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Information Technology in the Implementation of Independent Curriculum Based on PJBL in Early Childhood

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ABSTRAK

Masalah timbul terutama pada penguasaan TI pada guru PAUD, IKM di PAUD dan pelaksanaan PjBL di PAUD. Tujuan penelitian ini untuk menganalisis kemampuan guru PAUD dalam menggunakan teknologi informasi pada implementasi kurikulum merdeka berbasis PjBL. Metode penelitian ini menerapkan metode deskriptif kualitatif, menggunakan instrumen pedoman wawancara yang disusun berdasarkan aspek-aspek penguasaan TI, IKM, dan pelaksanaan PjBL. Hasil penelitian menunjukkan kemampuan guru PAUD menggunakan teknologi informasi dalam implementasi kurikulum merdeka berbasis PjBL berkategori baik. Kemampuan guru PAUD pada aspek pengetahuan menggunakan teknologi informasi dalam implementasi kurikulum merdeka berbasis PjBL berkategori baik dan memiliki kecenderungan positif. Kemampuan guru PAUD pada aspek sikap menggunakan teknologi informasi dalam implementasi kurikulum merdeka berbasis PjBL berkategori baik dan sedikit memiliki kecenderungan negatif. Kemampuan guru PAUD pada aspek keterampilan menggunakan teknologi informasi dalam implementasi kurikulum merdeka berbasis PjBL berkategori baik dan sedikit memiliki kecenderungan negatif. Simpulan penelitian menunjukkan aspek pengetahuan, sikap, dan keterampilan menggunakan teknologi informasi memiliki kaitan yang sangat kuat sebagai hirarkhi pembentukan kompetensi penggunaan teknologi informasi dalam implementasi kurikulum merdeka berbasis PjBL.

ABSTRACT

Problems arise mainly in the IT mastery of PAUD teachers, IKM in PAUD and the implementation of PjBL in PAUD. This study aimed to analyse PAUD teachers' ability to use information technology to implement the independent curriculum based on PjBL. This research applies a qualitative descriptive method, using an interview guideline instrument compiled based on aspects of IT mastery, IKM, and implementation of PjBL. The results of the study showed that the ability of PAUD teachers to use information technology in implementing the independent curriculum based on PjBL is categorized as good. The ability of PAUD teachers in the aspect of knowledge using information technology in implementing the independent curriculum based on PjBL is categorized as good and has a positive tendency. The ability of PAUD teachers to use information technology in implementing the independent curriculum based on PjBL is categorized as good but has a slight negative tendency. The ability of PAUD teachers in the aspect of skills in using information technology in implementing the independent curriculum based on PjBL is categorized as good and has a slight negative tendency. The study's conclusion shows that the aspects of knowledge, attitudes, and skills in using information technology have a solid relationship as a hierarchy of competency formation in using information technology in implementing the independent curriculum based on PjBL.

1. INTRODUCTION

IKM is part of the learning recovery effort, through a more flexible curriculum framework, focusing on essential materials and character development, as well as student competencies (Anggraini et al., 2022; Hamrin et al., 2021). The main characteristics of the independent curriculum that support learning recovery are project-based learning/PjBL for the development of soft skills and character according to the profile of Pancasila students; focus on essential materials so that there is enough time for in-depth learning on basic

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competencies such as literacy and numeracy; flexible for teachers to carry out differentiated learning according to students' abilities and make adjustments to local contexts and content (Kahfi, 2022; Rusmalinda & Rahmadani, 2022). IKM is a cycle that goes through three stages of diagnostic assessment, to understand the initial real conditions that can be used in preparing planning, and learning methods should be used; planning, teachers prepare learning implementation plans from the results of diagnostic assessments, and group children based on ability levels, learning is carried out based on plans and teachers conduct formative assessments periodically to find out the development of children's learning, and update learning methods if necessary (Asiati & Hasanah, 2022; Rahmadayanti & Hartoyo, 2021). At the end of the learning process, a summative assessment is carried out as an evaluation process for achieving learning objectives (Anggraini et al., 2022; Hamrin et al., 2021).

IKM is not mandatory for all schools, and schools have the authority and responsibility to develop the curriculum according to the needs and context of each school. The government is tasked with preparing the curriculum framework, while its operation is the task of the school and the autonomy of teachers. Changes to the national curriculum, the implementation of the curriculum should be managed carefully so that it has an impact on improving the quality of learning and education in Indonesia (Adlika, 2019; Yarso et al., 2019)According to the readiness of each school in the 2022/2023 academic year, IKM can be selected in three options: implementing several parts and principles of the independent curriculum without changing the curriculum of the educational unit that is currently being implemented; implementing the independent curriculum using teaching tools that have been provided; implementing the independent curriculum by developing various teaching tools themselves. IKM in PAUD must be designed so that children achieve the abilities stated in the learning outcomes. IKM intracurricular learning meaningful play as a manifestation of independent learning, independent play. The problem that emerged as a result of initial observations in the field was that the chosen play activities had not provided a pleasant experience, and had not increased the achievement of children's growth and development. This problem was caused by: teachers did not have an accurate understanding of IKM; teachers had not mastered the principles of IKM; teachers had not yet equivalized the types of meaningful independent play and provided a pleasant experience in IKM (Nurfadhillah et al., 2021; Wahyuni & Yokhebed, 2019). The results of the minimum competency assessment for 15-year-old children in understanding simple reading and applying basic mathematical concepts, around 70% of students showed results below the minimum competency of PISA 2021 (Fatikasari, 2021; Mashuri, 2019). Furthermore, during the Covid-19 pandemic, an emergency curriculum was implemented, which was able to increase literacy skills = 73% and numeracy skills = 66% (Hakim & Basuki, 2023; Harizah et al., 2022). These results reinforce the importance of comprehensive reconstruction of the design and implementation strategy of the 2013 curriculum, implementing an emergency curriculum and continuing with the implementation of the independent curriculum (IKM) (Pratama et al., 2024).

Based on the results of observations at the PAUD Institution which is a partner in the PPL activities of S1 PG-PAUD students, PAUD teachers have problems in understanding the concept and implementation of PjBL such as: determining basic questions, making project designs, compiling schedules, monitoring project progress, assessing results, and evaluating experiences. The implementation of the independent curriculum based on the PjBL model really needs the help of information technology, both as a source, media, and learning tool. Information technology is anything that is used to help process data, process, obtain, compile, store, and transform data to produce quality information. Information technology can also be used to retrieve, move, and process information through appropriate and dynamic media following the development of the times. Most PAUD teachers have not mastered information technology, especially computer users related to data processing, analysis, and interpretation of data, both in text, audio, visual, audio-visual, and multimedia data in independent play.

The implementation of learning as the main activity of IKM is suggested to implement cooperative learning, especially project learning. The project-based learning model/PjBL is a learning model that uses activities as media. Students explore, assess, interpret, synthesize and provide information to produce various forms of learning outcomes (Astuti, 2022; Primananda & Hamid, 2021). PjBL aims to improve children's ability to solve problems, improve new abilities and skills in learning, make children more active in solving complex problems with real product results. PjBL steps include determining basic questions, making project designs, preparing schedules, monitoring project progress, assessing results, and evaluating experiences. Project-based learning is very good at fostering children's creativity and can produce valuable products, and children respond very positively (Sahtoni, Suyatna, and Manurung 2017). The implementation of PjBL can significantly improve children's critical thinking skills and independence (Desiana 2022). The PjBL model of cooperative learning in early childhood education is still considered a relatively new learning model. The learning that has been carried out so far has mostly used lecture

methods, questions and answers, giving assignments and discussions which are not structured comprehensively like the PjBL model (Hidayat et al., 2023; Risky & Liana, 2022).

Previous research findings state that the Project Based Learning (PjBL) model is known to play a better role in stimulating children and is able to improve child development (AM Sari et al., 2023). The concept of project-based learning is one of the learning models that can support the concept of "independent learning" for students which can stimulate how students think critically, independently, collaboratively, and in problem-solving skills, so that students will be better prepared to face challenges in their time and real life in society (Shalehah, 2023). However, the implementation of the independent curriculum based on the PjBL model still experiences many obstacles for teachers who teach in PAUD. The purpose of this study was to analyze the ability of PAUD teachers to use information technology in the implementation of the independent curriculum based on PjBL in Mataram City.

2. METHOD

This study uses a quantitative descriptive method with several stages of activity, namely analyzing data on the implementation of the curriculum in force in PAUD, to describe the initial conditions of PAUD institutions in order to welcome IKM (Sumarmi et al., 2021). The results of this preliminary study are used to position the condition of educational units in selecting the IKM option; conduct theoretical and meta-analysis of research results to build a hypothetical framework on the relationship between the application of information technology in PjBL model learning in the implementation of the independent curriculum in PAUD; collect data on mastery of information technology, implementation of the independent curriculum/independent play and the application of PjBL as a learning activity that is relevant to the desired learning outcomes. Prepare a framework for the implementation of the independent curriculum and the application of PjBL, as well as the need for mastery of information technology in compiling RPPH, implementation of learning and assessment of the process and learning outcomes. The research location was placed in PAUD institutions selected by stratified quota and purposeve. 90 teachers were obtained from PAUD institutions with accreditation A, B and C in the work area of the Mataram City Education Office in 2023. Data collection used observation guidelines on the ability of PAUD teachers to use information technology in PJBL model learning in the implementation of the independent curriculum. Data on teachers' ability to use information technology is divided into three aspects, namely: aspects of knowledge about IT devices, aspects of attitudes towards the use of IT in learning, and aspects of skills in using IT in implementing learning. The instrument is in the form of a Likert pattern scale with 4 categories. The instrument has met content validity.

3. RESULTS AND DISCUSSION

Results

Data description was obtained through descriptive analysis assisted by SPSS 23.0. The results are presented in Table 1.

Table 1. The Results of Descriptive Analysis of Knowledge (X1), Attitudes (X2), and Skills (X3) Using Information Technology in Early Childhood Education Teacher IKM in Mataram City

Sub-Variables	Analysis Components	Statistics
Knowledge About Information Technology Devices	Mean	148.88 (62.03%)
	Median	148.00
	Standard Deviation	15,306
	Range	63
	Minimum	120
	Maximum	183
Attitudes towards the Use of Information Technology in Learning	Mean	166.94 (69.56%)
	Median	167.00
	Standard Deviation	15,720
	Range	68
	Minimum	132
	Maximum	200
Skills in using Information Technology in SMEs	Mean	178.11 (74.21%)
	Median	178.50
	Standard Deviation	19,103

Sub-Variables	Analysis Components	Statistics
	Range	84
	Minimum	137
	Maximum	221

The instrument used to collect data X1, X2, and X3 each consists of 60 items. Each item is scaled 4, 3, 2, 1. The ideal maximum score is the score obtained if all items are answered on a scale of 4 = 4 x 60 = 240. The ideal minimum score = 60 X 1 = 60. Ideal range = 240 – 60 = 180. Ideal mean = 60 + (180: 2) = 60 + 90 = 150. The knowledge of PAUD teachers about information technology devices in the implementation of PjBL-based IKM found a mean = 148.88 greater than the median = 148.00, meaning the left squint data. Mean = 148.88 (62.03%) then it is stated that PAUD teachers are classified as having good knowledge about information technology devices in the implementation of PjBL-based IKM. The attitude of information technology devices of PAUD teachers in Mataram City in the implementation of PjBL-based IKM found a mean = 166.94 smaller than the median = 167.00, meaning the data is right-squinted. With a mean of 166.94 (69.56%), the attitude of PAUD teachers about information technology devices in the implementation of PjBL-based IKM is classified as good. The skills of PAUD teachers about information technology devices in Mataram City in the implementation of PjBL-based IKM found a mean = 178.11 (74.21%) smaller than the median = 178.50, meaning the data is right-squinted. With a mean of 178.11 (74.21%), the skills of PAUD teachers about information technology devices in the implementation of PjBL-based IKM are classified as good. The results of the normality test of data distribution X1 (knowledge of information technology devices), X2 (Attitude towards the Use of Information Technology in Learning), X3 (Skills in using Information Technology in IKM) using the Shapiro Wilk technique, because the number of sample members is less than 100, are in Table 2.

Table 2. The Normality Test of X1, X2, and X3 Using the Shapiro Wilk Technique

Sub-Variables	Statistics	df	Sig.
Knowledge About Information Technology Devices	0.979	90	0.152
Attitudes towards the Use of Information Technology in Learning	0.990	90	0.759
Skills in using Information Technology in SMEs	0.992	90	0.873

Based on the coefficient of the results of the normality test and visually on the distribution of data distribution, it is concluded that the sub-variables of knowledge, attitude, and skills in using information technology in the implementation of PjBL-based IKM are normally distributed. Analysis of the relationship between knowledge, attitude and skills in using IT. As an enrichment to the description of the ability of PAUD teachers to use information technology in PjBL-based IKM, it is very necessary to analyze the relationship between the three dimensions of ability/competence. The dimensions of competence in question consist of knowledge, attitude and skills in using IT. The results of the analysis can be presented in Table 3.

Table 3. The Relationship between Knowledge, Attitudes, and Skills in Using Information Technology in PjBL-Based SMEs

		Knowledge About Information Technology Devices	Attitudes towards the Use of Information Technology in Learning	Skills in using Information Technology in SMEs
Knowledge About Information Technology Devices	Pearson Correlation	1	0.995**	0.994**
	Sig. (2-tailed)		0.000	0.000
	N	90	90	90
Attitudes towards the Use of Information Technology in Learning	Pearson Correlation	0.995**	1	0.998**
	Sig. (2-tailed)	0.000		0.000
	N	90	90	90

		Knowledge About Information Technology Devices	Attitudes towards the Use of Information Technology in Learning	Skills in using Information Technology in SMEs
Skills in using Information Technology in SMEs	Pearson Correlation	0.994**	0.998**	1
	Sig. (2-tailed)	0.000	0.000	
	N	90	90	90
**. Correlation is significant at the 0.01 level (2-tailed).				

The results of the analysis of the relationship between knowledge of information technology devices and attitudes towards using information technology in the implementation of the independent curriculum based on PjBL are classified as very strong. The relationship between knowledge of information technology devices and skills in using information technology in PjBL-based IKM is classified as very strong. The relationship between attitudes in using information technology in the implementation of the independent curriculum based on PjBL and skills in using information technology in PjBL-based IKM is classified as very strong. The findings on the relationship between knowledge, attitudes, and skills, the use of information technology in PjBL-based IKM contain the meaning that the three aspects of these abilities are complementary. These abilities are the competencies of PAUD teachers which are holistic and integrative in supporting the quality of the process and learning outcomes of early childhood.

Discussion

The use of information technology in education and learning is carried out in order to improve the quality of the learning process and outcomes. The development of science and technology, as well as the demands of society for educational products, require the government to reconstruct the curriculum and implementation of learning. Since 2020, the education curriculum in Indonesia has been directed at the independent curriculum, with cooperative learning, especially project-based learning. This change in the paradigm of education and learning requires the use of information technology (IT). IT-based learning has a major impact on the education system, learning methods, learning models, and learning approaches (Julhadi and Herdi 20 22; Sucipto 2022). In this regard, the use of IT for teachers in learning is very important. Competent and professional teachers must be supported by mastery and utilization of information technology in learning. Based on the results of this study, the competence of PAUD teachers in the use of information technology has reached a good category. Meanwhile, based on data distribution, there is a tendency for the population to move towards positive changes. The obligation of teachers in implementing the independent curriculum, especially the implementation of project-based learning, information technology plays a role as a learning medium, tool, and learning resource (Kholik et al., 2022; Kurniati et al., 2022). Information technology has a very important role in the preparation of learning plans and implementation of learning, namely facilitating the formation of collaborative interactions and building contextual meaning, which supports the effectiveness of children's understanding (FI Sari et al., 2023; Setiawan et al., 2022)

Independent curriculum for early childhood is also called independent play, because the learning process aims for children to perceive that learning is fun. IKM strives to provide the widest possible space to grow and develop according to the nature of the child and obtain appropriate educational services. IKM has flexible learning characteristics, giving teachers the freedom to conduct learning according to developmental stages and adjustments to the context of local content (Iqbal et al., 2022; Rahmadayanti & Hartoyo, 2021). The ultimate goal or objective of independent play in PAUD is to develop five aspects (physical-motor, cognitive, language, social-emotional, and religious/moral values); in addition, it is mandatory to develop the content of the Pancasila student profile dimensions (Faith and devotion to God Almighty and noble morals, global diversity, mutual cooperation, independence, critical and creative thinking) (Firstanianta et al., 2023; Rahman et al., 2023). One play activity will develop an aspect of growth and development and/or an aspect of the Pancasila student profile (Rai et al., 2022; Sutiyono, 2021).

The learning models that are underlined in IKM are problem-based learning (PBL), case-based learning (CBL), and project-based learning (PjBL). This learning model stimulates children more to engage in meaningful activities in their lives according to their development phase (Kuswanto et al., 2022; Paratiwi & Ramadhan, 2023). The PBL, CBL, and PjBL models are learning models that provide direct experience according to the characteristics of the surrounding environment (Elisabet et al., 2019; Nurhidayah et al., 2021; Tiantong & Siksen, 2013). The main learning themes are based on four main themes: I love the Earth, I love Indonesia, playing and working together/we are all brothers and sisters, imagination and creativity. These themes are packaged in one meaningful play activity, and have an impact on character development,

as well as various competencies. Learning in PAUD is a play activity through direct/own experience in solving problems, trying new things, being tolerant, working together, sharing, making agreements, to integrate essential competencies between disciplines.

Learning in the form of independent play in PAUD institutions must be an integration of various learning models, techniques, methods and strategies into a systematic learning plan with the PjBL model, based on STEM and scientific. This collaborative learning plan is adjusted to the growth and development of children, environmental situations, and learning objective criteria. PjBL optimizes children's participation in making plans, executing plans, evaluating and reporting project results. Based on Scientific, Technology, Engineering, and Mathematics (STEM), that learning is expected to apply scientific principles, use technology, develop engineering skills, and build mathematical competencies. Scientific learning means that every learning activity develops children's activities physically, mentally and spiritually with five main steps: observing objects, asking questions, collecting information, developing associations/solutions and communicating learning outcomes (Purbarani et al., 2018; Putri & Ardi, 2021). There are several theoretical concepts that do not match the process and results of this study, such as the Tabularasa theory and the Behavioral theory. The Tabularasa theory that developed in the Western world views humans as being born empty like white paper, it is also stated that everything we learn in life is the result of things we observe using our senses. Behavioristic theory is a change in behavior as a result of experience. Learning occurs due to the interaction between stimulus and response or the presence of input and output.

The development of science and technology requires theories that are in accordance with the learning needs and learning outcomes expected by the user community. Thus, it is very necessary to formulate a curriculum that can adopt the development of science and technology and the needs of society. The curriculum at least describes the standards of graduate competencies, learning content, learning process, assessment of the process and learning outcomes, educators and education personnel, necessary facilities and infrastructure, finance, and management. Theories that are relevant to learning that is responsive to the development of the era are: Humanistic, Cognitive, and Constructivist theories (Olson 2010). Humanistic Theory is a learning theory that prioritizes the learning process, and carries the concept of humanizing humans in understanding themselves and their environment. Cognitive learning theory is a learning theory that prioritizes the learning process rather than the results. This theory views that a person's behavior is determined by their perception and understanding of the situation related to their learning goals. Constructivist learning theory views that students will be able to interpret information into their minds only in the context of their own experiences and knowledge, on their needs, backgrounds and interests (Abdiyah & Subiyantoro, 2021). Characteristics of constructivist learning: active learning, authentic and situational, interesting and challenging, linking old knowledge with new information, reflecting on knowledge, teachers as facilitators, and teachers can provide assistance in the learning process.

The implementation of the results of this study in educational and learning activities is that the competence of teachers' mastery of the use of information technology has been classified as good. This is a positive capital in the implementation of the independent curriculum based on PjBL, because information technology skills play an important role in preparing plans and implementing learning in IKM, mastery of knowledge, attitudes and skills of information technology in PAUD teachers, has a very strong correlation, so that these results contain the meaning that the development of information technology competence in PAUD teachers can be done by instilling knowledge, forming attitude values, and training and practicing skill development, an accurate understanding of the implementation of the independent curriculum in PAUD will be very useful for choosing and using the right learning models and methods, using appropriate STEM, and implementing science learning steps in project-based learning models. Based on the results of this study, it can enrich the conceptual treasury that is implementative to the implementation of the independent curriculum in optimizing the growth and development and profile dimensions of Pancasila students in early childhood.

4. CONCLUSION

The ability of PAUD teachers to use information technology in the implementation of the independent curriculum based on PjBL in Mataram City is categorized as good. The ability of PAUD teachers in the aspect of knowledge in using information technology in the implementation of the independent curriculum based on PjBL is categorized as good and has a positive tendency. The ability of PAUD teachers in the aspect of attitudes in using information technology in the implementation of the independent curriculum based on PjBL is categorized as good and has a slight negative tendency. The ability of PAUD teachers in the aspect of skills in using information technology in the implementation of the independent curriculum based on PjBL is categorized as good and has a slight negative tendency. The aspects of

knowledge, attitudes, and skills in using information technology have a very strong relationship as a hierarchy of competency formation in the use of information technology in the implementation of the independent curriculum based on PjBL.

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