## Abstract

This study aims to develop a website-based assessment application to improve teacher performance during the COVID-19 pandemic. They are using research methods with a quantitative approach. Data collection techniques were carried out by distributing questionnaires via a google form. The participants involved were 100 teachers throughout West Java. The media expert validation test results show that the application has an excellent feasibility level with a percentage of 84%. Material expert validation gets a ratio of 85%. The user expert validity level receives a rate of 93%. The cumulative results from the three experts obtained a validity percentage of 87% and were included in the excellent category so that the Web-based assessment application was feasible to use. Paired sample t-test analysis showed that the application of the application could increase the effectiveness of the assessment with a t-test value ( $p = 0.000$ ,  $n(100) = 15.569$ ,  $<0.05$ ). This research contributes so that teachers and parents can carry out assessment activities continuously.

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**Key Words:** Assessment Application, Web-based Application, Early Childhood, Teacher Performance.

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## Introduction

Early childhood development in the age range of 0-6 is often called the golden age. This development occurs only once in a human's life. At this age, it is essential to stimulate the growth of the child's brain through the development of children's health. Providing adequate nutrition, educational services, and attention services will boost significantly (Safitri, 2020). Early Childhood Education services are an essential foundation for children in their golden age. Early childhood development includes physical, motor, cognitive, social-emotional, language, moral, and spiritual growth (Laksana et al., 2020). Developing all these aspects sustainably is significant (Daelmans et al., 2017).

Social, language, cognitive, physical, motor, and moral development through appropriate stimuli determine the quality of children in the future (Kurnia et al., 2019). Through the Childhood

Education unit, all aspects of action can be monitored. The teacher's role as a facilitator must understand the characteristics of the students they face (McClintic & Petty, 2015). Every child is unique, so the teacher must master the Standards for Child Development Achievement Levels (Allington & Gabriel, 2012). Early childhood education focuses on facilitating children's growth and development according to their achievements. The result of each child, when carrying out activities, needs to be followed up or improved according to their abilities (Miller et al., 2017). Therefore, teachers need to conduct an assessment to measure each child's development level. Appropriate checks can improve the quality of children's learning activities (Kugler, J.D., Beekman III, R.H., Rosenthal, G.L., Jenkins, K.J., Klitzner, T.S., Martin, G.R., & Lannon, 2009).

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The implementation of the assessment has been regulated in the national standard for early childhood education. Assessment is used to see the development progress and abilities the child has made. In addition, it is carried out with the aim that teachers can pay attention to the development of each child (Wilson, 2018). Assessment for early childhood is different from adult students by using tests. Children's reviews occur naturally and are recorded, documented, and given follow-up directions (Bin Abdul Aziz & Yusoff, 2016; Vartuli et al., 2016). Assessment begins when the child comes gradually and continuously, for example, by playing and communicating with his friends. Then, through observation, it will be identified with parents to provide appropriate learning assistance to obtain optimal results (Xu & Brown, 2016).

The world is currently being hit by an outbreak of Corona Virus Disease 2019 (COVID-19) (Zimmermann & Curtis, 2020). WHO has conveyed various appeals and issued policy circulars to prevent the spread of COVID-19? During this pandemic, one of the government policies related to education requires that learning activities in schools be changed to learning activities at home (Churiyah et al., 2020). Learning activities at home involve using technology for children, teachers, and parents (Adhe et al., 2020; Craig & Churchill, 2020). In addition, parents are asked to accompany their child's learning process while at home. Parents are in the closest environment to their children, so their role is increasingly needed during this pandemic. Various challenges in the world of education are in line with the current pandemic (Hidayat et al., 2020). Early childhood education must not be lost with the Covid-19 Pandemic (Bayham, J., & Fenichel, 2020). It is necessary to improve communication between teachers and parents to ensure that early childhood learning activities run well at home according to the developmental needs of children (Zimmermann & Curtis, 2020; Hidayat et al., 2020). The results of the assessment of children should also be considered. The evaluation usually carried out in schools is currently impossible (Bennett, 2011). Teachers still rely on the children's daily reports given by their parents. The online learning process needs to be complemented by online assessments that can be accessed quickly. Communication between parents and teachers about the assessment of children can be carried out optimally (Muhdi et al., 2020; Uzun et al., 2021).

The results of an assessment conducted by researchers in September 2020 to early childhood teachers in Karawang Regency showed that 70% of teachers had not used the student assessment database program, and 80% of teachers had difficulty using databases during the pandemic. In addition, 40% of teachers do not understand how reporting should be done. Field conditions tend to be more significant because of the limitations of the research and respondents who have not covered all early childhood education in the Karawang Regency. So far, the assessment used has focused on the children's final project. According to school rules, assessment and evaluation are only done at the end of the semester by asking for all the children's assignments. Teachers rarely conduct assessments during regular online activities, and assessments are carried out at the end of the semester. The assessment focuses on the results, not the process of developing each activity. This learning approach causes learning not to see aspects of child development. To improve child development, an assessment that involves all aspects is interconnected. Teachers and parents must integrate to produce optimal assessments (Mulatsih, 2020). Assessment is an integral part of learning. A teacher must design a systematic and programmed assessment.

Entering the 21st century, the focus of assessment changes according to the learning process, knowledge, and skills (Papadakis et al., 2020). This opinion is supported by Shute & Becher (2010), which state that educational assessment is prioritized to help the student potential evaluation system (Shute & Becker, 2010). Reviews that emphasize learning outcomes and processes aim to develop children's potential. Early childhood education is assessed following the child's growth and development achievements. During the pandemic period, an application was created to facilitate the assessment process, making it easier for teachers and parents to carry out the assessment. Anyone with access rights can access this kind of assessment. Web-based applications can be accessed anywhere and anytime. However, this system can only provide information to parents and children about developments during the learning process. Using a website-based assessment processing application, it is hoped that users will find it easier to process student data and have a good level of effectiveness. This information system is helpful because it makes it easier for teachers.

Web-based assessment is one response to assessment problems during the pandemic, considered quite effective and efficient (Brown et al., 2015). Indicators of development goals summarized in the curriculum must be adjusted to the time without neglecting the main learning objectives (H., Maxim, H. H., & Norris, 2010). Assessment is declared effective if it can achieve the learning objectives. Web-based assessment is an efficient medium because it does not require much effort, money, and costs compared to conventional assessments (Wang, Q., Liu, F., & Li, 2013). Based on the background that the researcher has described, the problems in this study can be formulated as follows; 1) Is WEB-based assessment effective in evaluating early childhood development during a pandemic?

**Research Methods**

The method used in this study is a research and development method with a quantitative approach. The procedures carried out in development in the field of education have two main objectives, namely: (1) developing a product and (2) testing the effectiveness of the product. The development model used is the ADDIE model. The ADDIE development model is a learning design model based on a systems approach that effectively develops products and interactive processes. The evaluation results of each phase can improve learning development to the next stage.

**Participants**

The sample in this study was Early Childhood Education teachers in West Java Province. The areas selected as research participants were Subang, Karawang, Bekasi, Purwakarta, and South Bandung Regencies. Research participants are Early Childhood Education Teachers. Sampling technique with random sampling technique. The number of participants in the study consisted of 110 participants with details of 17 men and 98 women.

**Data Collecting Technique**

The technique used in collecting research data is a questionnaire. The data collection instrument is important because it determines whether or not the data obtained is good. The data collection instrument was used to get the expected amount of data. Table 1 presents the aspects assessed, the

tools used, the data observed, and the respondents involved.

**Table 1.** Details of Instruments and Respondents

Dimension	Element	Respondent
Use of database-based assessments	Easy to use, maintain, repeatedly used, easy navigation, and explicit instruction	Teachers
Ease of reporting	Interesting, attractive illustration and quality design	Teaching
Language Used	Communicative, consistent, and proportional	Teachers
Social-Emotional	Self-awareness, Responsibility towards yourself and others	Teachers

**Data Analysis Technique**

The data analysis technique was carried out through 2 tests, namely the normality test and the t-test. The normality test aims to test whether the research data is usually distributed. The results of the normality test of the data in this study used the Kolmogorov Smirnov test using the SPSS application.

$P < 0.05$ . The data is not normally distributed.

$P > 0.05$  data is normally distributed.

Paired sample t-test was used if the data were normally distributed. An independent sample t-test is one of the methods of testing the effectiveness of the product being developed—the results of the t-test through pre-test and post-test instruments. The basis for accepting or rejecting  $H_0$  in the t-test is as follows: If  $p < 0.05$ , then  $H_0$  is rejected, and  $H_1$  is accepted. If  $p > 0.05$ ,  $H_0$  is accepted, and  $H_1$  is rejected.

**Results and Discussion**

The results of developing a web-based assessment application using the ADDIE development model. The feasibility of the web-based assessment application was evaluated by a team of experts, namely media experts and early childhood development experts, as shown in table 2.



**Table 2.** Team of Expert Validation Results

Indicators	Percentage	Category
1. The web-based assessment application is easy to use	82	Valid
2. The web-based assessment application is easy to maintain (Main table)	82	Valid
3. The web-based assessment application can be used repeatedly (reusable)	81	Valid
4. The web-based assessment application has an easy navigation	87	Very valid
5. The web-based assessment application has an explicit instruction	92	Very valid
6. The web-based assessment application can be installed and used in many hardware and software devices	86	Very valid
7. The web-based assessment application has good security and accessibility system	86	Very valid
8. The web-based assessment application can be managed and managed well	82	Valid
9. The web-based assessment application has an attractive main page design	83	Valid
10. The web-based assessment application has an attractive illustration and picture in it	83	Valid
11. The web-based assessment application has a suitable display page	87	Very valid
12. The web-based assessment application has the proper background and writing color	81	Valid
13. The web-based assessment application has a suitable font for the users	83	Valid
14. The web-based assessment application has a good quality design	84	Valid
15. The web-based assessment application has good display layout elements	87	Very valid
16. The web-based assessment application uses communicative language following the message and can be accepted by the target	85	Valid
17. The web-based assessment application uses consistent font types and sizes	84	Valid
18. The web-based assessment application uses readable font type and size	88	Very valid
19. The web-based assessment application uses proportional font type and size.	80	Valid
20. Know and respect other people's religions	85	Valid
21. Rough motoric	85	Valid
22. Fine Motor	83	Valid
23. Health and Safety Behaviour	87	Very Valid
24. Learning and problem solving	83	Valid
25. Logical thinking	87	Very Valid
26. Symbolic thinking	90	Very Valid
27. Receptive	90	Very Valid
28. Expressive	83	Valid
29. Self-awareness	83	Valid
30. Responsibility towards yourself and others	83	Valid
31. Prosocial behavior	80	Valid
Art appreciation	83	Valid
Art activities	85	Valid

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Based on the analysis results, it can be concluded that the validation of media experts, child development experts, and user validation is 87%, meaning that web-based assessment applications are suitable for independently evaluating early childhood learning outcomes. The results of the normality test can be seen in table 3.

**Table 3.** Normality test results

One-Sample Kolmogorov-Smirnov Test	Pre-test	Post-test
N	100	100
Mean	60.48	80.27
Std. Deviation	9.86	6.78
Test Statistic	0.127	0.138
Asymp. Sig. (2-tailed)	0.198	0.092



The data is normally distributed based on the normality test results of  $p > 0.05$ . Therefore, it can be continued with the t-test, as shown in table 4.

**Table 4.** t-Test Results

Effectiveness	t-Statistics	p-Value	Significant
Program understanding	5.020	0.000	Significant
Right on target	4.465	0.000	Significant
On-time	4.163	0.000	Significant
The achievement of goals	2.980	0.000	Significant
Real change	2.344	0.000	Significant
Time efficiency	2.367	0.000	Significant
Energy efficiency	2.489	0.000	Significant
Cost efficiency	2.578	0.000	Significant
Energy efficiency	2.489	0.000	Significant
Assessment effectiveness	15.569	0.000	Significant

Results The paired sample t-test analysis in determining the effectiveness of the developed product found a significant difference ( $p = 0.000$ ,  $t(100) = 15.670$ ,  $< 0.05$ ) between the pre-test and post-test scores. The findings also show that the eight elements of effectiveness (Program Understanding, Right on target, On time, goal attainment, Real change, Time Efficiency, Power Efficiency, and Cost Efficiency) had a significant difference ( $p = 0.000$ ) between pre-test and post-test. This lesson contributes to how to integrate collaborative assessment and web-based assessment applications.

This finding (Topping, K. J., & Ehly, 2001) supports the conclusion that Assessment Applications have interactive components such as assessment forms and synchronous systems that enable collaborative peer learning. The potential for knowledge production through communication and social interaction, especially knowledge sharing and discussion, can improve students' developmental assessment skills (Roschelle et al., 2018). Learning that uses e-learning, and other information technologies has the feature of developing a collaborative learning model of learning activities in distance learning (Podlubny, I., Chechkin, A., Skovranek, T., Chen, Y., & Jara, 2009). The features available in CMSL can facilitate student interaction to be active in learning activities through chat features and discussion forums (MacDonald, M. P., Spalding, G. C., & Dholakia, 2003). In addition,

teaching and learning activities involve students developing their way of learning to become active students (Biasutti, 2011). Anderson and Simpson (2004) show that discussion activities in cyberspace can be more productive because students are freer to have the same time and opportunity for renewal.

**Conclusion**

Based on the research results, developing a web-based assessment application follows the goals that have been targeted. Based on the validation of media experts, child development experts, and user experts (teachers), the validity percentage is 87% and is included in the Very Valid category. Therefore, it is declared feasible and accepted as a web-based assessment application. Developing a web-based assessment application can increase the effectiveness of the assessment process during a pandemic. Assessment-based provides ease of use, care, cost, and time that can increase the effectiveness of child assessment during a pandemic. Web-based assessment applications can be the primary tool for early childhood teachers and parents who expect optimal child growth and development. Web-based assessment applications are one of the breakthroughs relevant to the times that have begun to utilize technology in every activity.

Recommendations for web-based assessment tools are effective in learning during a pandemic. You are expected to read the instructions on the front page before logging into the application because there are conditions and some features with different functions. It's better if they use this judgment; Teachers can provide follow-up suggestions that parents can do and use the assessment results to guide the learning process. For further development, similar research can be designed with a broader range of ages and levels of education. The limitation of this research is that the application can only operate on a window-based system. It must be developed for all operating system platforms such as Android and IOS.

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