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A needs analysis on the utilization of learning management systems as blended learning media in elementary school

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Abstract

In Indonesia, educational activities have shifted to home-based learning after the COVID-19 epidemic broke out. Consequently, digital learning has become a necessary option for many teachers. This study aims to understand teachers' experiences, digital platform mastery, digital-based learning pedagogy and the role of parents in learning at home in implementing the teaching process using learning management system-based blended learning media during the COVID-19 epidemic. A questionnaire was used in this study to gather data on the experiences of the teachers, parents' participation in home learning during COVID-19, the digital pedagogy and the mastery of digital platforms using a qualitative approach. This study involved 16 students' parents and 96 elementary school teachers. The data was analyzed using NVivo Pro software. The testing of data validity was carried out through data triangulation. Results of this recent study revealed that based on their experience, teachers still used videos as the main teaching material in digital learning and they carried out the learning assessment process using digital platforms. This was impacted by the process of changing from distant learning to the new normal. Additionally, the selection of digital media was carried out by considering media effectiveness, the learning process, available facilities and digital literacy. Moreover, parents not only provided learning facilities at home but were also more active as facilitators and supervisors during the learning process at home. This study contributes to provide some considerations for mathematics teachers in designing learning management system-based blended learning media in elementary schools during the COVID-19 epidemic.

Keywords: Blended learning, COVID-19 pandemic, Elementary school, LMS, Role of parents.

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Contents

Contribution of this paper to the literature

The current study focuses on the design of LMS-based blended learning media in elementary school. This study clearly demonstrates the necessity of creating learning management systems (LMS) for elementary school students as well as the roles that parents, teachers and students play.

1. Introduction

Learning digitalization had become an ongoing issue before the pandemic happened because the quality of education in Indonesia was considered to be progressing slowly and an improvement was deemed necessary. In Indonesia, measurements of education quality are often linked to data from surveys of student learning outcomes as seen in various international tests. During 15 years of participating in the Program for International Student Assessment (PISA), Indonesia's position has yet to reach a higher level. In addition, equal access to education is also another issue that the country needs to address. Disparities in the quality of education are still found in various regions and schools. The PISA survey data analysis reveals new issues as it indicates that educational disparity happens not between students within schools but rather between different schools (Li, Li, Nan, Jia, & Liu, 2020). Two years of online learning have had an impact on student learning processes and outcomes specifically for elementary school students. According to Chua and Islam (2021), many children reported learning loss and found online learning to be dull during COVID-19. In the case of learning from home, class time is limited to thirty minutes and students are expected to attend class twice a week for in-person instruction and work submission. The duration of onsite learning is 120 minutes (2 hours). In addition, student learning outcomes during the pandemic decreased because learning time was limited and students needed even more time to adjust to online learning. Learning activities during the pandemic also had a negative impact on teachers. Although the average level of emotional exhaustion is moderate, more than 20% of teachers and 15% of school principals report high levels of emotional exhaustion. In addition, the majority of educators and principals report feeling stressed and believes that the epidemic poses a serious threat to life. The relationships between teacher stress and health, career retention, instructional quality and the achievements of students were especially concerning (Klusmann et al., 2023). In addition, severe tiredness is experienced by students when learning at home. However, students who learn using e-learning experience low-stress levels. Students still feel bored while they are learning at home (Sulaiman, Mahomed, Rahman, & Hassan, 2023). Blended learning is a way to reduce the negative impacts of online learning and prevent students from continuously losing knowledge. Blended learning is an innovative concept that incorporates the strength of both conservative teachings in the classroom and ICT supported learning by combining both offline and online learning (Sánchez-Ruiz, Moll-López, Nuñez-Pérez, Moraño-Fernández, & Vega-Fleitas, 2023). However, blended learning poses similar problems as online learning such as students tend to find it difficult to stay focused on materials delivered online, students lack interest in the material presented, students find the lesson tedious and they are unable to fully participate in the learning activities (Ramalingam, Yunus, & Hashim, 2022). In addition, effective learning does not always happen. Students who don't consistently attend class demonstrate a lack of parental support which affects their participation (Amelia & Harmaini, 2020). The need for blended learning becomes critical as the new normal of the learning process is applied post-pandemic. The development of various digital applications that support distance learning, such as Zoom, Google Form, Quizizz and others has resulted in a trend in the studies of the effectiveness of mixed learning or blended. Many experts have developed a Learning Management System (LMS) that is either integrated into one website or separated into different links. A few researchers such as Santos, Durano, and Hortillosa (2023) and Elmunsyah, Nafalski, Wibawa, and Dwiyanto (2023) claimed that LMS can be interpreted as a framework that handles aspects of learning comprehensively. LMS enables and delivers instructional content, identifies and assesses individual and organizational learning or training goals, tracks progress towards fulfilling those goals and shows data for supervising an organization's overall learning process (Ahmad, Elias, Sahari, & Mohamed, 2023; Furqon, Sinaga, Liliasari, & Riza, 2023). During online learning, LMS encourages teachers and students to be active in the learning process (Elmunsyah et al., 2023). Blended learning not only supports both teachers and learners but also encourages students to think creatively and actively throughout their at-home study (Shakeel, Al Mamun, & Haolader, 2023).

Numerous studies have examined learning media based on blended learning approaches throughout the COVID-19 epidemic. Some studies focus on designing learning media for higher education students (Chua & Islam, 2021; Razali, Sulaiman, & Ayub, 2022). The learning media for higher education students is designed for some scientific fields such as management (Li et al., 2020), English education (Amelia & Harmaini, 2020; Ramalingam et al., 2022)and theology (Stanislaus & Lee, 2021). Moreover, Erlina, Prayekti, and Wicaksono (2022) specifically studied the design of blended learning approach-based learning media for atomic physics course. Additionally, Musdalifah, Baharuddin, Jabri, Elihami, and Mustakim (2021) designed blended learning approach-based learning media for Islamic education course. In contrast, this current study focuses on the design of LMS-based blended learning media in elementary school. Therefore, this recent study aims to provide some considerations through a needs analysis for mathematics teacher and lecturer in designing LMS-based blended learning media for elementary students during the COVID-19 epidemic. This study clearly demonstrates the necessity of creating learning management systems (LMS) for elementary school students as well as the roles that parents, teachers and students play.

2. Literature Review

2.1. Blended Learning

Blended learning refers to the simultaneous use of offline and online learning within a single learning process. Blended learning has gained prominence in Indonesia due to the COVID-19 epidemic which has restricted students' regular attendance at school. Blended learning requires teachers and students' digital technology skills. The frequency or variety of digital technology used in classrooms is insufficient for the devices that schools provide. It depends on how well-adjusted they are with technology (Sailer, Murböck, & Fischer, 2021). Numerous studies demonstrate the value of blended learning during pandemic (Jacqueline, Gumallaoi, Villanueva, & Sad-Ayan -Lacambra, 2022; Kamble, Hassan, Mishra, & Asnate-Salazar, 2022; Lin, Chen, & Liu, 2017).

2.2. Learning Management System

Education is the right of every child. Teachers as professionals must carry out learning properly and effectively. Teaching's main objective is to encourage learning, yet the extent to which the teacher may be considered responsible for the students' learning is limited. The questions lie in how we construct the relationship between teaching and learning (Bray, Girvan, & Chorcora, 2023). Accelerating the digitization of education is necessary for reestablishing learning throughout the epidemic, enabling students to attend class but also study online.

The term "online learning" or "e-learning" refers to the use of contemporary internet multimedia technologies to enhance the quality of learning by enabling exchanges and online cooperation in addition to providing access to resources and services (Khaldi, Bouzidi, & Nader, 2023). In particular, e-learning refers to making education accessible to everyone with an internet connection which is completely at variance with the conventional methods of acquiring and sharing knowledge (Kassianos, Plackett, Kambouri, & Sheringham, 2023). E-learning is an innovative form of instruction that implements virtual learning by using the internet (Ke et al., 2023). Moreover, it is carried out synchronously or asynchronously depending on the learning scenario that is prepared (Navío-Marco, Sánchez-Figueroa, & Galán, 2023). The obstacles and solutions provided by e-learning and blended learning also show that respondents understand the basic needs to apply these two learning models (Jaya & Suparman, 2021).

2.3. Parental Involvement in Online Learning at Home

Parents serve as their children's primary learning facilitators due to the epidemic's use of online education. Parents recognised the necessity of closing all schools during this epidemic. Additionally, they enthusiastically support the government's planned strategy to let children finish their education at home by implementing other modes of instruction during and after the lockdown. Online learning increases the family's financial burden because of the increased usage of electricity while distance learning decreases the family's spending priority in terms of the child's daily allowance (Alharthi, 2023). On the other hand, students find it difficult to complete assignments during power outages since they frequently lose connectivity causing them to quit the online session. In addition, parents and children struggle with their own personal issues such as stress, health issues and social interactions (Agaton & Cueto, 2021; Bhamani et al., 2020). Parental involvement is often focused on the involvement of parents at home and usually involves their behavior towards the educational progress of their children (Tan, Pan, Zhang, Lan, & Law, 2022). Parents' perceptions of distance learning were mixed. It was challenging to find a strong statement between agreeing and disagreeing like and dislike. Parents generally do not have negative views or resistance to distance learning but this is unexpected, new, burdensome and forces them to adjust quickly (Suparman & Juandi, 2022). On the other hand, the relationship between children and parents becomes stronger due to the time spent together during distance learning (Bhamani et al., 2020).

3. Method

This study used a qualitative methodology and was descriptive in nature. This design and approach were applied to provide a need analysis for mathematics teachers and lecturers as well as several considerations in designing LMS-based blended learning media in elementary school during the pandemic. Consequently, the qualitative method was used to give some in-depth requirements analyses on the development of blended learning materials based on LMSs in the context of the COVID-19 pandemic (Creswell & Creswell, 2018). This study involved 16 students' parents and 96 elementary teachers distributed in eight cities in Indonesia whereby each city delegated two parents and twelve teachers. They were selected using non-probability sampling specifically purposive sampling and they were also representative participants (Andrade, 2021). The questionnaire consisting of some open questions related to teachers' experience, digital platform mastery and digital-based learning pedagogy was used as an instrument to collect the data. Moreover, the questionnaire which contained several open questions regarding parental role in online learning at home was also used as an instrument to collect the data. The instruments had been validated theoretically by three experts who focused on educational technology, pedagogy and educational psychology.

Additionally, the instruments had been validated empirically whereby they were tested with a group of students' parents and also with a group of elementary teachers. The validity test on these instruments showed that the instruments had been valid. Moreover, reliability tests on these instruments revealed that the reliability value of the instrument regarding teachers' questionnaire was 0.816 and the reliability value of the instrument related to parental role's questionnaire was 0.714. These show that the instruments related to teachers' experience, digital platform mastery, digital-based learning pedagogy and parental role in online learning at home during COVID-19 have been reliable and eligible to be used. The data collection was conducted by distributing the questionnaire to the participants online using Google Forms. Furthermore, the data obtained were qualitatively analyzed using the NVivo Pro software. The steps for data analysis consisted of systematically compiling the obtained data, classifying the data by coding (codes and nodes), presenting the data, drawing conclusions and verifying the conclusions (Maguire & Delahunt, 2017).

4. Results and Discussion

4.1. The Use of Learning Management Systems

The data analysis's findings revealed that teachers used some websites and applications (see Figure 1).

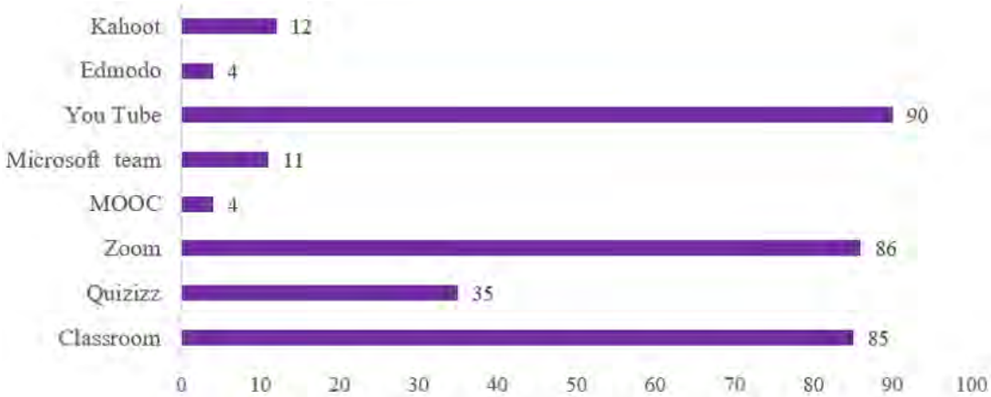

Figure 1. The distribution of applications used by teachers in online learning during the pandemic.

According to the Ministry of Education and Culture, the learning process focused on using instructional materials, namely films (see Figure 1). This means that instructional videos are considered more interesting than other forms of content. The survey results show that the students were more interested in videos with a short duration which ranges from 1 to 5 minutes. Some teachers also conducted limited face-to-face meetings virtually (through Zoom or Google Meet). Class management was also conducted on a limited basis through Google Classroom. However, the use of applications for assessment (Quizziz and Kahoot) was still low as formative assessments are difficult to do in e-learning. The same problem was mentioned in many studies related to the use of the classroom. Teachers in Trenggalek (Java) and Bantaeng (Celebes) conducted flipped classrooms with students. However, they did not go very well. The habit of seeking independent learning resources was not a common practice among both students and teachers. In fact, students are still waiting for the teacher to explain the material in class (Li et al., 2020).

Teachers have used plenty of best practices for online learning despite abrupt changes to the process (see Figure 2).

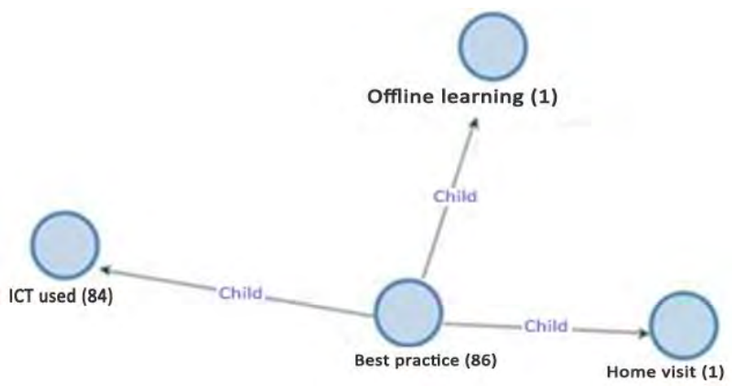

Figure 2. Best practices for distance learning due to the pandemic.

When distance learning was carried out, almost all teachers carried it out online. Obtained data show that only one teacher taught offline and one teacher performed a home visit. Meanwhile, teachers who used technology as a learning medium accounted for 84 respondents. The use of technology in the learning process was done in various ways such as through virtual communication (25 respondents), conducting online assessments (6 respondents), implementing digital learning processes (42 respondents) and using e-rapport (1 respondent). Implementation of distance learning using technology eases teachers ability to deliver learning material (Helsa, Juandi, & Ghazali, 2023; Suparman et al., 2022). Technology use encourages students to study as it offers a variation from traditional instruction (Sulaiman et al., 2023). Distance learning helps students and teachers improve their digital literacy.

An integrated learning management system (LMS) is required to support the transition to online learning and enable learning management. Ahmad et al. (2023) stated that LMS provides more constructivist-based instruction, focuses on flexible, learner-defined goals and encourages collaborative learning inside and outside of the school in order to expand the learning environment to the home and involve parents more completely. Moreover, it better addresses personalized assessment and truly becomes systemic. Additionally, it enhances support for professional diagnosis and development for stakeholders including teachers, increases cost-effectiveness and leverage of current resources available in schools and LMS and easily integrates systems to enable improved collaboration among stakeholders and across systems.

The LMS currently being developed has many potentials such as being easy to use, having renewable educational content, being easy to use for assessment, not time-consuming and costly and being interactive as well as communicative (Ahmad et al., 2023; Furqon et al., 2023). Teachers mention that LMS helps teachers during distance learning but parental supervision is low on children's learning processes especially when there are technical problems. Sulaiman et al. (2023) explained that building an LMS is challenging because it must be able to provide real-time access to teachers and students in the form of teaching materials, classroom information and schedules.

4.2. Changes in Distance Learning towards the New Normal of Learning

Teachers prepared themselves to shift from home learning to the new standard of education when the epidemic decreased and schools reopened. Learning in the new normal era requires quick adapting such as setting the learning hours and implementing health protocols. The new normal era requires several new learning systems as it combines face-to-face and virtual learning (Liesveld, Petrovic, & Grohman, 2023; Zine et al., 2023). Several factors that teachers needed to consider included problems faced by teachers (40 respondents), students' enthusiasm for welcoming the new normal of learning (7 respondents), learning strategies prepared by teachers in the new normal of learning (62 respondents) and students' learning habits (37 respondents) (see Figure 3).

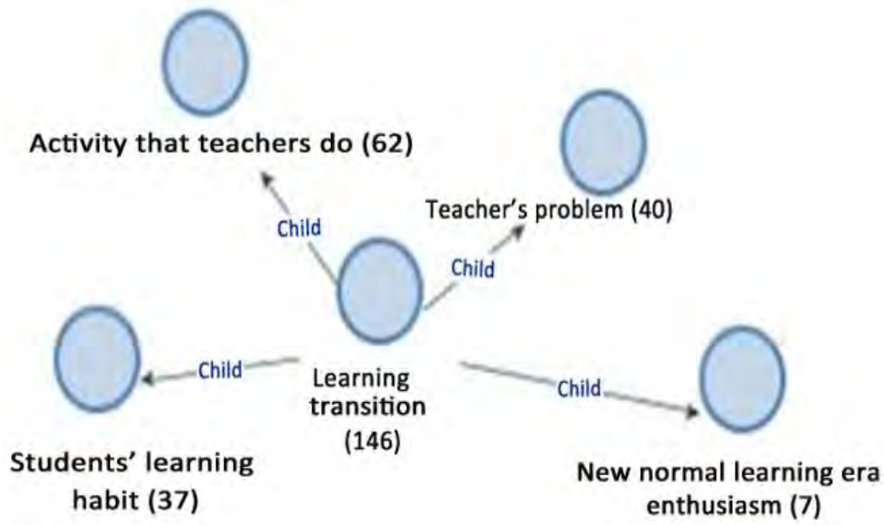

Figure 3. Factors considered during the transition from distance learning to the new normal era.

Most teachers stated that they had difficulties rebuilding blended learning after two years of implementing online learning. Difficulties faced by teachers included adjusting to students' behavior, children's being accustomed to studying at home, children's being accustomed to learning on their own, teachers not used to apply IT to online learning, lack of students' interest in learning, low learning motivation changes in learning from online to face-to-face, children's spending most of their time of playing, teachers having difficulty with engagement as students usually play with their gadgets during online learning, encouraging students' learning engagement and shaping the children's behavior. The same situation also happened in Karanganyar in which students were examined by open book and multiple choices test which researchers thought was not effective (Yuliyana, Rochmiyati, & Maulina, 2021). Teachers finally struggle with how to teach students to provide interesting classes (5 respondents), adapt to creative learning models (6 respondents) and instill discipline and good behaviour (16 respondents) as a result of the aforementioned challenges. Moreover, as learning loss becomes inevitable, teachers must choose interesting media that foster students' interest (15 respondents), re-explain essential materials before moving on to the next material (3 respondents) and improve students' motivation (11 respondents).In the new normal, teachers and students are excited about learning because students have more freedom to select what they want to study (3 respondents) because they believe this to be more successful than relying only on online instruction (3 respondents). Similarly, Lin et al. (2017) explained that teachers face a dilemma while conducting blended learning. Schools facilitated the needs of teachers both in terms of providing hardware and software to reduce teachers' anxiety while implementing digital learning. Besides encouraging teachers, schools also provide teachers with resources to various professional community organizations that promote digital learning. Schools realize that building effective digital learning must start with the teachers themselves.

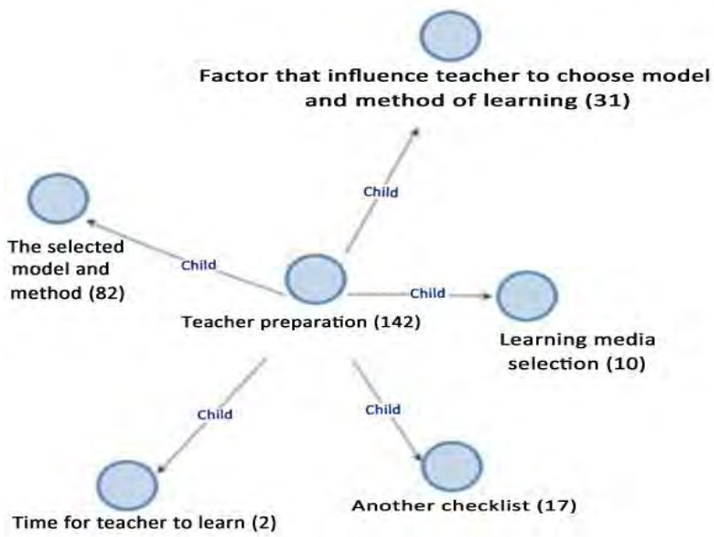

Figure 4. Teachers' classroom preparation before the new normal learning begins.

Teachers need to prepare for an effective new normal of learning as shown in Figure 4. Several factors influence teachers in choosing learning methods in the new normal era. These factors include appropriate learning preparation (13 respondents), learning adjustments (14 respondents), the implementation of diagnostic assessments (2 respondents) as well as facilities and infrastructure that support the learning process (2 respondents). In addition, the selection of learning media is also a concern for every teacher in the new normal era. Teachers from many schools use methods that are quite varied from one another. Some teachers used innovative and fun methods (44 respondents) and they took a persuasive approach to students (2 respondents). However, some teachers applied a more individualistic approach (2 respondents) because health protocols restrict the implementation of the new normal of learning. Five respondents stated that learning was in the form of blended learning. Teacher's digital learning skills become the fundamental requirement to adopt digital learning in the class (Radkowitsch, Vogel, & Fischer, 2020). On the other hand, motivation and quality of technology integration also support how teachers prepare blended learning (Backfisch, Lachner, Stürmer, & Scheiter, 2021).

In this process, the teacher experienced difficulties in improving motivation and understanding students' behavior. Some teachers mentioned that during the face-to-face meetings, the teacher re-explained the material from the previous meeting because the students did not understand the prerequisite material for studying the current lesson. Moreover, the data presented by Li et al. (2020) criticize the implementation of blended learning. One of the criticisms of digital-based learning is the lack of personalized interaction between teachers and students compared to conventional face-to-face learning. Teachers and parents continue to value the relationships that develop between students and teachers in the classroom because they are indispensable and strongly believe in the value of interaction-based learning. This is in line with the results of a survey conducted on adolescents in America which showed that 84% of students preferred face-to-face classroom interaction.

Selection of IT media is also the teachers' main problem as teachers need time to get used to the media (2 people) and even attend training for that specific purpose (2 respondents). Imran, Fatima, Salem, and Allil (2023) explained that teachers must be able to manipulate and modify devices and use technology for online learning. It will also support learning flexibility in the new normal of learning. Teachers must prepare themselves in other areas namely building effective rapport with school supervisors and principals (10 respondents), parents (3 respondents) and the students themselves (18 respondents). School leaders who support blended learning have proven to be professionally successful. Indeed, some principals describe significant changes to their practice such as the incorporation of new frameworks for teaching and learning, schedule alterations to allow for more flexible learning and shifts in their approach to professional development. More research should be conducted to better understand the limitations and promise of such professional development approaches (Ng, Ching, & Law, 2023).

4.3. Selecting the Right Technology for Blended Learning

After two years of online learning, students who live in urban areas are familiar with and fluent in using technology as part of their learning tools. Meanwhile, students who live in rural or sub-urban areas still have difficulties in using technology because the system for picking up and delivering assignments to schools is a distance learning model instead of using internet.

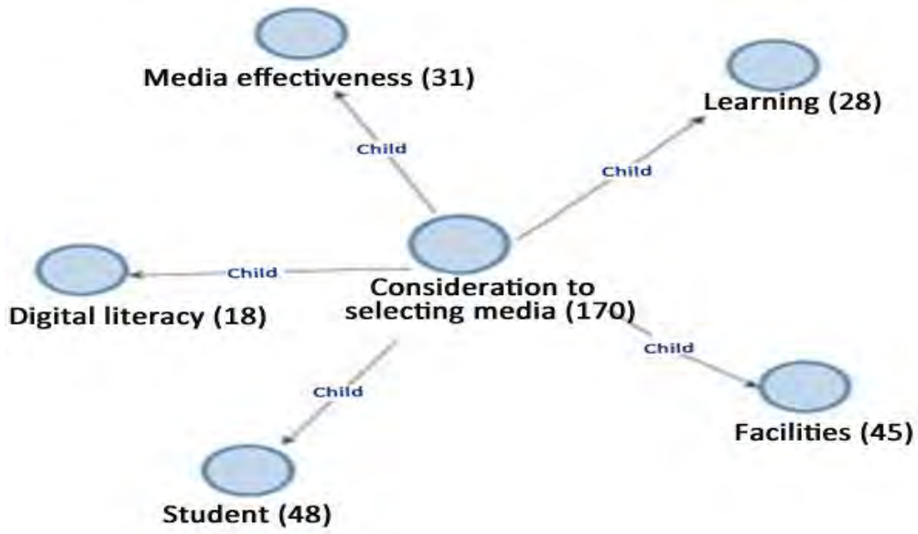

Figure 5. Teacher considerations in selecting media and combining them with learning materials and models.

Figure 5 shows that there are differences between the general learning process and the learning process in the new normal. The new normal of learning takes into account various things before determining tools that can support students. One of the tools is to use technology as a medium in the learning process. Technology is considered the right tool to support learning in the new normal era where blended learning is the norm. The method for selecting appropriate technology for blended learning includes several considerations such as student characteristics (48 respondents), characteristics of learning material (28 respondents), the effectiveness of media that supports the learning process (31 respondents), the infrastructure and facilities available in schools (45 respondents) and digital literacy (18 respondents).

Some teachers still rely on the convenient use of videos and PowerPoint slides which results in blended learning that does not involve students in the process because these two media are the most popular for use during online learning and the interesting designs of these two media become the main reason for this selection. It was explained that design and technology activity is seen as the process of satisfying needs by solving practical problems that involve pupils working with a variety of materials. Design and technology are regarded as

foundational subjects in the national curriculum. It is currently required in every elementary school classroom. This paper focuses on the processes, design and technology activities and creative methods that require students to solve real-world issues in meaningful contexts that are adapted to their skills and experiences. At the time of writing this book the statutory orders for English, mathematics, science, history, geography and art demand that teachers address thirty-two attainment targets for Key Stage 1 (age 3–7) students and thirty-three for Key Stage 2 (ages 7–11). These requirements do not take into account other areas of learning that teachers are also required to plan for including human and social, and moral considerations. Teachers will still have to provide a broad and balanced curriculum.

Implementation of digital-based learning in the new normal era poses various advantages for both teachers and students (see Figure 6).

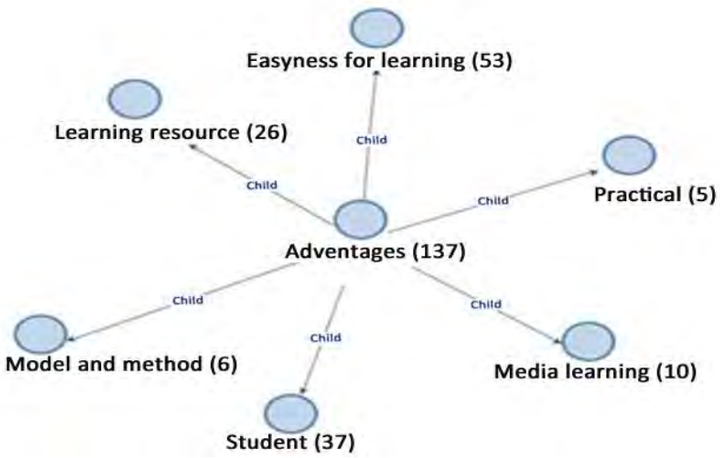

Figure 6. The feasibility of digital platforms.

These advantages include ease of obtaining learning materials (26 respondents), ease of encouraging students' engagement (37 respondents), ease of use of technology-based methods and models (6 respondents), more efficient learning (53 respondents), the possibility of creating innovative media (10 respondents) and practicality (5 respondents). Digital learning is convenient for both teachers and students as it provides an opportunity for each teacher to teach the material in two ways to help students learn better. In addition, teachers and students also increase their technology-related teaching skills. Sailer et al. (2021) explained that including technology-related teaching abilities in teaching and continuing education appears to be a technique to boost the likelihood of students engaging in constructive digital learning activities. This is especially significant because teachers' technology-related teaching skills appear to be significantly less developed than their basic digital skills.

The use of technology in the classroom is an innovation in the field of education and functions as a preventive measure to overcome the challenges of the COVID-19 pandemic. Blended learning is advantageous not just for its convenience but also for the evolving post-pandemic classroom environment. Lin et al. (2017) argued that digital learning improves students learning performance. Teachers match the class to make appropriate use of teaching methodologies, adapt to the classroom environment and build a learning environment for students to gladly use digital learning so that students fearlessly submit questions in the discussion and improve online interactive learning with teachers. Integrating digital learning into classroom instruction benefits students and teachers in many ways.

However, there are also some weaknesses in the use of digital media especially in Indonesia, namely lack of digital literacy, the school curriculum that does not support the use of technology, lack of facilities and infrastructure that support digital learning (see Figure 7).

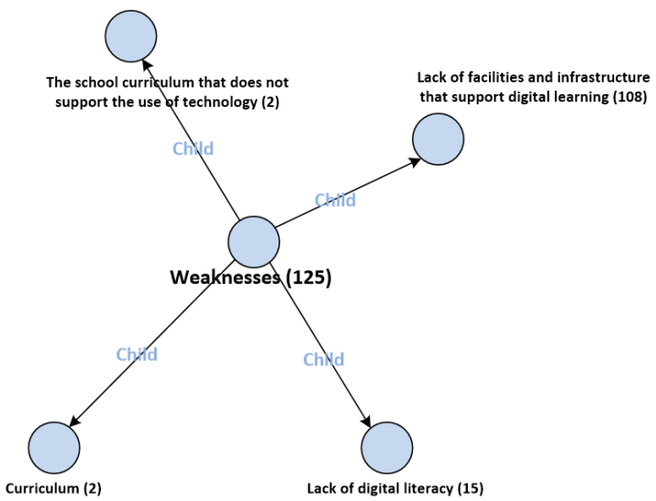

Figure 7. Weaknesses in implementing digital-based learning.

These weaknesses are in line with the opinion of Serkina, Vobolevich, Petunina, and Zakharova (2023) that inadequate infrastructure for implementing e-learning with other models is one reason why learning that is commonly applied by teachers is a blended learning model, even though it also uses online learning applications. Furthermore, Backfisch et al. (2021) stated that from a teacher education perspective, teachers have to be aware of

the influence of contextual aspects such as their motivation as well as the quality and quantity of their technology integration.

4.4. The Role of Parents in Blended Learning

The conscious presence of parents during blended learning becomes necessary since supervision during distance learning is part of the parental task (see Figure 8). Parents have a critical role in helping their children learn and provide ICT instructions to their children. Moreover, parents should communicate regularly with the teachers and support learning programs developed by their children's teachers at schools because during online learning, the process of supervising learning directly becomes part of the parents' duties. Many parents do not understand how to supervise their children's learning at home or even consider it easier to do their children's assignments themselves. Therefore, the support of parents as facilitators of children's learning is highly expected by teachers during blended learning. Aside from being supervisors and facilitators for their children's learning, parents are also expected to accompany their children while they are using technological tools (such as laptops and smartphones) as learning media for more focused and effective blended learning.

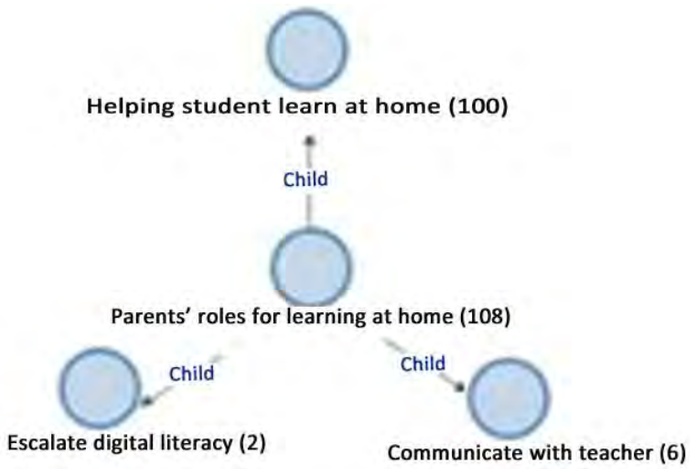

Figure 8. The role of parents in learning at home.

Some literature suggests that there are six factors that need to be considered before building an LMS: pedagogical factors, learning environment, learning tools and media, learning design and curriculum, administrative tools and technical specifications (Aguagallo et al., 2023; Fuadi, Suparman, Juandi, & Avip, 2021; Sondakh, Asaloei, & Werang, 2023; Turnbull, Chugh, & Luck, 2023; Yunita, Juandi, Hasanah, & Suparman, 2022). However, the role of parents has not been included in the use of LMS because LMS only considers the two-ways process of learning which is between teachers and students. Meanwhile, research indicates that parents should supervise their children while they are using devices for purposes other than learning as well as provide guidance and instructions when their children are studying at home.

5. Conclusion and Implication

The discussion leads to the conclusion that online tools can facilitate evaluation in addition to learning. Teachers provide some material, student worksheets and assessments based on an online quiz. Transitioning from distance learning to the new normal, teachers experience many difficulties, not just low student motivation as they are used to studying from home but also the problems of readjusting lesson plans and student behavior to onsite learning. It relates to teacher stress because of the burden and the impact of the learning process. Several factors are taken into consideration by teachers in choosing media and combining it with learning materials and models, namely the effectiveness of the media, the learning material, the availability of facilities and infrastructure and the digital literacy of both students and teachers. The use of digital media provides practical conveniences such as easy-to-obtain teaching materials, ease of learning for teachers and students, practical reasons and ease of use of media. However, there are also several weaknesses, namely teachers' readiness to prepare for learning, limited infrastructure available both at home and at school, a lack of digital literacy and support from the curriculum regarding the standardization of how the learning process should be conducted.

The role of parents becomes essential in blended learning. Parents whose children participated in blended learning should be able to educate, guide and supervise their children's learning. This has not been facilitated by existing models and LMS. Therefore, a learning management system that not only facilitates students and teachers in the distance learning process but also supports the role of parents as teacher partners in educating their children at home becomes crucial to achieve an effective and successful blended learning. Thus, this need analysis is proposed as considerations for mathematics teachers and lecturers in preparing and designing LMS-based blended learning media in elementary school during the pandemic.

This study also identifies the suggested procedure for organizing the educational process. Students can thereby achieve the same learning goals as those who learn without restrictions due to the COVID-19 epidemic. Moreover, this study will contribute to students' mathematics achievement, mathematics literacy and 21st century learning skills.

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