Parental Involvement in Digital Learning: Mother's Experiences of Elementary School Students

https://doi.org/10.3991/ijim.v17i10.38253

Rizky Amelia[1,2](✉), Zamzani[1], Ali Mustadi[1], Anik Ghufron[1], Ahmad Suriansyah[2], Aslamiah[2]
[1] Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] Universitas Lambung Mangkurat, Banjarmasin, Indonesia
rizkyamelia.2020@student.uny.ac.id

Abstract—After the implementation of the school closure policy, parents are acclimating to studying with their children due to the effects of COVID-19 pandemic. Therefore, this study thoroughly discusses the involvement of parents in a child's digital education, especially the experience of the mothers with elementary school students. The survey approach and qualitative methods are used to obtain 277 respondents from the population of parents in Berau, Indonesia. Structural Equation Modeling (SEM) and Partial Least Square (PLS) are the data analysis technique used with the help of SmartPLS software version 3. The results shows that the direction of the relationship between the use of gadgets and maternal involvement is positive, hence the hypothesis decision is accepted. The digital learning of children includes letter and number recognition, reading, learning to count, coloring, drawing, playing educational games, and studying. Some of the mothers' involvement includes explaining websites accessible by children to communicate politely on social media. These results are valuable insights for parents in providing involvement in digital learning for elementary school students. It is important for parents to have a higher level of understanding and familiarity with the application or technology that their children utilize.

Keywords—digital learning, elementary school, mother's experience, parental involvement, students

1 Introduction

Community and school learning activities are expected to continue even though the pandemic has not been cured, and multiple groups are collaborating to restore the educational system. The pandemic brought rapid changes in various areas, including education, thereby forcing people to learn adaptively through digital technology instruments [1]. Technology was also raised as one of the priority issues in the 2022 G20 on Education and Culture forum. Digital technology in education is about the physical contribution as a learning tool and multidimensional concept [2]. Using technology for learning should also be followed by a transformation of patterns by teachers and students [3], [4]. However, the digital teaching method gap creates new habits that allow

learning [5]. The normally bustling education industry came to an abrupt halt, forcing reform across the board, including new approaches to teaching, course design, and curriculum delivery [6].

The approach to learning is starting to change since it is student-centered. Children are digital natives who use technology [7], and should continue learning about various applications through communication channels [8], [9]. Additionally, effective and efficient tools are expected to optimize the various digital spaces provided for the interaction of teachers and children. As a result, children become more enthusiastic, creative, and critical in selecting information to develop new ideas not previously found in conventional learning [10], [11]. The development of digital learning focuses student on playing games while lacking sensitivity to the surrounding environment and social relationships. This sums up the state of modern-day childhood, especially regarding schooling. Usually, they are more focused on learning to prepare for a better future, and develop the capacity for abstract thought.

However, children in the modern digital age are carried away by technology, leading to a reluctance to accept responsibility, moral decline, and increased crime [12]. It happens because of the ease of accessing information and communication using technology through online social media pages. It is also a common problem that allows children focus more on this technology circle than on learning [13]. Complex problems affect the educational process, and the digital learning culture should have various stimuli [11]. To help children at home, parents need to provide guidance, instruction, understanding, cooperation, and supervision. Meanwhile, parents should control and supervise every activity and information received through digital media and provide excellent and appropriate explanations [14]. Proper parental modeling is needed to use technology in children to construct knowledge and support learning [15].

Parental involvement is the spearhead of students' attitudes or behaviors in responding to digital learning. It becomes essential because engagement influences communication patterns and interactions [16]. The involvement in this digital model has a severe impact on the growth of children. One of the negative impacts experienced by students who use technology without parental supervision is moral degradation. The use of information technology is not balanced by noble ethical values in the real world [17]. Children are especially vulnerable to the long-term consequences of exposure to unregulated substances. Parents are tasked with accompanying and directing them in using technology to manage the negative impact [18], [19].

Based on the observations, the nature of parental involvement, especially for mothers, has undergone relative changes in the education sector. Schools are starting to view this as an opportunity in children's education after the Covid-19 pandemic [20]. The involvements are expected to play a significant role in the past and are getting used to directly assisting children in learning after the school closure policy in 2020-2021. However, many parents encounter obstacles in this mentoring activity, such as managing children's learning and playing time [21].

During the COVID-19 pandemic in Japan, mothers are preferable to fathers when accompanying elementary school pupils learning online. [22]. According to research conducted in Italy, women were primarily responsible for the increased caregiving and housework that COVID-19 required [23]. In order to examine parent and child well-

being during the COVID-19 pandemic in Italy, parents of children aged 2 to 14 years were surveyed online. This research by Spinelli et al. also highlights the difference between mothers' and fathers' engagement in their children's learning during the pandemic. The study indicated that the COVID-19 quarantine significantly negatively influenced the health of both parents and children. Of the 854 replies they got, 797 were from women. From a larger perspective, mothers frequently participate more actively in their student's educational activities and supervision [24].

Researchers have found that the mother-child relationship modifies the link between family involvement in children's schooling and academic success [25], [26]. Specifically, as mothers reported experiencing more affection for their children, the positive correlation between family involvement in school and academic achievement increased. The warmth between mothers and their children has been linked to children's tendency to internalize family values and norms through identification and modeling [27]. Children who have a close bond with their mothers may be more likely to internalize academic ideals and participate in activities (like reading) that contribute to academic success [28], [29].

Mothers will be extra helpful to children in preparing all learning media to support the learning process and overcome all kinds of problems. Meanwhile, problems arise due to the absence of direct assistance from the teacher. Mothers are responsible for explaining the lessons taught in school, and their children can pick up and retain every piece of information [28]. This can be conducted by (1) choosing features on gadgets that are relevant to the children's age, (2) accompanying children during the use of gadgets, (3) limiting the children's time to use the gadget, (4) avoiding addiction in children by providing rules, and (5) assisting children in adjusting to the environment and the development of the times [29].

An overview of the context has been built in the relationship between school and home based on various explanations. Homework and participation in their children's digital education are becoming increasingly important as technology advances. The scholarly output can be increasingly successful with digital technology in learning accompanied by parental involvement [30]. Much attention has been paid to analyzing the impact of digital technologies on learning [1], [31]. However, research on parental involvement in children's education has received less attention, especially in digital learning. Therefore, this study thoroughly discusses the involvement of parents in digital learning using technology and looks at the relationship between school and home. The following is a rundown of the issues discovered in this research.

- RQ1: What role does the usage of technology have in the educational experience of elementary school students?
- RQ2: What role do mothers play in supporting their children with their digital education?
- RQ3: Does the mother's involvement in her children's technology usage affect the children's ability to learn?

2 Literature review

2.1 Digital learning

Information and communication technology (ICT) and other educational technologies are used in classrooms more and more frequently. The research has established a clear connection between educational technology and effective learning outcomes [10], [12]. What's more, research shows that it's critical to have educational technology especially suited for students, considering their needs and abilities. Technology is crucial to students' learning early on, mainly when used under an adult's supervision [1]. In addition, the technology significantly impacts students' daily lives and is present in many ways throughout their educational journey. Students can improve their cognitive and numeracy skills by using well-designed digital resources [4], [7], [12], [19].

2.2 The role of parents

Parents' opinions about what they ought to do about their children's education are incorporated into role-playing activities for parental involvement. Previous studies have highlighted the importance of parent's participation in their children's education and their prospects for academic achievement [26], [32]–[35]. Definitions of parental involvement used in various articles: parent-child communication about school; home supervision; checking homework; homework assistance; educational expectations and aspirations; school attendance and participation; reading with children; communicating with schools; parenting style; and parental attitudes toward education [32]. Role construction is influenced by parents' views on child rearing, child development, and appropriate home support roles in children's education [36]. In addition, parental role construction develops from parents' interactions with people and groups related to education and is influenced over time by social factors. The ability of role construction to influence and shape parental involvement has been empirically supported in studies of diverse groups of elementary school students [18], [36], [37]. In comparison to parents who have less active role beliefs, parents who have an active role construction are typically more involved in their children's education [15], [16], [21].

2.3 Mother's involvement

The mother-child relationship is crucial to children's ability to perceive and evaluate their surroundings and selves. The children whose needs are adequately met view themselves as valuable creatures, and they view their environment as valued and trustworthy. Mothers should be the primary adults who satisfy a child's need for affection, and they should help their children develop self-esteem [35]. In an environment where children are adequately supported, the discipline and education mothers provide to their children will be of high caliber [28]. People are now more aware of the significance of healthy mother-child relationships for developing healthy personalities and environ-

mental adaptation in children. When mothers engage in healthy, non-threatening, cooperation-based communication with their children, the children develop into adaptable, creative, and self-controlled individuals [30], [35], [38]. Mothers must be self-assured, sensitive to their children's difficulties, accepting, and share their children's emotions and thoughts. Mothers who tenaciously defend their own opinions, refuse to get ideas and beliefs that differ from theirs and disregard their children's views and opinions are incapable of establishing healthy relationships with their children.

3 Methods

3.1 Research design

This research was conducted using quantitative descriptive methods with a survey approach. It obtains a complete picture of parents' involvement in digital-based student learning, especially the role of mothers of elementary school students in Berau Regency, East Kalimantan, Indonesia The data was sourced from the population of parents in Berau Regency, with about 277 respondents. The eligibility criteria for parental participants are limited to mothers of students enrolled in early grade levels. Moreover, the study employs a purposive random sampling technique, which is further supported by careful consideration [39]. Purposive sampling is a method of sampling where decisions are made based on criteria that are believed to be appropriate for the characteristics of the target population.

3.2 Data collection

The data collection used a questionnaire containing indicators of the mother's involvement in stimulating digital learning at home [26], [28], [29]. This questionnaire was circulated in April-July 2022 through a google form application whose link was distributed through the WhatsApp group. This research instrument uses a Likert scale to collect precise data because the answer options for each question range from highly positive to extraordinarily negative or vice versa. Using a Likert scale to measure an individual or group's opinions, perceptions, and attitudes regarding social phenomena.

This study employed a closed questionnaire that supplied answer options so respondents could place a checkmark next to the appropriate answer option on the Google Form platform as a survey of respondents associated with the phenomenon under investigation. This research instrument was created using sub-variable indicators.

Table 1. Sub-variable indicators of instrument

No.	The Role of Parents	Question Number
1	Utilization of technology for educational games	1, 2, 3, 4
2	Utilization of technology to study	5, 6, 7
3	Utilization of technology for coloring	8, 9, 10
4	Utilization of technology for drawing	11, 12
5	Utilization of technology to recognize letters, and numbers, read, and count.	13, 14, 15
6	Train children's critical thinking skills based on images and words.	16, 17, 18
7	Describe the websites that children can access.	19, 20, 21, 22
8	Train children to communicate politely when using social media.	23, 24
9	Supervise children when uploading photos and videos on social media.	25, 26, 27
10	Train children's creativity to create learning-related photos and videos.	28, 29, 30

The research data validity technique uses content, constructs, and empirics [39]. The content's validity is measured by testing the feasibility of each item of the questionnaire statement based on the assessment of competent experts. Based on the test results, the panels commented that the questionnaire items were declared feasible to be tested in empiric validity. In validating constructively, it analyzed the rules for writing questionnaire instruments to prevent multi-interpretation when respondents answered several questionnaire item statements. Empirical validity is also ensured by piloting several questionnaire items among parents who belong to the same population as the study but not included in the sample. Meanwhile, the empiric validity test calculation uses the product moment formula.

3.3 Data analysis technique

The results of the empiric trial by calculating its internal consistency resulted in 20 instruments having an internal consistency index of ≥ 0.30. Meanwhile, the reliability calculation was carried out with the Cronbach alpha formula. The results of the reliability calculation reach an alpha value of > 0.7, hence the instrument is suitable for research. Once validity and reliability have been calculated and explained, each questionnaire item is ready for data collection. The Structural Equation Modeling (SEM) approach is an analytical method, and the variant-based approach simultaneously tests measurement and structural models. The analytical tool employed to test the research hypotheses is Partial Least Squares (PLS), supported by the SmartPLS software version 3. Data analysis is performed directly according to the data that has been obtained [40].

Structural Equation Modeling (SEM) can be solved using PLS, which in this situation is more effective than other SEM methods [41]. SEM is frequently employed by researchers who specialize in the social sciences since it provides greater flexibility in research that integrates theory and data and is capable of doing path analysis with latent variables [40]. PLS is a powerful analytical method because it is not dependent on a wide range of hypotheses. Indicators with category, ordinal, interval and ratio scales can all be used in the same model; a large sample number is neither required nor recommended [42]. Apart from validating hypotheses, PLS also elucidates whether or not

a connection exists between hidden variables. PLS is more suitable for data analysis in predictive research because it is used to support the theory. PLS can be used to analyze data for correlations between latent factors. Constructs made with both reflexive and formative markers can be analyzed using PLS. For this reason, covariance-based SEM is insufficient because the resulting model would be anonymous [41].

4 Results and discussion

This section uses tables to present the findings of this study, which aims to analyze the role of technology use in the educational experience of elementary school students, the role played by mothers in supporting their children's digital education, and the effect of mothers' involvement in their children's use of technology on their children's learning abilities.

RQ1: What role does the usage of technology have in the educational experience of elementary school students?

The integration of technology in learning has been found to yield many positive impacts for students in elementary schools. However, the involvement of parents, especially mothers, is essential to control and confront any challenges that may arise. Based on the interviews with participants, tasks related to the child's schooling became the mother's responsibility. Some studies and literature also show that most mothers perform these significant tasks [26], [29], [43]. The following are the results of a survey of student activities in digital learning.

Table 2 shows that the highest percentage of the use of technology in children's digital learning is in the activities of recognizing letters and numbers, reading, and learning to count. Before children can read, write, or count, letters and numbers must be learned. The results showed that mothers teach children to think critically and independently. After the child has mastered letters and numbers, gadgets can be used to practice reading and counting [44]. Reading ability is related to language skills that instill ideas and feelings in the text.

Table 2. Average survey results on the use of technology in digital learning students

No.	Children's Digital Technology Activities	Score
1	Utilization of technology for educational games	3.964
2	Utilization of technology to study	2.401
3	Utilization of technology for coloring	4.051
4	Utilization of technology for drawing	3.968
5	Utilization of technology to recognize letters, and numbers, read, and count.	4.3

Counting activities include mentioning, identifying, operating, and comparing numbers. Meanwhile, the numbers from 0 to 20 can be mentioned in seven-years-old children. Parents use numeracy applications to hone skills in primary school children according to their level. According to research findings, a significant proportion of parents, estimated at approximately 78%, require literacy, numeracy, and communication skills in order to enhance their child's competency in various domains. Furthermore,

students find it easier to learn the material with learning numeracy applications. This is because visual and audio combine to digest the material easily, and children are highly interested in the media [45]. The acquisition of reading and numeracy skills is crucial in facilitating children's academic development within conventional educational institutions.

The use of technology is also used to learn, draw, and color, and parents should accompany children in using these activities. In drawing tools, mothers introduce children to access applications, and their roles in maximizing the use of technology in coloring activities are carried out in several ways. These include the *Vutoria program*, color recognition, *Macromedia flashes C6*, kids painting coloring book, kids center coloring, kids doodle-color and draw coloring for children, and toddler coloring book free [46]. Some mothers also provided instructions on how to download and use the application. Children have initiative and are more critical of the new problems faced while accessing the application through the explanation. The results align with previous research, where children use images to express and articulate emotions, high-level thinking, means of interaction, and presentation of concrete and abstract ideas to show the development of children's thinking [47].

Meanwhile, coloring activities become a means of imagination for children, a tool for recognizing color differences, and fine motor training by coordinating between the hands and eyes. Coloring activities can concentrate and train children's target-setting skills. Additionally, it can become a means to make classes fun and influence creativity [48]. Children also use technology to play educational games wrapped in rules that stimulate cognition and improve concentration. Playing games can stimulate children's thinking skills, such as block sequencing regarding color. The combination of several principles of technology-based games can create educational content that is entertaining and fun [49]. Furthermore, learning educational games for reading, writing, and counting can increase the interest in learning for children aged 3-8 years with a percentage of 78.33% (very good) [50]. The use of android-based game media affects language skills, as can be seen from cycles I and II indicators at 53% and 83% [48].

However, the results are contrary to this study because several factors have a considerable influence, namely the involvement of parents in supervising children. The lack of support and the role of parents or teachers can affect learning effectiveness. It is imperative to establish a consensus on the supervision of children's healthy digital engagement. Leveraging contemporary technology, educational institutions can develop gamified applications that facilitate both learning and play for children [51]. Therefore, educational games are used as entertainment and to educate children.

The employment of technology in the classroom reveals that children exhibit the lowest average utilization rate. Moreover, the pedagogical approach involves using educational applications for Islamic education. The assessment applications for children include *asmaul husna, hijaiyah* letter recognition, *iqro, BIL Hikmah*, association (*Metas-Q*), and memorization method of the *Qur'an* [52]. The utilization of studying as an educational application aims to cultivate Islamic character and serves as a mode of play-based learning. Children can be interested in learning with the educational application of *hijaiyah* letter recognition on gadgets because the presence of sounds and

pronunciation methods support the application. Furthermore, an android-based application with *Unity 3D* gives children's appeal, especially in *hijaiyyah* letter material included in the excellent category [53]. Therefore, parents should be able to guide their children through the app's interface to ensure the best possible learning experience. One of the advantages of gadget applications is their potential to facilitate collaboration, which can enhance knowledge acquisition related to religion. Furthermore, they offer a means for children to learn through play.

RQ2: What role do mothers play in supporting their children with their digital education?

In addition to measuring the percentage of digital technology utilization, this study also calculated the percentage regarding mother' roles. The results related to the assessment of the role of parents are presented in Table 3.

Table 3. Average mother's role survey results

No.	The Role of Parents	Score
1	Train children's critical thinking skills based on images and words.	3.477
2	Describe the websites that children can access.	3.942
3	Train children to communicate politely when using social media.	2.884
4	Supervise children when uploading photos and videos on social media.	3.347
5	Train children's creativity to create learning-related photos and videos.	2.549

Based on Table 3, the highest average information obtained is found in the explanation of websites that children can access. There has been no effort to foster children's imaginations regarding learning-related photography and videography. These results indicate that the mothers have performed the required role using digital technology. Parents play a role in assisting digital native children [54]. Parents and women have numerous responsibilities in today's increasingly digital world. Mothers are expected to direct children in the wise use of technology to use digital media positively.

Parents are expected to control the use of gadgets during the development and growth of children. They are prominent in the child's growth and development process. Children need maternal guidance during internet use to be utilized positively. Indonesian mothers monitor usage, set limits, and guide to help their children make the most of the available technology tools [55]. Character formation involves the parents' fundamental role [21]. Mothers also play a role in assisting the use of gadgets by stimulating cognitive competence through *YouTube* videos. The involvement is skilled and understands the various terms of digital devices to place these media with full supervision and responsibility [56]. Some of the efforts in monitoring the use of gadgets include accompanying children, supervising every content accessed, limiting access time, and setting up the required gadgets appropriate for their age [29].

The children's critical thinking skills should also be practiced with images and words obtained online. Mothers are obliged to develop themselves through productive activities and become literate. The increasing involvement of coaches, teachers, supervisors, directors, and child controllers is needed during online implementation [57]. Mothers can involve children in developing critical thinking skills by providing stories or cases

regarding technology's positive and negative impacts [14], [58]. Parents are determinants of the child's future and success through intensive guidance during the learning process at home.

RQ3: Does the mother's involvement in her children's technology usage affect the children's ability to learn?

This study has shown several variables about using digital technology in parental involvement, and the utilization requires a unique role to keep it balanced. Based on the analysis of the previous discussion, data were obtained that technology has been utilized in positive activities. Before hypothesis testing, data quality was analyzed by testing reliability and validity, compiling inner models, and analyzing algorithms. From the results, an invalid but reliable questionnaire indicator was obtained. This is because the descriptive validity obtained from the average variance extracted (AVE) and actual values are less than 0.5 and above 0.7. The data is reliable and valid when the Cronbach alpha and descriptive validity values are more than 0.5 and 0.7 (Creswell & Poth, 2017). A model-inner image of the indicators was eliminated, as presented in Figure 1.

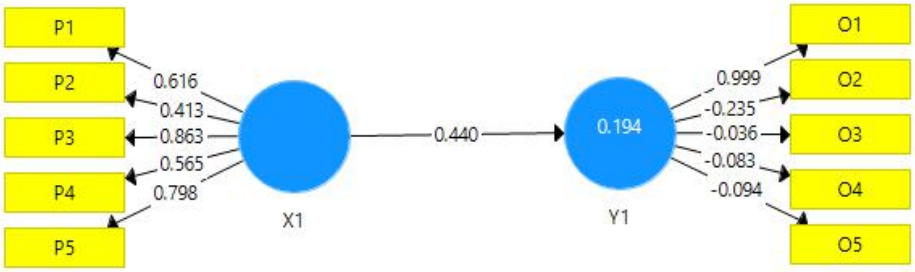

Fig. 1. Inner model modifications

Figure 1 presents the inner modification model, while Table 4 presents the test of the quality of the research data. The presentation is as follows.

Table 4. Data quality test results

No	Variables and Indicators	Outer Loading
1	Utilization for educational games (P1)	0.616
2	Utilization for reviewing (P2)	0.413
3	Utilization for coloring (P3)	0.863
4	Utilization for drawing (P4)	0.565
5	Utilization for counting (P5)	0.798
6	Mothers train the child's critical thinking skills towards images and words (O1)	0.999
7	The mothers explain the website that children can access (O2)	-0.235
8	Mothers train children to communicate politely on social media (O3)	-0.036
9	Mothers supervise children who upload photos and videos on social media (O4)	-0.083
10	Mothers train children's creativity to make photos and videos related to learning (O5)	-0.094

The data qualification test in Table 4 shows that the outer loading value (for reflexive indicators) obtains the weight of each indicator as a measure of each latent variable. Indicators with outer weight are the strongest variable gauges. Table 5 above exposes the data of latent variables with loading values below 0.5, and the measurements have not met the required convergent validity.

Table 5. Hypothesis test results

Symbol Hypothesis	Original Sample	SD	Mean	P Values	T Statistics	Conclusion
X1->Y1	0.441	0.135	0.413	0.002	3.141	Accept

In the SEM model with PLS, the significance test analysis aims to determine the effect of technology utilization on maternal involvement. The bootstrapping procedure is a strategy to test hypotheses using the SEM PLS method with the smartPLS 3.0 computer program to gather results regarding the effect of gadget use on primary school-aged children. Before testing the hypothesis, the T-table value data was obtained by 1.97. Table 5 hypothesis test showed that the statistical value of the effect of gadget utilization (X1) on maternal involvement (Y1) was 3,141 > T-table (1.97). The original sample estimate indicated a positive value of 0.441 as the direction of the relationship between the use of gadgets (X1). Meanwhile, mother's involvement (Y1) is positive since the hypothesis decision is accepted, showing a significant influence on parental involvement in digital learning. This demonstrates that mothers' involvement significantly encourages Indonesian primary school students' commitment to digital learning. This finding supports the findings of earlier studies, which found that mothers' support is essential for learning and for the academic or educational success of their offspring [26], [32]–[35]. Similarly, Boonk et al. found a substantial positive correlation between academic success and a mother's involvement in learning support [59].

The findings are relevant to several studies that screen use time in children results from interactions between child factors and parental attitudes. Parents' involvement in fostering technology use is a form of primary responsibility because the family is the first place of education. Communication is the main factor that should be preserved by controlling, monitoring, supporting, and making children aware of the importance of education [60].

Similarly, the numerous benefits that online learning environments provide, as well as what motivates commitment to online learning, can justify the high level of involvement of mothers in the digital learning of their children. Rahayu discovered, for instance, that digital learning promotes and facilitates learners' cognitive development at the expense of collaborative learning [34]. Digital learning fosters higher-order thinking and collaborative work [15], [16]. Particularly, J. Park et al. assert that mothers' involvement in learning allows children to overcome developmental obstacles and complete developmental duties [43]. This study's engagement theory also supports the conclusion that learners will be intrinsically motivated to learn when the learning environment and activities are technological.

5 Conclusions and limitations

The use of digital learning should have various stimuli to excite and motivate children in digital learning. To accompany children at home, mentoring, education, awareness, collaboration, and parental involvement are required. Parents should control and supervise every activity and information received through digital media and provide excellent and appropriate explanations. Parental involvement is essential to control and face various challenges of students. Based on the interviews with participants, tasks related to schooling are the mother's responsibility.

The highest percentage of children's digital learning is in recognizing letters and numbers, reading, and learning to count, while the lowest is in the assessment activity. Furthermore, the highest average information is found in the explanation of websites to be accessed. The role that has not been performed is training children's creativity in taking photos and videos related to learning. The statistical value of the effect of gadget utilization (X1) on maternal involvement (Y1) was 3,141 > T-table (1.97). The original sample estimate value shows a positive value of 0.440, which indicates that the direction of the relationship between the use of gadgets (X1) and maternal involvement (Y1) is positive, hence the hypothesis decision is accepted. There is a significant influence on parental involvement in digital learning. Therefore, the mothers have carried out the required role as a companion for children using digital technology. The influence of gadgets on parental involvement is significant for parents to guide children in the digital era. The findings can be the subject of a parent study to monitor and limit the use of gadgets for children of primary school age. Parents should be more competent and know more deeply about the applications used by children. The novelty in this study is more specifically focused on using gadgets by utilizing applications provided by schools or the government.

These results demonstrate the high involvement of mothers in digital learning for Indonesian elementary school pupils. The government, educators, and pupils could all benefit from these findings. This study has contributed to the body of knowledge regarding the involvement of mothers in the digital learning of their children in Berau, East Kalimantan Indonesia. Therefore, it is recommended that primary school systems implement and follow digital learning education as a supplement to traditional teaching and learning methods in order to maintain continuity during extraordinary times such as the COVID-19 pandemic, not only in Indonesia but also globally. For the academic success of their children who have become digital consumers, parents, particularly mothers, must attempt to maintain the education system in synergy with the digitalization revolution.

It stands to reason that the present study has its own set of restrictions, just like any other piece of research. However, a mixed methods approach may be more ideal than the single method used in this research because of the lockdown caused by the COVID-19 pandemic. This study only considers two variables: maternal involvement and child participation in digital learning. There may be additional factors that influence digital learning commitment, such as mother's education, mother's occupation, family economic conditions, number of children the mother cares for, mother-child emotional relationship, child's learning environment, and communication between mothers and

teachers at school. If this is applicable to their society, subsequent research may consider additional factors. Therefore, these findings must be interpreted as a portrait of mother involvement in digital learning among children in Indonesia, particularly in Berau, East Kalimantan. In doing so, these findings provide a solid foundation for the argument and a solid springboard for further in-depth research on the involvement of mothers in the digital learning of primary students around the globe.

6 Acknowledgment

The authors are thankful to the editors of International Journal of Interactive Mobile Technologies (iJIM) for publishing this paper. The Faculty Research Support Fund provided funding for this study.

7 References

[1] Y. Nurmalisa, S. Sunyono, and D. Yulianti, "An Integrative Review: Application of Digital Learning Media to Developing Learning Styles Preference," *Int. J. Inf. Educ. Technol.*, vol. 13, no. 1, pp. 187–194, 2023. https://doi.org/10.18178/ijiet.2023.13.1.1795

[2] M. A. Camilleri, "Evaluating service quality and performance of higher education institutions: a systematic review and a post-COVID-19 outlook," *Int. J. Qual. Serv. Sci.*, vol. 13, no. 2, pp. 268–281, 2021. https://doi.org/10.1108/IJQSS-03-2020-0034

[3] A. Al-Hunaiyyan, R. Alhajri, and A. Bimba, "Towards an Efficient Integrated Distance and Blended Learning Model: How to Minimise the Impact of COVID-19 on Education.," *Int. J. Interact. Mob. Technol.*, vol. 15, no. 10, 2021. https://doi.org/10.3991/ijim.v15i10.21331

[4] Z.-J. Liu, N. Tretyakova, V. Fedorov, and M. Kharakhordina, "Digital literacy and digital didactics as the basis for new learning models development," *Int. J. Emerg. Technol. Learn.*, vol. 15, no. 14, pp. 4–18, 2020. https://doi.org/10.3991/ijet.v15i14.14669

[5] K. Lavidas, Z. Apostolou, and S. Papadakis, "Challenges and opportunities of mathematics in digital times: Preschool teachers' views," *Educ. Sci.*, vol. 12, no. 7, p. 459, 2022. https://doi.org/10.3390/educsci12070459

[6] C. F. Pasani, R. Amelia, and Z. Hassanhassan, "Covid-19 impact in Indonesia's education sector: Challenges and strategy," *J. Adv. Res. Dyn. Control Syst.*, vol. 12, no. 7 Special Issue, pp. 1722–1731, 2020. https://doi.org/10.5373/JARDCS/V12SP7/20202281

[7] D. Buckingham and R. Willett, *Digital generations: Children, young people, and the new media*. Routledge, 2013. https://doi.org/10.4324/9780203810668

[8] M. Kalogiannakis and S. Papadakis, "Evaluating pre-service kindergarten teachers' intention to adopt and use tablets into teaching practice for natural sciences," *Int. J. Mob. Learn. Organ.*, vol. 13, no. 1, pp. 113–127, 2019. https://doi.org/10.1504/IJMLO.2019.10016617

[9] S. Papadakis, F. Alexandraki, and N. Zaranis, "Mobile device use among preschool-aged children in Greece," *Educ. Inf. Technol.*, vol. 27, no. 2, pp. 2717–2750, 2022. https://doi.org/10.1007/s10639-021-10718-6

[10] R. Amelia, S. I. A. Dwiningrum, and A. Mustadi, "Pandemic Pedagogy in The Era of Digital Transformation," in *ICLIQE 2021: Proceeding of The 5th International Conference on Learning Innovation and Quality Education*, 2021, pp. 1–7. https://doi.org/10.1145/3516875.3516911

[11] C. Nanjundaswamy, S. Baskaran, and M. H. Leela, "Digital Pedagogy for Sustainable Learning.," *Shanlax Int. J. Educ.*, vol. 9, no. 3, pp. 179–185, 2021. https://doi.org/10.34293/education.v9i3.3881

[12] N. Pugacheva, T. Kirillova, O. Kirillova, A. Luchinina, I. Korolyuk, and A. Lunev, "Digital paradigm in educational management: The case of construction education based on emerging technologies," *Int. J. Emerg. Technol. Learn.*, vol. 15, no. 13, pp. 96–115, 2020. https://doi.org/10.3991/ijet.v15i13.14663

[13] N. Ronzhina, I. Kondyurina, A. Voronina, K. Igishev, and N. Loginova, "Digitalization of modern education: problems and solutions," *Int. J. Emerg. Technol. Learn.*, vol. 16, no. 4, pp. 122–135, 2021. https://doi.org/10.3991/ijet.v16i04.18203

[14] H. Ayub, "Parental influence and attitude of students towards technical education and vocational training," *Int. J. Inf. Educ. Technol.*, vol. 7, no. 7, pp. 534–538, 2017. https://doi.org/10.18178/ijiet.2017.7.7.925

[15] H. Herwin and S. C. Dahalan, "Technological Integration Factors in Parental Involvement during Distance Learning," *Int. J. Inf. Educ. Technol.*, vol. 12, no. 7, 2022. https://doi.org/10.18178/ijiet.2022.12.7.1664

[16] K. Wilson, "Parent Perspectives of Digital Learning Experiences: A Phenomenological Study." Lamar University-Beaumont, 2022.

[17] K. Rahardi, "Linguistic impoliteness in the sociopragmatic perspective," *Humaniora*, vol. 29, no. 3, p. 309, 2017. https://doi.org/10.22146/jh.v29i3.24954

[18] S. Papadakis, N. Zaranis, and M. Kalogiannakis, "Parental involvement and attitudes towards young Greek children's mobile usage," *Int. J. Child-Computer Interact.*, vol. 22, p. 100144, 2019. https://doi.org/10.1016/j.ijcci.2019.100144

[19] S. Papadakis, A. İ. C. Gözüm, M. Kalogiannakis, and A. Kandır, "A Comparison of Turkish and Greek Parental Mediation Strategies for Digital Games for Children During the COVID-19 Pandemic," in *STEM, Robotics, Mobile Apps in Early Childhood and Primary Education: Technology to Promote Teaching and Learning*, Springer, 2022, pp. 555–588. https://doi.org/10.1007/978-981-19-0568-1_23

[20] T. Stratigos and M. Fenech, "Early childhood education and care in the app generation: Digital documentation, assessment for learning and parent communication," *Australas. J. Early Child.*, vol. 46, no. 1, pp. 19–31, 2021. https://doi.org/10.1177/1836939120979062

[21] A. McFadden and K. Thomas, "Parent perspectives on the implementation of a digital documentation portal in an early learning centre," *Australas. J. Early Child.*, vol. 41, no. 4, pp. 86–94, 2016. https://doi.org/10.1177/183693911604100411

[22] E. Yamamura and Y. Tsustsui, "The impact of closing schools on working from home during the COVID-19 pandemic: evidence using panel data from Japan," *Rev. Econ. Househ.*, vol. 19, pp. 41–60, 2021. https://doi.org/10.1007/s11150-020-09536-5

[23] D. Del Boca, N. Oggero, P. Profeta, and M. Rossi, "Women's and men's work, housework and childcare, before and during COVID-19," *Rev. Econ. Househ.*, vol. 18, no. 4, pp. 1001–1017, 2020. https://doi.org/10.1007/s11150-020-09502-1

[24] M. Spinelli, F. Lionetti, M. Pastore, and M. Fasolo, "Parents' stress and children's psychological problems in families facing the COVID-19 outbreak in Italy," *Front. Psychol.*, vol. 11, p. 1713, 2020. https://doi.org/10.3389/fpsyg.2020.01713

[25] S. D. Simpkins, H. B. Weiss, K. McCartney, H. M. Kreider, and E. Dearing, "Mother-child relationship as a moderator of the relation between family educational involvement and child achievement," *Parent. Sci. Pract.*, vol. 6, no. 1, pp. 49–57, 2006. https://doi.org/10.1207/s15327922par0601_2

[26] G. Ozturk and S. Hill, "Mother–child interactions during shared reading with digital and print books," *Early Child Dev. Care*, 2018. https://doi.org/10.1080/03004430.2018.1538977

[27] B. Izci, "An Exploratory Study of Mother-Child Interactions Around Digital Media Applications." The Florida State University, 2019. https://doi.org/10.3102/1568667
[28] D. Tzuriel, "Mother-child mediated learning experience strategies and children's cognitive modifiability: Theoretical and research perspectives," *Educ. Psychol. Certitudes Uncertainties*, pp. 1–19, 2018. https://doi.org/10.5772/intechopen.80976
[29] D. Zayia, L. Parris, B. McDaniel, G. Braswell, and C. Zimmerman, "Social learning in the digital age: Associations between technoference, mother-child attachment, and child social skills," *J. Sch. Psychol.*, vol. 87, pp. 64–81, 2021. https://doi.org/10.1016/j.jsp.2021.06.002
[30] D. Bach and S. Christensen, "Battling the tiger mother: Pre-School reform and conflicting norms of parenthood in Singapore," *Child. Soc.*, vol. 31, no. 2, pp. 134–143, 2017. https://doi.org/10.1111/chso.12162
[31] B. Williamson, Big data in education: *The digital future of learning, policy and practice*. Sage, 2017. https://doi.org/10.4135/9781529714920
[32] S. A. Fajoju, O. Aluede, and A. I. Ojugo, "Parental involvement as a correlate of academic achievement of primary school pupils in Edo State, Nigeria," *Res. Educ.*, vol. 95, no. 1, pp. 33–43, 2016. https://doi.org/10.7227/RIE.0023
[33] K. C. Lawrence and O. V. Fakuade, "Parental involvement, learning participation and online learning commitment of adolescent learners during the COVID-19 lockdown.," *Res. Learn. Technol.*, vol. 29, 2021. https://doi.org/10.25304/rlt.v29.2544
[34] N. W. Rahayu and S. Haningsih, "Digital parenting competence of mother as informal educator is not inline with internet access," *Int. J. Child-Computer Interact.*, vol. 29, p. 100291, 2021. https://doi.org/10.1016/j.ijcci.2021.100291
[35] A. Ulutas and M. Kanak, "An Analysis of the Mother and Child Education Program's Effects on the Relationship between Mothers and Their Five-or Six-Year-Old Children.," *J. Educ. Learn.*, vol. 5, no. 4, pp. 234–244, 2016. https://doi.org/10.5539/jel.v5n4p234
[36] S. Papadakis, F. Alexandraki, and N. Zaranis, "Greek Parents' App Choices and Young Children's Smart Mobile Usage at Home," in *New Realities, Mobile Systems and Applications: Proceedings of the 14th IMCL Conference*, 2022, pp. 39–50. https://doi.org/10.1007/978-3-030-96296-8_4
[37] E. N. Patrikakou, "Parent Involvement, Technology, and Media: Now What?.," *Sch. Community J.*, vol. 26, no. 2, pp. 9–24, 2016.
[38] S. N. Carman and C. J. Chapparo, "Children who experience difficulties with learning: Mother and child perceptions of social competence," *Aust. Occup. Ther. J.*, vol. 59, no. 5, pp. 339–346, 2012. https://doi.org/10.1111/j.1440-1630.2012.01034.x
[39] R. Heale and A. Twycross, "Validity and reliability in quantitative studies," *Evid. Based. Nurs.*, vol. 18, no. 3, pp. 66–67, 2015. https://doi.org/10.1136/eb-2015-102129
[40] M. A. Memon, T. Ramayah, J. H. Cheah, H. Ting, F. Chuah, and T. H. Cham, "PLS-SEM statistical programs: a review," *J. Appl. Struct. Equ. Model.*, vol. 5, no. 1, pp. 1–14, 2021. https://doi.org/10.47263/JASEM.5(1)06
[41] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *Eur. Bus. Rev.*, vol. 31, no. 1, pp. 2–24, 2019. https://doi.org/10.1108/EBR-11-2018-0203
[42] J. Hair, C. L. Hollingsworth, A. B. Randolph, and A. Y. L. Chong, "An updated and expanded assessment of PLS-SEM in information systems research," *Ind. Manag. data Syst.*, 2017. https://doi.org/10.1108/IMDS-04-2016-0130
[43] J. Park, L. Ross, and D. L. Rodriguez, "Educating Children and Navigating Digital Literacy in COVID-19: Latina Mothers and Mother-Child Pedagogies," *Int. J. Multicult. Educ.*, vol. 23, no. 3, pp. 79–93, 2021. https://doi.org/10.18251/ijme.v23i3.2999

[44] E. Wartella and A. R. Lauricella, "Early learning, academic achievement, and children's digital media use," *Media well-being Child. Adolesc.*, pp. 173–186, 2014.
[45] P. S. Moyer-Packenham *et al.*, "How design features in digital math games support learning and mathematics connections," *Comput. Human Behav.*, vol. 91, pp. 316–332, 2019. https://doi.org/10.1016/j.chb.2018.09.036
[46] N. MIKELIĆ PRERADOVIĆ, G. Lešin, and M. Šagud, "Investigating parents' attitudes towards digital technology use in early childhood: A case study from Croatia," *Informatics Educ.*, vol. 15, no. 1, pp. 127–146, 2016. https://doi.org/10.15388/infedu.2016.07
[47] B. Marhaeni, I. Septriana, and S. W. Suci, "Fine Motor Stimulation of Children Through Coloring Activities in Early Childhood," *Temat. J. Pemikir. dan Penelit. Pendidik. Anak Usia Dini*, vol. 8, no. 1, pp. 51–59, 2022. https://doi.org/10.26858/tematik.v8i1.27550
[48] N. Behnamnia, A. Kamsin, M. A. B. Ismail, and A. Hayati, "The effective components of creativity in digital game-based learning among young children: A case study," *Child. Youth Serv. Rev.*, vol. 116, p. 105227, 2020. https://doi.org/10.1016/j.childyouth.2020.105227
[49] A. C. Camilleri and M. A. Camilleri, "The Students' Intrinsic and Extrinsic Motivations to Engage with Digital Learning Games," in *Proceedings of the 2019 5th International Conference on Education and Training Technologies*, 2019, pp. 44–48. https://doi.org/10.1145/3337682.3337689
[50] T. Panskyi and Z. Rowinska, "A Holistic Digital Game-Based Learning Approach to Out-of-School Primary Programming Education.," *Informatics Educ.*, vol. 20, no. 2, pp. 255–276, 2021. https://doi.org/10.15388/infedu.2021.12
[51] A. İ. C. Gözüm and A. Kandır, "Digital games pre-schoolers play: parental mediation and examination of educational content," *Educ. Inf. Technol.*, vol. 26, no. 3, pp. 3293–3326, 2021. https://doi.org/10.1007/s10639-020-10382-2
[52] N. N. Kamaruzaman and N. Jomhari, "Digital game-based learning for low functioning autism children in learning Al-Quran," in *2013 Taibah University International Conference on Advances in Information Technology for the Holy Quran and Its Sciences*, 2013, pp. 184–189. https://doi.org/10.1109/NOORIC.2013.46
[53] A. Luckyhasnita, A. S. Chan, and G. A. Hutagalung, "Designing a children's iqra book using augmented reality technology in hijaiyah letters," 2021.
[54] S. Stormo Walder, "School Engagement for Digital Native Parents: Parents' Perceptions of Effective Methods.," *ProQuest LLC*, 2019.
[55] B. Huber, K. Highfield, and J. Kaufman, "Detailing the digital experience: Parent reports of children's media use in the home learning environment," *Br. J. Educ. Technol.*, vol. 49, no. 5, pp. 821–833, 2018. https://doi.org/10.1111/bjet.12667
[56] S. Livingstone, G. Mascheroni, M. Dreier, S. Chaudron, and K. Lagae, "How parents of young children manage digital devices at home: The role of income, education and parental style," 2015.
[57] M. E. Feinberg *et al.*, "Impact of the COVID-19 Pandemic on Parent, Child, and Family Functioning," *Fam. Process*, 2021. https://doi.org/10.1111/famp.12649
[58] M. Nouwen, N. Jafarinaimi, and B. Zaman, "Parental controls: reimagining technologies for parent-child interaction," in *Proceedings of 15th European Conference on Computer-Supported Cooperative Work-Exploratory Papers*, 2017, vol. 2017, pp. 18–34.
[59] L. Boonk, H. J. M. Gijselaers, H. Ritzen, and S. Brand-Gruwel, "A review of the relationship between parental involvement indicators and academic achievement," *Educ. Res. Rev.*, vol. 24, pp. 10–30, 2018. https://doi.org/10.1016/j.edurev.2018.02.001
[60] J. Xie, M. Wang, and D. Hooshyar, "Student, parent, and teacher perceptions towards digital educational games: How they differ and influence each other," *Knowl. Manag. E-Learning An Int. J.*, vol. 13, no. 2, pp. 142–160, 2021. https://doi.org/10.34105/j.kmel.2021.13.008

8 Authors

Rizky Amelia is a Ph.D. Candidate, Department of Primary Education, Graduate School, Universitas Negeri Yogyakarta & Lecturer in Department of Primary School, Universitas Lambung Mangkurat, Banjarmasin, Indonesia. She received awards from Elsevier as a reviewer in the journal Heliyon (Scopus Q1) and the Journal of Computer Speech & Language (Scopus Q2). She has also been a reviewer of articles in the Australasian Journal of Educational Technology (Scopus Q1), Frontiers in psychology (Q1), Educational studies (Q2), Journal of Turkish Science Education (Q2), Multidisciplinary journal of educational research (Q2), International Journal of Information and Education Technology (Q3), International Journal of Learning, Teaching and Educational Research (Q3), International Journal of Cognitive Research in Science, Engineering and Education (Q3), and Eğitim ve Öğretim (Q4). Her research focuses on teaching and learning in primary school, linguistic education, writing skill, digital literacy, learning design, STEAM Education, and Indonesian language education. She can be contacted at email: rizkyamelia.2020@student.uny.ac.id and rizkyamelia@ulm.ac.id.

Zamzani is a Senior Professor of Indonesian Language Education Department and Chairman of the Senate of Universitas Negeri Yogyakarta, Colombo Street No.1 Yogyakarta, Yogyakarta 55281, Indonesia. His research focuses on Indonesian language learning, language skill education, linguistics, teaching and learning education, and learning evaluation. He can be contacted at email: zamzani@uny.ac.id.

Ali Mustadi is a Professor and researcher in undergraduate of Elementary School Teacher Education Department, Master, and Doctoral Program of Primary Education Department, Graduate School, Universitas Negeri Yogyakarta. He also a secretary of Primay Education Forum of Indonesia. He joined Sandwhich Program in Ohio State University, USA (2009-2010). Actively participated in Short Course on Lesson Study (SToLS) JICA in Japan (2013). Participated in SEA-ESD UNESCO team member 2018-now. Boards of Indonesia Association of Primary Education Lecturers since 2013-now, active member in Comparative Education Society of Asia (CESA) and WCCES since 2012-now, also active member in World association of Lesson Study (WALS), ISPI, TEFLIN, AsiaTefl. His research focuses on thematic learning in primary school, authentic assessment, digital media for learning, disaster literation, and teaching and learning in primary school. He can be contacted at email: ali_mustadi@uny.ac.id.

Anik Ghufron is a Senior Professor of Educational Curriculum and Technology Department and Postgraduate Director of Universitas Negeri Yogyakarta, Colombo Street No.1 Yogyakarta, Yogyakarta 55281, Indonesia. His research focuses on curriculum development, digital learning, teaching and learning education, and learning evaluation. ORCID: https://orcid.org/0000-0001-6711-3606 Google Scholar: https://scholar.google.com/citations?hl=en&user=RyW5p-AAAAAJ Scopus: https://www.scopus.com/authid/detail.uri?authorId=57204199426. He can be contacted at email: anikghufron@uny.ac.id.

Ahmad Suriansyah is a senior Professor of researcher in undergraduate of Elementary School Teacher Education Department, Master and Doctoral Program of

Management Education Department, and Director of Postgraduate Program in Universitas Lambung Mangkurat Indonesia. His research focuses on leadership management, transformational leadership, character education, education in primary school, digital transformation, and learning strategy. He can be contacted at email: a.suriansyah@ulm.ac.id.

Aslamiah is a senior Professor of researcher in undergraduate of Elementary School Teacher Education Department, Master and Doctoral Program of Management Education Department, Graduate School, Universitas Lambung Mangkurat Indonesia. Her research focuses on leadership management, transformational leadership, character education, education in primary school, digital transformation, and learning strategy. She can be contacted at email: aslamiah@ulm.ac.id.

Article submitted 2023-01-21. Resubmitted 2023-03-09. Final acceptance 2023-03-09. Final version published as submitted by the authors.