



Child Development Measurement Instrument Based on Digital Format at the Childcare Center

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Abstract. The rapid development of technology affects the development of instruments for measuring child development. The tool developed follows Permendikbud RI No. 137 of 2014 by utilizing technology based on the digital format of JotForm. This study aimed to create a digital format-based child social-emotional development measurement instrument at the Ceria Anak Foster Care Park (TARA). This research uses a mixed method with an (R&D) approach and uses the ADDIE research model (analysis, design, development, implementation, and evaluation). Data collection techniques were conducted through interviews and validation tests through the expert judgment of measurement, material, and I.T. experts. Then a limited trial implementation was carried out on 2-3-year-old children in a foster park for children. The results of expert judgment show that the measurement instrument for social-emotional development using the JotForm application in the TARA program is declared very feasible with revisions. The percentage of the feasibility of the measurement instrument is 100%, the rate of material feasibility is 88%, and the portion of application feasibility is 100%. The results of the limited trial implementation show that the measurement instrument of children's social-emotional development using the JotForm application in the home-based childcare program is feasible to use. The percentage of the feasibility of the measurement instrument after being implemented with a limited trial was 72.6%. Recommendations for further research can test the effectiveness of measuring children's socio-emotional development using the JotForm digital format to implement child assistance at the daycare or childcare.

Keywords: Development, measurement instrument, children's social-emotional development, JotForm, childcare center.

INTRODUCTION

Early Childhood Education (ECE) is essential in providing a clear picture of psychosocial and physical stimulation at home or other educational institutions. ECE is crucial for children's development, focusing on growth and skill acquisition from birth to age eight (Heikkilä, 2022). Children in change and action must be given direction by providing specific stimuli and stimuli (Valentine et al., 2009). One form of ECE that is nonformal and organizes educational programs for children from birth to six years is the daycare center, commonly referred to as childcare, following the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 84 of 2014

(Patmonodewo, 2000). A child begins his growth and development since he is in the womb, or what can be called the prenatal period, and will experience a rapid increase when he is 0-5 years old, or what is often known as the golden age (Nardina et al., 2021). Children's growth and development can be maximized if children can carry out skills according to their age, assisted by providing stimulation provided by parents (Ariyanti, 2007). One of the objectives of establishing daycare is to stimulate and help several aspects of child development according to their age in ECE programs by applying the concept of home-based childcare. Home-based childcare has the potential to provide a diverse learning environment for children, especially during their growth period (Rinekasari, 2018).

Based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 137 of 2014 Article 10 paragraph 1, child development under its age level includes religious and moral values, physical and motor, cognitive, language, social and emotional, and art. Nonformal ECE, such as daycare, can create an early childhood environment to stimulate aspects of child development as a form of intervention efforts that are regulated through learning for children's development, growth, and behavioral changes (Martani, 2012). The learning evaluation is conducted to find information about children's progress to become material for determining and following up on child development (Zahro, 2015).

One of the applications of learning evaluation that can be carried out in daycare is to evaluate the progress of children's development based on observations during children's activities in daycare. The results of the observation process will be given to parents in the form of a child development achievement report (Solihah, 2020). Observations in measuring children's social-emotional development require measurement instruments that contain all aspects of action that must be achieved according to the child's age. Observations that follow the measurement reference can produce a good evaluation of child development. Then a measurement instrument is made to create a connection that provides appropriate and accurate information (Gunartha & Widiarsi, 2021).

Observational studies in research (Solihah, 2020) show that the instrument for measuring children's social-emotional development has been carried out but has yet to be made into digital form, so it has not made it easier for educators to evaluate learning. However, observational studies in research (Rinekasari, 2021) show that measuring children's social-emotional development with paper-based manual measuring instruments will take too long, which impacts caregivers' performance to stimulate children's developmental achievements to be slowly related to the many work activities of caregivers.

Following the indicators of the level of achievement of child development formulated in Permendikbud RI No. 137 of 2014, that measurement instruments must be made according to the stimulation carried out in daycare which helps children's daily habits when at home (Suminah et al., 2015). One alternative that can be used in observing the level of achievement of children's social-emotional development is electronic rubrics. In connection with current technological developments, rubrics need to be developed with a digital base to make it easier for educators to measure the competencies that children have achieved and can be accessed at any time using a laptop, smartphone, or computer (Muktiarni et al., 2019). JotForm can also create electronic rubrics with checklist instruments to make it easier for users to generate assessment or measurement rubrics. JotForm is an online based application that can be used and accessed through the website or applications downloaded on the play store or app store (Aji et al., 2020).

Measuring children's socio-emotional development using paper-based instruments manually is considered traditional, widely used, and requires physical storage space, manual data entry, and verbalization, potentially underestimating abilities in nonverbal individuals (Svarre et al., 2017; Arnold & Reed, 2019; Neumann & Neumann, 2019). Based on these problems, it is necessary to develop an instrument for measuring the socio-emotional development of children aged 2-3 years based on digital JotForm applications. The product of measuring instruments for the socio-emotional development of children aged 2-3 years with JotForm applications uses non-test techniques in the form of checklists through observation or observation.

Based on the problems that have been described, the researcher is interested in conducting research with a problem focus on "Development of a Child Social Emotional Development Measurement Instrument Using the JotForm Application in the Home-Based Childcare Program" and conducting validation tests and limited trial implementation of the JotForm application as an instrument for measuring the social-emotional development of children aged 2-3 years at the Children's Services Laboratory.

METHOD

The research method used in this research is using Mix Method with Research and Development (R&D) approach. The development model used is ADDIE. The ADDIE research model from Branch (Branch, 2009) consists of five stages: Analysis, Design, Development, Implementation, and Evaluation, see **FIGURE 1** below.

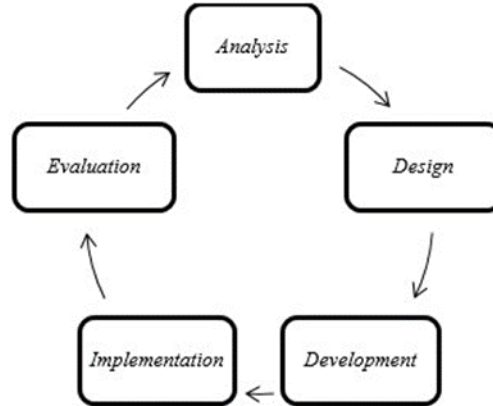


FIGURE 1. Stages of the ADDIE model.

The research subjects total 11 people consisting of several elements, namely two caregivers or educators and five children aged 2-3 years for limited trial implementation and validators consisting of one measurement expert, two material experts, and one I.T. expert. The research instrument consists of interview guidelines, validation through expert judgment, limited trial implementation, and evaluation. The interview guideline consists of several questions that the manager of the Children's Services Laboratory will ask to obtain information related to the measurement instrument for children's social-emotional development using the JotForm application in accordance with the required analysis results. The validation format is used to determine the feasibility of the measurement instrument using the JotForm application made by the researcher to be submitted to the validator.

FIGURE 1 shows the stages carried out in this study, including the analysis, design, development, implementation, and evaluation stages. Data analysis includes data reduction, validation, revision, percentage, and interpretation. Research data in the form of interview results and numerical data in the form of validation results through expert judgment. Then implemented through a limited trial to caregivers and children aged 2-3 years. The results of the limited trial implementation were then evaluated. The research was to develop a JotForm application-based child social-emotional development measurement instrument by testing it with validators.

RESULT & DISCUSSION

Development of an Instrument for Measuring Children's Social-Emotional Using the JotForm Application

The development of measuring instruments for children's social-emotional development using the JotForm application adapts from previous researchers and refers to Permendikbud RI No. 137 of 2014. Based on the needs analysis, it is necessary to develop a digital or application-based child social-emotional development measurement instrument to keep up with current developments related to increasingly developing technology. The result of socio-emotional development measurement instruments using the JotForm application is carried out through several stages.

1. Measurement scale analysis.
2. Measurement instrument for social-emotional development of 2-3-year-old children.
3. JotForm account creation.



Figure 2. Display of the JotForm for socio-emotional development measurement.

FIGURE 2 is a screen view of the JotForm application for measuring early childhood social-emotional development in childcare centers.

Validation

The validation stage in this research is a measurement instrument for children's social-emotional development using the JotForm application in the home-based childcare program, which is validated by measurement experts, material experts, and I.T. experts.

Measurement Expert Validation Results

Measurement expert validation was carried out by one lecturer teaching the Learning Evaluation Course in the UPI Family Welfare Education Study Program. The results of the measurement expert validation showed a feasibility percentage of 100%, including very feasible criteria without revision. Overall, measurement experts provide pretty good comments on the instrument for measuring children's social-emotional development using the JotForm application in the home-based childcare program. Suggestions and input are given by experts on tidiness in making validation sheets.

Material Expert Validation Results

Material expert validation was conducted by academic experts, lecturers of the Early Childhood Teacher Education Study Program at the Islamic University of Bandung, and lecturers of the Family Welfare Education Study Program at the University of Education Indonesia. The results of the material expert validation showed a feasibility percentage of 88%, including the criteria for feasibility with revision. In general, the suggestions and comments given by the experts regarding the writing and selection of less precise words and the measurement aspects need to be added again to clarify the incomplete activities further. The instrument for measuring children's social-emotional development using the JotForm application in the home-based childcare program is very feasible, with revisions to be used in Permata Hati Daycare.

I.T. Expert Validation Results

The Computer Science Study Program lecturers at the University of Education Indonesia conducted I.T. expert validation. The results of I.T. expert validation show a feasibility percentage of 100%, very feasible criteria without revision. Overall, IT experts provide suggestions and comments regarding the results of this data; of course, there are comments, criticisms, and recommendations from experts, namely paying more attention to the privacy of user identity.

Data Processing of Development Measurement Results

Implementation was carried out in a limited trial at the Children's Services Laboratory with five children and two caregivers on June 21, 2022. Before the measurement instrument was used to measure the social-emotional development of children aged 2-3 years at Permata Hati daycare, the researcher explained the JotForm application used to measure children's social-emotional development to the manager and caregivers. After explaining, the caregiver opened and tried the JotForm application for a trial before it was used to measure children's social-emotional development. When the caregiver tries the JotForm application, it runs smoothly, and the caregiver quickly understands how to use it. Furthermore, caregivers try to observe children's social-emotional development by filling in the aspects listed on the instrument for measuring children aged 2-3 years using the JotForm application.

Evaluation Stage

This evaluation stage is related to developing research to improve the resulting product. At this stage, the results were obtained from a limited trial of children through implementation at Permata Hati daycare with two caregiver respondents through a respondent questionnaire.

The results of the limited trial of measuring children's social-emotional development instruments using the JotForm application by Permata Hati daycare caregivers obtained a total score with an average mark of 54.5 if the percentage is 72.6%. Then the device for measuring children's social-emotional development using the JotForm application can be declared feasible for use in daycare.

This stage is carried out to produce a product that is suitable for use. In addition, the instruments developed must still be designed to be more appropriate for help; this evaluation is used as a reference in improving future devices.

Discussion

The development in this study is a developmental measurement instrument that initially uses paper-based or in the form of a journal and then developed into a developmental measurement instrument using the JotForm application. JotForm is a web application for creating conditions digitally. In addition, JotForm can also be used to create digital rubrics with checklist instruments to make it easier for users to generate assessment or measurement rubrics. Digital apps offer user-friendly, efficient assessments for nonverbal abilities, offering new features and improved evaluation compared to paper-based methods (Svarre et al., 2017; Arnold & Reed, 2019; Neumann & Neumann, 2019). The stages in the development of measuring instruments for social-emotional development in this study are analysis of the development of measurement instruments, design of measurement instruments, development of measurement instruments, implementation with limited trials, and evaluation.

The development of measuring instruments for the socio-emotional development of children aged 2-3 years was carried out after the needs analysis results were conducted through interviews with managers and caregivers at the Children's Services Laboratory. Based on the needs analysis, analysis, and adaptation from previous researchers, it is necessary to develop digital or application-based child socio-emotional development measurement instruments to keep up with current developments related to increasingly developing technology. Digital assessments offer cost-efficiency and reliability compared to paper-based methods, supplement clinical discussions, and require reliable resources like computers and the internet (Politi et al., 2015; Neumann & Neumann, 2019)

The measurement scale on the instrument for measuring the social-emotional development of children aged 2-3 years using the JotForm application is adjusted to the observation technique assisted by recording the checklist. The checklist is considered significant enough to be applied because the inventory is arranged in a table with four scales measuring children's developmental status based on the results of observations. The form of measurement using

measurement scale for children's developmental level There are four scales used according to [11] the state of Not Developing (B.B.), Starting to Develop (M.B.), Developing as Expected (BSH), and Developing Very Well (BSB).

The results of validating the instrument for measuring children's social-emotional development using the JotForm application in the home-based childcare program were declared very feasible for use in the Children's Services Laboratory after making appropriate improvements to the display aspect following the suggestions of the measurement expert. The results of the revisions made to the assessment tool are related to the substance and readability aspects. The result is in line with research conducted that accuracy in writing will make it easier for readers to absorb and understand the information conveyed through writing. A review of digital technologies in school-based assessment found automated marking and computer- and web-based assessment support (Blundell, 2021). Reliability and validity depend on reader attention, speed, workload, and preference. Design should consider cognitive and affective factors (Al-Sulaimi & Al-Shihi, 2017).

The results of the validation of the measurement instrument for children's social-emotional development using the JotForm application were declared very feasible with revisions to be used in the Children's Services Laboratory after corrections were made to the indicators and aspects of the assessment following the suggestions and comments from the two material experts. Children begin to form friendships at the age of 2-3 years. In their friendship relationships, children tend to want to have more peers and be liked by their friends. Children begin to learn to share, take turns in playing, help their peers, and several other social skills (Saputra & Masykouri, 2011). The results of validating the instrument for measuring children's social-emotional development using the JotForm application were declared feasible without revision for use in the Children's Services Laboratory. The suggestion from the I.T. expert is to pay more attention to the privacy of user identity. One of the drawbacks of digital format assessment compared to paper-based is that it allows for security issues such as data breaches or hacking (Blundell, 2021).

The assessment of the caregiver or educator's response has a scale limit of 1-5, obtained from a limited trial respondent questionnaire. The evaluation of caregivers or educators on the instrument for measuring the social-emotional development of children aged 2-3 years using the JotForm application in the home-based childcare program obtained percentage results in the programming aspect of 68% with a decent category, in the content aspect of 88% with a very feasible variety and in the display aspect of 62% with a proper class. Overall, the results of the limited trial of measuring children's social-emotional development instruments using the JotForm application in the home-based childcare program by Permata Hati daycare caregivers obtained a percentage of 72.6%, so the measurement instrument can be declared feasible for use in Permata Hati daycare.

The results of this evaluation are related to the stages of development research to improve the resulting development product. At this stage, an evaluation is carried out based on suggestions and comments obtained from measurement experts, material experts, and I.T. experts using a validation sheet that will be used to improve the product that researchers have developed. Validity can be ensured through expert validation, which involves experts in the field reviewing the assessment items and providing feedback on their relevance and appropriateness (Bartolomé & Garaizar, 2022). Using the JotForm application can make it easier for users because how to use it by accessing it can be done anywhere if connected to the internet network. JotForm can help educators carry out measurement or evaluation activities (Imawanty & Fransiska, 2019). This stage is carried out to produce a product that is suitable for use. In addition, the instruments developed must still be designed to make them more suitable for use; this evaluation is used as a reference in improving future devices.

CONCLUSIONS

Based on the results of research that researchers have conducted, it can be concluded that the study entitled the development of a measurement instrument for Children's Social, emotional development using the JotForm Application in home-based childcare Programs as follows:

- The JotForm application is being used to measure children's social-emotional development in home-based childcare programs. A needs analysis revealed no specific instrument for children aged 2-3. Therefore, a device for measuring social-emotional development using the JotForm application is necessary.
- The development of measuring instruments for children's socio-emotional development is based on Permendikbud RI No. 137 of 2014 and needs analysis. A digital or application-based tool is required to keep up with technology developments. The JotForm application adjusts the scale for children aged 2-3 years, utilizing observation techniques and checklist recording.

- The validation test for measuring children's social-emotional development using the JotForm application in home-based childcare programs was conducted with four validators. The results showed that the instrument for children aged 2-3 years is feasible with revisions and improvements based on validators' suggestions. This achievement demonstrates the instrument's feasibility for use in Permata Hati daycare.
- A limited Day Care Permata Hati trial involved five children and two caregivers. The instrument assessed programming, content, and display aspects with 15 questions. The results showed feasibility for use in the daycare facility.

The evaluation of a children's social-emotional development measurement instrument involves input from experts in measurement, material, and I.T. This validation stage improves the product, ensuring it is suitable for use and meets the needs of researchers.

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