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Development of E-Assessment Monitoring of Child Growth and Development (SI INTAN) in Kindergarten Abdi Pertiwi

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ABSTRACT

This study aims to determine the needs analysis of E-Assessment (Si Intan) monitoring child growth and development, to test the feasibility of E-Assessment (Si Intan) monitoring child growth and development, and to test the practicality of E-Assessment (Si Intan) monitoring child growth and development in Abdi Pertiwi Kindergarten. This research is a type of research and development (Research and Development). The research and development model of education (Research and Development) carried out adopts the 4-D development model (Four-D) with research stages, namely, define, design, develop, and dissemination. It's just that researchers limit this research to the development stage, namely product practicality testing, not to the dissemination stage due to limited time and researcher costs. The results of the needs analysis show that teachers and parents need new assessment products on children's growth and development whose results of identifying needs Regarding Media New assessments that answer yes are in the qualifications are needed so that they become the basis for researchers in developing this e-assessment (Si Intan). The results of the validation of this e-assessment product (Si Intan) are valid and reliable, the results of this validity consist of trials on 2 validators, namely media expert validators on the e-assessment product (Si Intan) who get good qualification validity test results. As well as the results of the validity of the assessment expert on this e-assessment product (Si Intan) get good qualification results. The results of the reliability union show an average agreement between raters of 0.125 while for raters the consistency is 0.932 which means it has high stability.

Keywords: E-Assessment, Child Growth and Development

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INTRODUCTION

In teaching and learning activities, teachers are required to have the ability to carry out Assessment, understand the concept of Assessment, recognize Assessment tools that can be used in various forms, media and steps for implementing Assessment, be skilled in using Assessment tools and be able to interpret assessment results (Riadi, 2017). Assessment is carried out as an evaluation material whether the learning activities carried out have succeeded in stimulating the development and growth of children or not. In addition, assessment is carried out to provide information to teachers or parents about

children's progress and the achievement of children's learning outcomes (Paramita et al., 2019).

The assessment system in early childhood education describes more about children's developmental achievements (religious and moral values, physical-motor, language, cognitive, social-emotional, and art) (Arumsari & Putri, 2020). Assessment that is done correctly will help teachers or parents in improving aspects of development that have not been achieved so that child development can take place optimally. For this reason, teacher understanding in conducting child development assessments is needed (Muravyeva et al., 2020).

Early Childhood Education (PAUD) is a level of education held before basic education, can be carried out through formal or non-formal channels. Assessment is needed so that we can make learning that suits the needs of children (RK & Watini, 2022). Learning assessment in ECCE has different characteristics from assessment at other levels of education, where in ECCE learning assessment is delivered in the form of a description of existing assessment criteria. Assessment results in ECCE are not expressed in quantitative form, only qualitative that describes the achievement of child development in accordance with the standard level of child development achievement. Assessment in ECCE institutions has several stages that must be carried out starting from daily, weekly, monthly, semester assessments (Efiawati et al., 2021). This assessment must be carried out outentic every day and continuously to determine the success of learning (Puteri et al., 2023).

Early childhood learning assessment can be carried out by utilizing a way that records all activities and attitudes of children seen during the learning process. Assessment is carried out starting from children coming to school, marching, participating in the learning process, washing hands before eating, eating lunch with friends, playing freely, until finally returning home. Assessment in early childhood is carried out naturally without any coercion, which arises based on real conditions when children move or the results obtained from activities (Mundia & Heru, 2020).

According to Howard Garner, assessment is the way we obtain information from someone related to his skills, potential, attitudes and abilities, with the aim of: (1) providing feedback for the person concerned and (2) as a source of information for the surrounding community. Assessment is a process of collecting information about children to understand and support learning activities and better child development. Before conducting an assessment, measurement is carried out., measurement at the ECCE level by providing treatment or treatment that refers to the behavior of the child to be measured (Suminah, 2018). Thus assessment includes the behavior, skills, abilities, preferences, and interactions of children with children, children with teachers, and children with materials / play tools. In conducting an assessment there are several things that need attention, namely: Assessment can be done by observing what you do, what children are biased, and what are the habits of children. As the results of research from (Bai et al., 2020) which states one of the obstacles to conducting an Assessment is the application of assessment techniques.

The use of digital technology in recording, storing, and evaluating children's works in multimedia form. Using digital technology, portfolio assessment systems can provide

parents and teachers with more detailed and accurate feedback on child development (Yudha et al., 2023). Development for the concept of Assessment from the results of the discussion above, the design for Assessment so that it can be used easily by ECCE educators and also utilize technology that develops according to today's times, there are no methods or stages that are added or modified, but rather development to create applications that can make it easier for ECCE educators to use them in the process of early childhood growth and development assessment.

Assessment can be seen as a type of application or use of various methods and tools to collect data about student learning outcomes and competencies. In another sense, Assessment in early childhood education is a series of activities carried out with the aim of collecting data or evidence about early childhood development and learning outcomes (Dabis, 2019). More and more schools are turning to technological means as a complement to traditional methods to enhance the educational experience for their students (Salsabila et al., 2021). In addition, technology assistance plays an important role for educators in maximizing student learning. There's no denying that when technology is integrated into the classroom, children are more engaged and teachers have more tools to make learning as engaging as possible. Teachers often incorporate technological means into assessment procedures (Maruti & Kusumawati, 2018).

Through a survey of PAUD teachers in Walantaka District, it can be concluded that teachers who know E-Assessment in the 21st century are 28%, while those who do not understand about Early Childhood E-Assessment are 72%. A survey of ECCE teachers in Walantaka sub-district showed that 92.59% of teachers expect special ways to assess early childhood development in the 21st century, using digital media. From the survey, it is necessary to develop E-Assessment as a tool to measure children's development at school.

Early childhood is a golden period of development and growth. This period is very important to stimulate various aspects of child development to grow optimally. Therefore, monitoring of early childhood growth and development must be carried out regularly by parents, teachers, and health workers. Unfortunately, there are still many parents and teachers who find it difficult to monitor children's growth and development accurately. Growth and development measuring instruments that exist today are still conventional and require experts to interpret the results. In addition, the track record of children's growth and development is also difficult to monitor if you only rely on manual records. Therefore, technology-based early childhood growth and development measurement tools are needed that can make it easier for parents and teachers to monitor children's development.

E-assessment of growth and development is believed to be a solution to these problems. E-assessment allows digital recording of growth and development track records. In addition, the assessment results can also be interpreted automatically by the system so that parents and teachers do not have to struggle to understand the measurement results. Thus, the development of e-assessment of early childhood growth and development is needed to facilitate monitoring of children's growth and development.

Several studies show that the use of digital technology can increase parental participation in children's education and provide more detailed feedback on children's

development seeing impressions of letter recognition, number recognition, recognition of the names of the Prophet and so on, of course limited to a duration of time ranging from 15 minutes to 2 hours. And most parents have carried out their role as guides and caregivers for their children. This can be seen from the efforts that have been made by parents in maintaining social development in children., research conducted by (Paramitha & Anggara, 2018) shows that the use of digital technology in early childhood assessment can help teachers and parents monitor individual child development and provide more detailed feedback.

From previous research tables, there is no system that has implemented a child growth and development system in kindergarten which is reported daily, monthly and semester at once. Reporting in previous systems has almost the same mechanism in all systems, namely providing records of child development in the form of records of children's activities and there are some systems that only provide value from child development. From the results of previous research, a media is needed that provides complete child development reports that are reported daily, monthly and every semester and religious assessments.

In addition to the reporting system, there is also a system that helps parents to find out the child's schedule while in kindergarten. With the system to be built, parents can be helped by a monitoring system in monitoring children's development which is expected to help parents and teachers to work hand in hand to give more attention to children related to development that is considered still lacking during teaching and learning activities at school. And the next novelty can be seen from the data collection technique where in this study using the delphi technique where the Delphi technique, the delphi technique is a systematic method of collecting opinions from a group of experts through a series of questionnaires, where there is a feedback mechanism through rounds / rounds of questions held while maintaining the anonymity of respondents' responses (experts).

In this study, researchers limited several things due to the time and cost of research. Researchers limit this research to the development stage, namely product practicality testing, not to the dissemination stage due to limited time and researcher costs.

This study aims to determine the needs analysis of E-Assessment (Si Intan) monitoring child growth and development, to test the feasibility of E-Assessment (Si Intan) monitoring child growth and development, and to test the practicality of E-Assessment (Si Intan) monitoring child growth and development in Abdi Pertiwi Kindergarten.

METHOD

Development Research Model

This research is a type of research and development (Research and Development). The research and development model of education (Research and Development) carried out adopts the 4-D (Four-D) development model. The Four-D research and development model was developed by Sivasailam Thiagarajan, Dorothy S. Semmel and Melvyn I. Semmel (1974) with research stages, namely, define, design, develop, and dissemination (Thiagarajan, 1974).

The define stage is the stage to establish and define learning requirements. This define stage includes five main steps, namely front-end analysis, learner analysis, task analysis, concept analysis and specifying instructional objectives.

The design stage aims to design learning tools. Four steps must be taken at this stage, namely: (1) preparation of test standards (criterion-test construction), (2) selection of media (media selection) in accordance with the characteristics of the material and learning objectives, (3) format selection (format selection), namely reviewing the existing teaching material formats and determining the format of teaching materials to be developed, (4) making an initial design according to the chosen format.

The development stage is the stage to produce product development which is carried out through two steps, namely: (1) expert appraisal followed by revision, (2) developmental testing. The purpose of this development stage is to produce the final form of learning tools after going through revisions based on input from experts/practitioners and trial data.

Data Collection

The instruments used in this study are as follows:

The interview guidelines in this study were used to collect deeper data on needs analysis both related to desired learning outcomes, implementation techniques, or other things that were not revealed through questionnaires. A questionnaire is a list of questions given to others with the intention that the person is willing to respond according to the user's request. Questionnaires are used at the time of research, validation and trials. Validation is shown to material validators and media validators using response questionnaires to find out whether or not the product that has been developed is feasible.

Data Analysis

In order to find out whether this e-assessment meets the criteria as a good teaching material, analysis is needed. The extent to which e-assessment can be used by ECCE teachers requires validation.

Furthermore, the validation process of early childhood e-assessment based on expert judgment through the Delphi Technique involves the opinions of experts, namely: media expert lecturers, and assessment expert lecturers. Measurements are also carried out in a statistical descriptive manner using percentages.

At this stage, the author can already know the validity of the e-assessment website developed. Proof of validity is sufficient construction validity (Sugiyono, 2017), proof of construct validity using Purwanto's opinion which states that proof of construct validity can be done by asking for expert judgment (Purwanto, 2017), by means of using product validation sheets.

The validity of the measurement results of the instruments used is carried out through validation actions by experts (expert judgment). Two early childhood education experts and two media experts were asked to validate the e-assessment website. This validation includes: first, content validation (content-related evidence), and construct validation.

Delphi technique, Delphi technique is a systematic method of collecting opinions from a group of experts through a series of questionnaires, where there is a feedback mechanism through rounds of questions held while maintaining the anonymity of respondents' responses (experts) (Stephenson et al., 2019). The advantage of the Delphi process is that face-to-face meetings are not required so there is no risk of peer pressure, and experts from different regions can easily participate in the study. The Delphi technique in our study consisted of the following procedure: experts were interviewed with an electronic questionnaire, answers were collected, aggregated, and refined throughout 2 rounds. Although the panel members do not know the individual answers of the other participants, after each general round feedback is given to each panel member by summarizing all the assessments from the previous round (Mahajan et al., 1976).

The resulting product feasibility data is determined through analysis of the validation results of material experts, media experts, and assessment experts. Data from the validation of media experts and assessment experts were analyzed descriptively.

Table 1. Expert Validation Eligibility Categories

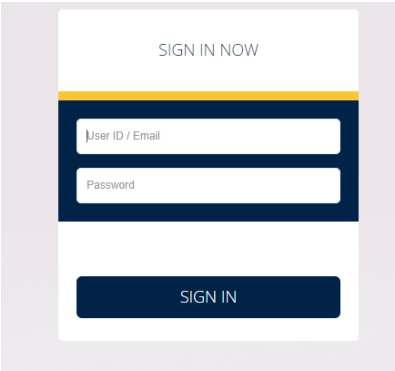
Achievement Level	Qualification	Information
90% - 100%	Excellent	No Revision Required
75%- 89%	Good	Needs Minor Revision
65% - 74%	Considerable	Major Revision Required
55% - 64%	Kurang	Major Revision Required
0% - 54%	Sangat Kurang	Need Overall Revision

Reliability studies involving raters are usually called inter-rater agreements or inter-rater reliability. If in the case of self-report reliability is shown by internal consistency seen from between one item and another item has a high correlation, then in the case of reliability between raters tested consistency is the rater. So the position of the grain is replaced with the position of the person (rater). Rater-raters that have high agreement can be seen from the position of the subject being observed. If the order of subject scores of Rater A and B is almost the same, then both raters have a high agreement (Jančařík & Kostelecká, 2014; Wess et al., 2021). This is because agreement is operationalized in the form of correlation.

Instrument reliability tests that use observation sheets the most appropriate formula is to use Inter Rater Reliability, reliability involving raters is usually called inter rater agreement or inter rater reliability. If in the case of self-report reliability is shown by internal consistency seen from between one item and another item has a high correlation, then in the case of reliability between raters tested consistency is the rater. So the position of the grain is replaced with the position of the person (rater). To assess reliability between two or more observers, as well as reliability tests. In this sub-chapter, inter-rater reliability is calculated using inter-rater Reliability, showing the comparison between the variation caused by the measured attribute and the overall measurement variation. To calculate reliability by using raters (Mardapi, 2012).

RESULT AND DISSCUSSION

This research and development resulted in a product in the form of E-Assessment Monitoring of Child Growth and Development (Si Intan) which was developed with a 4-D model (define, design, develop, and dissemination). The steps contained in the 4-D model are: 1) so that researchers can find out the initial understanding of Abdi Pertiwi Kindergarten teachers and the need for e-assessment and the basis for product development. In this study, researchers identified teacher needs with a needs identification questionnaire. 2) designing e-assessment development products for monitoring children's growth and development to be developed. In the second stage it is focused on three steps of activity. First, researchers select several applications that can be used in the product development process. In making this system will use PHP and HTML programming languages. 3) Making e-assessment web products monitoring child growth and development, which includes the process of making domain names https://e-assessment-paud.com/ and hosting, validation instruments and then testing to determine the weight of validity and practicality of the product.



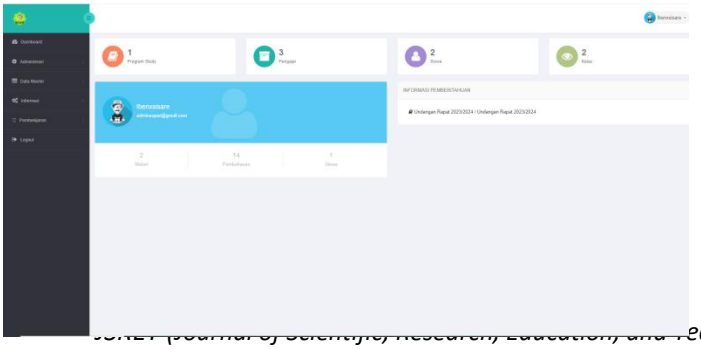


Figure 1 SI Intan Website Display

Products developed that have been completed will then go through the validation stage, which is validated by media experts and, assessment experts and practicality tests. Trials are carried out to obtain results in the form of assessment of design and assessment aspects, ease of using the product so that it is known how the development of the product reaches its validity and practicality weight. The scale used in the validity and practicality trial is a rating scale with choices of 1-5.

The Media Expert Test of the initial product development draft was given to design experts on December 18, 2023 to obtain data on the level of validity of the developed product from a media perspective. The design/media expert who is used as an assessor of development products is Muhammad Naja M. Kom, one of the web developer practitioners. Validator 2 is Ratu Yustika Rini, M. Pd, Head of S1 PAUD Study Program, Bina Bangsa Serang University. From the validation questionnaire, the following results were obtained:

Table 3. Media Expert Validation Results

No	Aspect	Score Validator 1	Score Validator 2
A	**Serving**		
1	Website menu placement is easy to access and use	4	4
2	Easy to use page layout design	4	4
3	The text on the web page is easy to read and learn	4	5
4	The videos presented on the website are easily accessible and understandable	2	1
5	The images presented on the website mudah untuk dilihat dan diamati	3	4

6	Integration with child development and assessment is easy to use	4	4
7	The organization between title and content can be easily followed by teachers and parents	3	4
8	Start page, content, interaction and evaluation combine consistent colors and are beautiful to look at	4	5
9	*The website is responsive (the size adjusts to the device used) so that it is easy and comfortable to use on any device, such as a laptop, mobile phone or tablet*	4	5
10	The size of the image/illustration/simulation/video is presented precisely and can be enlarged to the full screen size so that information is conveyed properly	2	2
11	Selection of font type and size is right so that it is easy to read	5	5
12	Writing material using the right rules so that it is easy to read	5	5
B	**Language**		
13	Language used, both to explain concepts and illustrations aplikasi konsep,	4	5
14	The delivery of messages between pages within adjacent pages reflects the coherence and interconnectedness of content	3	4
15	The message or material presented in the page reflects the unity of the theme	3	4
16	The grammar used to convey the message refers to the rules of good and correct Indonesian	5	5
17	The spelling used refers to the Enhanced Spelling guidelines	5	5
18	The sentence used represents the content of the message conveyed and follows the correct sentence layout in Indonesian	5	5

19	Terms used in accordance with the Big Dictionary of Indonesian and/or agreed technical terms of science	5	5
	Total	75	81
	Persentase	79%	85%

In table 3, the overall value of validator 1 is 75 or after conversion, the percentage result of 79% is in good qualification and needs to be revised minor, and the result of validator 2 which is 81 or after conversion, the percentage result of 85% is in good qualification and needs to be revised minor. Some of the suggestions and comments given are: 1) the assessment menu has not been categorized according to aspects of child development and development, 2) there is no communication feedback menu from parents, 3) there is no child growth report, 4) The front wallpaper is not appropriate, 5) There is no daily report data, monthly report data and semester report data on child development, 6) There is no information menu about website usage, 7) There is no image or video input menu in the assessment report. Expert Test Assessment at this stage the product that has been designed is consulted with the supervisor. The resulting product is evaluated, whether the resulting format is feasible or not, and how appropriate the content of the learning assessment is. The trial was validated by 2 assessment experts, namely Prof. Dr. Dinny Devi Triana, M.Pd as validator 1. He is a professor in the field of assessment at the State University of Jakarta and one of his works is the dance e-assessment web. The second validator is Dr. Rivo Panji Yudha, M.Pd, he is a lecturer in learning assessment at Panca Sakti University Bekasi The following are the validation results from 2 assessment experts.

Table 4. Assessment Expert Validation Results

No	Aspect	Score Validator 1	Score Validator 2
1	Website menu placement is easy to access and use	5	4
2	Easy to use page layout design	5	4
3	The text on the web page is easy to read and learn	5	5
4	Video-video yang disajikan dalam website mudah diakses dan dipahami	2	1
5	The images presented on the websitemudah untuk dilihat dan diamati	4	4
6	Integration with child development and assessment is easy to use	4	4

7	The organization between title and content can be easily followed by teachers and	3	4
8	Start page, content, interaction and evaluation combine consistent colors and are beautiful to look at	5	5
9	*The website is responsive (the size adjusts to the device used) so that it is easy and comfortable to use on any device, such as a laptop, mobile phone or tablet*	5	5
10	The size of the image/illustration/simulation/video is presented precisely and can be enlarged to the full screen size so that information is	2	2
	Total	40	38
	Persentase	80%	76%

In table 4, the overall value of validator 1 is 40 or after conversion, the percentage result of 80% is in good qualification and needs to be revised minor, and the result of validator 2 which is 38 or after conversion, the percentage result of 76% is in good qualification and needs to be revised minor.

Involving experts in product validation also helps ensure that the website conforms to good design principles. Experts can provide insight into these improvement opportunities and help design effective development strategies.

The level of agreement (reliability) between the four raters can be explained by calculating the reliability coefficient between raters using the Intraclass Correlation Coefficient. The calculation results (using the help of the SPSS program version 20) are presented in Table 5.

Tabel 5. Uji Realibilitas Intraclass Correlation Coefficient

Intraclass Correlation Coefficient

	Intraclass Correlation[a]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.125[b]	-.118	.526	1.519	1	3	.190
Average Measures	.932[c]	-.731	.816	1.519	1	3	.190

From table 5 it can be seen that the results of ICC calculations using SPSS v.20 in the analysis results show an average agreement between raters of 0.125 while for raters the consistency is 0.932 which means it has high stability (Polgar S, 2019; Streiner & Norman, 2008).

The level of product implementation is measured through observation by 5 observers of products that are being applied to the child's growth and development process. In this observation instrument on the level of implementation there are 11 statement items that must be answered with "Very Good", "Good", "Enough", "Less", "Very Less".

To determine the quality and practicality of the product, the five user teachers were given a questionnaire assessing the practicality of the product which included aspects of objectivity, systematic, construction, language and practicality with a total of 11 statement items. Each aspect was assessed with assessment alternatives: very good (scored 5), good (scored 4), Sufficient (scored 3), less (scored 2) and very less (scored 1). Table 5 presents a summary of the assessment results from the five teachers using the e-assessment product.

Seen from Table 5, in general, teachers assess products to have good objectivity, systematic, construction, language and practicality. This is illustrated by the T score of each rater I and IV obtained the lowest T score of 53.89, rater II obtained a T score of 79.46, rater III obtained a T score of 58.76, and rater V obtained the second highest T score of 69.72. Thus, according to the practical criteria of the Glicman formula, this E-Assessment product can be said to be generally considered practical by teachers (raters) in monitoring children's growth and development in Abdi Pertiwi Kindergarten.

Table 6 Results of T Score Analysis for Product Practicality Assessment

Person	x	$x- \bar{x}$	$(x- \bar{x})^2$	$Z=(x- \bar{x})^2/SD$	Skor T	Kriteria
Rater I	50	0.8	0.64	0.39	53.89	Praktis
Rater II	47	-2.2	4.84	2.95	79.46	Sangat Praktis
Rater III	48	-1.2	1.44	0.88	58.76	Praktis
Rater IV	50	0.8	0.64	0.39	53.89	Praktis
Rater V	51	1.8	3.24	1.97	69.72	Sangat Praktis
Jumlah	**246**				315.73	
Mean		**49.2**			63.15	Praktis
SD			**1.643**			

This study aims to develop e-assessment monitoring of children's growth and development in Abdi Pertiwi Kindergarten. Based on the results of the study, it was found that the SI INTAN developed had good validity based on the assessment of media experts and assessment experts. This shows that SI INTAN is suitable to be used for monitoring

children's growth and development in Abdi Pertiwi Kindergarten. In addition, the results of the practicality test also show that SI INTAN is included in the practical category.

Besides being valid and practical, SI INTAN has several advantages when compared to manual assessment. First, SI INTAN is designed systematically and structured to make it easier for teachers to conduct assessments. Teachers simply choose the assessment menu according to the aspect of growth and development they want to assess. Second, SI INTAN is portable because it is web-based so it can be accessed from anywhere via smartphone. Third, SI INTAN is equipped with an online monitoring feature so that parents can monitor the progress of their children. Fourth, SI INTAN provides a neatly printed and easy-to-read assessment report.

Although the SI INTAN development research shows positive results, there are some limitations that need to be considered. First, SI INTAN's test subjects are still limited to one kindergarten, namely Abdi Pertiwi Kindergarten, so it cannot be generalized to other kindergartens. It is necessary to conduct trials on a wider and varied sample to see the effectiveness of SI INTAN.

Second, the trial was carried out in a relatively short period of time, which is one month. Further research is needed to see the effectiveness and impact of using SI INTAN within one semester or one academic year.

Third, there is no comparison of assessment results between using SI INTAN and using manual assessment. Further research can compare these two methods to see the level of precision and practicality of each.

Fourth, SI INTAN only provides assessments for certain aspects of growth and development, not yet covering all aspects comprehensively. Further development is needed so that SI INTAN can assess the development of kindergarten children holistically.

Fifth, there has been no analysis of the utilization rate of online monitoring features by parents. It needs to be further investigated whether this feature is utilized optimally or not by parents.

Thus, it can be concluded that the use of technology in assessing child growth and development in kindergarten can help teachers and parents in monitoring child development. The SI INTAN e-assessment developed has proven to be valid and practical to use in Abdi Pertiwi Kindergarten so that it can be recommended for use in other kindergartens. However, further trials with wider subjects are needed to see the effectiveness of using SI INTAN in the long term. You can also get the results of the type of assessment that teachers and parents want through e-assessment that is easy to use, can directly see the assessment results, and can be used on mobile phones and laptops, making it easier for teachers. And parents see firsthand the results of children's growth and development. Researchers also teach teachers to operate e-assessment (SI INTAN). Media e-assessment (SI INTAN) has been developed and created, but all obstacles starting from the development process can be overcome until the e-assessment product (SI INTAN) can be resolved, resulting in a quality tested e-assessment product (SI INTAN).

CONCLUSSION

The results of the needs analysis show that teachers and parents need new assessment products on child growth and development whose results identify needs Regarding Media New assessments that answer yes are in the qualifications are needed so that they become the basis for researchers in developing this e-assessment (SI INTAN).

The results of the validation of this e-assessment product (SI INTAN) are valid and reliable, the results of this validity consist of trials on 2 validators, namely media expert validators of e-assessment products (SI INTAN) who get good qualification validity test results. As well as the results of the validity of the assessment expert on this e-assessment product (SI INTAN) get good qualification results. The results of the reliability test show an average agreement between raters of 0.125 while for raters the consistency is 0.932 which means it has high stability.

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