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IN-SERVICE TEACHER PROFESSIONAL EDUCATION: PROFILE OF ELEMENTARY SCHOOL TEACHERS' DIGITAL TECHNOLOGY SKILLS

FORMAÇÃO PROFISSIONAL DOCENTE EM SERVIÇO: PERFIL DOS PROFESSORES DO ENSINO BÁSICO HABILIDADES EM TECNOLOGIA DIGITAL

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Abstract: This study aims to describe the digital technology skills of elementary school teachers who had participated in the in-service Teacher Professional Education (PPG) program and find differences in participation in the in-service PPG program towards the digital technology skills of elementary school teachers. This type of research was chosen because the data revealed from PPG activities in office had occurred before. The subjects in this study were elementary school teachers in Buleleng Regency who had participated the in-service PPG at Universitas Pendidikan Ganesha and who had never attended in-service PPG. Sampling was done cluster random sampling. The sample of this study was 45 people, with details of 4 people from 9 district clusters. The required data is obtained through a rating scale instrument. Data analysis begins with a descriptive analysis of digital technology skills data for elementary school teachers. The second analysis was carried out using a differential test to find differences in the digital technology skills of elementary school teachers who participated in the in-service PPG program and those who did not. The results showed that the technological skills of elementary school teachers who took PPG in office were in the good to very good category, while those who did not take part were in the moderate to good category. There are differences in the technology skills of SD teachers participating in PPG in office and not participating in PPG in office. In other words, in-service PPG participants do better in digital technology skills compared to non-in-service PPG participants.

Keywords: Digital technology skills. Professional teacher. Elementary school.

Resumo: Este estudo tem como objetivo descrever as habilidades em tecnologia digital de professores do ensino fundamental que participaram do programa de Formação Profissional de Professores (PPG) em serviço e encontrar diferenças na participação no programa PPG em serviço em relação às habilidades em tecnologia digital do ensino fundamental professores. Este tipo de pesquisa foi escolhido porque os dados revelados das atividades do PPG no escritório já ocorreram antes. Os sujeitos deste estudo foram professores do ensino fundamental em Buleleng Regency que

haviam participado do PPG em serviço na Universitas Pendidikan Ganesha e que nunca haviam frequentado o PPG em serviço. A amostragem foi feita por amostragem aleatória por conglomerados. A amostra deste estudo foi de 45 pessoas, com detalhes de 4 pessoas de 9 clusters de distrito. Os dados necessários são obtidos por meio de um instrumento de escala de classificação. A análise de dados começa com uma análise descritiva dos dados de habilidades em tecnologia digital para professores do ensino fundamental. A segunda análise foi realizada por meio de um teste diferencial para encontrar diferenças nas habilidades em tecnologia digital de professores do ensino fundamental que participaram do programa PPG em serviço e daqueles que não participaram. Os resultados mostraram que as habilidades tecnológicas dos professores do ensino fundamental que assumiram o PPG em exercício estavam na categoria bom a muito bom, enquanto os que não participaram estavam na categoria moderado a bom. Existem diferenças nas habilidades tecnológicas dos professores SD que participam do PPG no cargo e não participam do PPG no cargo. Em outras palavras, os participantes do PPG em serviço se saem melhor em habilidades de tecnologia digital em comparação com os participantes do PPG que não estão em serviço.

Palavras-chave: Habilidades em tecnologia digital. Professor profissional. Ensino fundamental.

Introduction

Digital technology skills are something vital for teachers in facing the 21st century. One aspect that goes into them is teaching skills using technology (Kunter et al., 2013; Yüksel, 2014). To meet the demands of the 21st century, teachers should involve technology as an effective tool for learning (Ilomäki et al., 2014; Schleicher, 2012) and empower students to actively shape their own learning (Pariska, 2022; Parmiti et al., 2021; Schleicher, 2012). This requires that teachers understand the pedagogic use of technology and become masters to support the implementation of learning (Smith & Hu, 2013; Tondeur et al., 2016). Teachers must be able to develop learning that produces learning experiences according to the digital era for students, learn and work according to the 21st century, and promote digital society (Antara & Dewantara, 2022; Sandars et al., 2016).

Digital technology skills can be viewed from a) technical skills and practices using digital technology, b) the ability to use digital technology in meaningful ways for work, study, and everyday life, c) the ability to critically evaluate digital technology, and d) motivation to participate and commit to digital culture (Adnyani et al., 2022; Ilomäki et al., 2014). The digital competence in question can also be confident, competent, ethical in using digital technology and involving culture in technology (Chalkiadaki, 2018; Wiranata et al., 2021).

Furthermore, many research has been conducted on teachers' skills in using digital technology. These studies are in the form of quantitative, qualitative, and action research. For example, action research was conducted on teacher training students at universities in micro teaching classes (Altınay-Gazi, 2017). The treatment given was in the form of role-

playing learning with video tapped recording. The research results obtained included communication skills, self-control, and the ability to reflect on prospective teacher students. It can be said that the teacher's digital technology competence can be in the form of the teacher's skills to use technology as a learning aid and apply appropriate pedagogy. These skills can be obtained through training.

The results of research on ICT skills of vocational and technical teachers in Malaysia are influenced by gender, age, number of years of teaching experience, and type of ICT training attended (Alazam et al., 2012). The ICT training referred to in this study is MOE Curriculum training. Qualification level and ICT availability do not affect the skills. Most of the teachers participating in this study are frequently using ICT in teaching in the classroom. However, teachers at all levels of education have limited technological skills. Ownership of technological skills is influenced by knowledge of technology and participation in professional development forums (Almerich et al., 2016).

Factors that influence the integration of technology in teacher educators in Nigeria are teaching experience, class size, technological devices owned, technological knowledge, knowledge about learning, learning practices with ICT and teacher beliefs (Ifinedo et al., 2019). The factors that influence teachers' technological skills are gender, teacher's area of expertise, teacher's confidence in using technology, openness to technology, and the learning approach used by teachers (Falloon, 2020; Li et al., 2019).

The results of research on the ICT integrated model in Mathematics learning for elementary teachers found that the factors causing the low ICT skills possessed by teachers were the lack of school infrastructure to support learning with ICT, the lack of ICT knowledge and skills of teachers, and the unavailability of learning materials that integrate ICT (Dewi et al., 2019; Silalahi, 2015). Another finding is that training conducted by teachers through the ICT integration model in learning Mathematics helps teachers improve ICT skills. In other words, training teachers to integrate ICT into learning Mathematics helps teachers improve ICT skills.

Based on the studies that have been conducted, a research gap has been found regarding the factors that influence the digital technology competence of elementary school teachers. One of the factors suspected of influencing is the in-service PPG program. However, there has been no research on the in-service PPG program as one of the factors influencing elementary teachers' digital technology skills. Based on this, this study aims to describe the digital technology skills of elementary school teachers who had participated in

the in-service Teacher Professional Education (PPG) program and find differences in participation in the in-service PPG program towards the digital technology skills of elementary school teachers.

1. Methodology

This study aims to describe the digital technology skills of elementary school teachers who had participated in the in-service Teacher Professional Education (PPG) program. In addition, another research objective was finding differences in participation in the in-service PPG program towards the digital technology skills of elementary school teachers. Based on the purpose of the research conducted, the type of research used is ex post facto (Nur et al., 2019; Sugiyono, 2014). This type of research was chosen because the data revealed from PPG activities in office had occurred before. The flowchart of this research is presented in Figure 1.

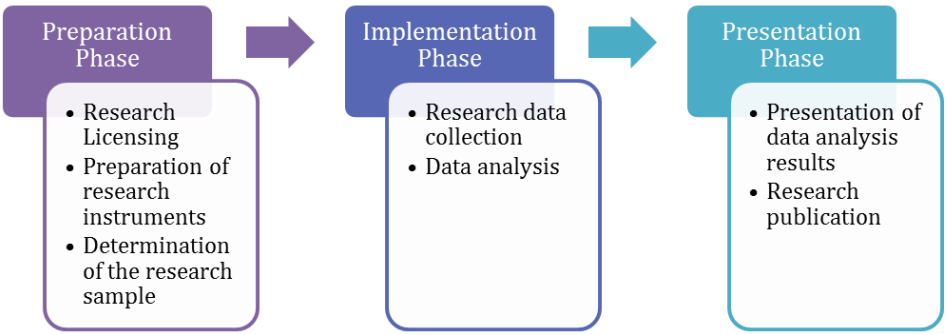

Figure 1. Research Flowchart

The subjects in this study were elementary school teachers in Buleleng Regency who had participated the in-service PPG at Universitas Pendidikan Ganesha and who had never attended in-service PPG. Sampling was done by cluster random sampling technique. The cluster used is the District in Buleleng Regency. The sample size was taken randomly using the condition $N \geq 30$. The sample for this study was 45 people, namely four representatives from nine District in Buleleng each. Two people have participated in the in-service PPG program and two other people have never participated in in-service PPG.

This research received approval from the Research Ethics Commission of the Institute for Research and Community Service, Universitas Pendidikan Ganesha. The required data is obtained through a rating scale instrument. This instrument is used to assess

teacher performance. The identity that is filled in on the rating scale sheet includes email address, status of participation in the PPG program in position, and work area (rural/urban). The rating scale content is adapted to aspects of digital technology skills. The rating scale uses a scale of 1-4.

The data obtained were analyzed quantitatively. Data analysis begins with a descriptive analysis of digital technology skills data for elementary school teachers. Analysis was carried out to determine the frequency and percentage. The results of the analysis are then set forth in the form of tables and diagrams. Furthermore, a second analysis was carried out using a differential test to find differences in the digital technology skills of elementary school teachers who took part in the in-service PPG program and those who did not take part in the program.

2. Results

The research results are presented in two specific points. These points are descriptions of the technological competency ownership of in-service PPG participating teachers and teachers who are not in-position PPG participants, then differences in digital technology skills between in-service PPG participating teachers and teachers who are not in-service PPG participants.

Description of Teacher's Digital Technology Skills

The descriptive analysis results of teachers' digital technology skills are presented in Figure 2.

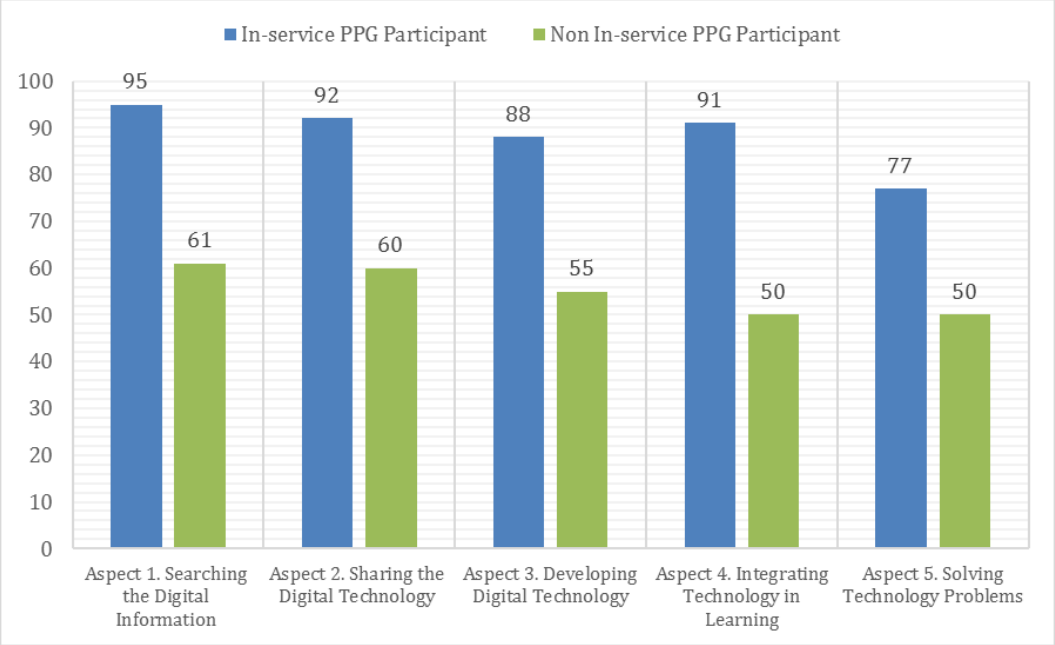

Figure 2. Descriptive Results of Teachers' Digital Technology Skills

Based on Figure 2, it can be seen that the digital technology skills of teachers participating in in-service PPG are in the range of 77% -95%, with good to very good categories. The aspect that is most highly controlled by the teacher is the aspect of digital information searching skills. The aspect with the lowest mastery is solving technological problems. Aspects of sharing digital technology and integrating technology in learning have almost the same percentage.

The digital technology skills of teachers who are not in-service PPG participants are in the range of 50% -61%, with moderate to good categories. The most highly mastered aspect is searching for digital information. The aspect with the lowest mastery is solving technological problems and integrating technology in learning. The results of the descriptive analysis in Figure 2 also show that the average percentage score of in-service PPG participating teachers is higher than the average percentage score of teachers who are not in-service PPG participants.

Differences of Teacher Digital Technology Skills

The results of the independent t-test results regarding the differences of teachers' digital technology skills are presented in Table 1.

Table 1. Independent t-test Result

Source		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mean Score	Equal variances assumed	3.250	0.080	5.321	34	0.000	1.34365	0.25251	0.83050	1.85681
	Equal variances not assumed			5.380	33.780	0.000	1.34365	0.24973	0.83602	1.85129

Based on the results of the analysis presented in Table 1, information is obtained that the Sig. (2-tailed) all show the number 0.000 <0.05 (5% significance level). If the significance value is less than 0.05, it can be concluded that there are significant differences in the digital technology skills of teachers participating in in-service PPG and teachers who have not attended in-service PPG.

3. Discussion

Based on research results, the in-service PPG program helps teachers improve their digital technology skills. In-service PPG is expected to be able to answer various educational problems, namely under qualifications and teachers who are less competent (low competence). In addition, in-service PPG also provides opportunities for teachers in the 4.0 industrial revolution era to have the ability to carry out innovative and fun learning by integrating critical thinking and problem solving, communication and collaborative skills, creativity and innovative skills, information and communication technology literacy, contextual learning skills, as well as information and media literacy. This is because PPG is a program that aims to increase the professionalism of an educator and re-emphasize the four teacher competencies comprehensively to educators (Ardiyani et al., 2020; Zulfitri et al., 2019). Ownership of an educator certificate will affect the high competence within (Koswara & Rasto, 2016; Pertiwi, 2017). That is, teachers who have educator certificates, of course, have superior teacher competencies, including digital technology competencies.

In-service PPG is a form of in-service teacher training. Training in PPG can be directed to the development of certain aspects, such as technological skills. These technology

adaptation skills are heavily emphasized in the in-service PPG program. This emphasis helps graduates of the PPG program in positions to have adequate technology adaptation skills or digital technology skills. One of the technological skills can be improved through training programs for teachers in teacher education (Prieto et al., 2013; Zulfitri et al., 2019). Professional development prepares teachers to carry out learning that uses technology as a tool to enhance their learning (An & Reigeluth, 2011; Meilia & Murdiana, 2019). Pedagogy-based ICT training is a key element in teacher professional development (Fernández-Batanero et al., 2022).

4. Conclusion

The technology skills of teachers who take in-service PPG are in the good to very good category, while those who do not take part are in the moderate to good category. There are differences in the technological skills of in-service PPG participant teachers and those who are not in-service PPG participants. In other words, in-service PPG participants do better in digital technology skills compared to non-in-service PPG participants.

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