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Implementation of iPad-based digital classroom services at al Azhar Islamic school 21 Solo Baru, Central Java, Indonesia

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ABSTRACT

The need for digital innovation in the educational paradigm is increasingly clear after the Covid-19 phenomenon. This has also been strengthened by government policies in responding to this need, by launching "kurikulum merdeka" that demands the use of "merdeka mengajar" platform with all its characteristics. The concept of digital learning with a variety of devices is offered. SMP Islam Al Azhar 21 Solo Baru has implemented a program that is quite progressive in an effort to find an education digitalization system. It is in the form of digital class services, which can be used as an option for students and parents to carry out all digital-based and e-learning activities. Furthermore, the digital system used is relatively new and not many are used in Indonesia. The use of iPad 1:1 (every 1 student uses 1 iPad) as the main device with various Apple for education applications integrated in it. Regarding to this implementation, there is an interest from the researcher for further research related to its implementation. This type of research is descriptive qualitative which reports on how the school's role in implementing iPad and its functions and contributions to classroom learning. The description regarding this matter was developed based on the results of semi-structured interviews and non-participant observations to see how this implementation could be carried out. Student group interviews were also used to support the findings. The result is an overview of the iPad-based digital classroom implementation starting from the initial ideas, the stages and steps of implementation, the perceptions of students and teachers, and the evaluation of those implementation. On the other hand, the main challenge lies in the relatively high budget requirements, and parents' doubts about the bad consequences of excessive iPad use, both in terms of health and social behavior.

Introduction

The use of developing information and communication technology for learning has become widely applied in various educational institutions, especially since the Covid-19 pandemic hit

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and had a significant impact on various aspects of life. This has made information and communication technology increasingly important, and online learning methods or e-learning have replaced conventional learning. The Internet of Things (IoT) has become a basic need for society at all levels. The Internet of Things (IoT) in digital schools refers to the integration of connected devices and technologies within educational institutions to enhance the learning experience and streamline various administrative processes. IoT enables the interconnectivity and data exchange between physical devices, allowing them to collect, analyze, and share information (Chander *et al*., 2022).

Cambridge International has revealed the results of an online survey of nearly 20,000 teachers and students (aged 12-19) from 100 countries, which shows that the use of technology in schools around the world continues to increase. The results indicate that 48% of students use desktop computers in class, 42% use smartphones, 33% use interactive whiteboards, and 20% use tablets. However, other findings show that the percentage is still high for the use of conventional means, such as pen and paper (90%), as well as blackboards (73%) (Mulyani, 2018). Meanwhile, the Ministry of Education and Culture (Kemendikbud) has stated that the application of technology in the education sector is still lagging behind compared to other fields. One of the obstacles is that teacher competence is still low (Suyatno *et al*., 2023). Furthermore, it has been stated that low teacher competence in the field of technology is one of the reasons for the limited application of technology in the education sector. Additionally, schools and educational institutions have yet to prioritize the systematic application of technology (Benavides et al., 2020).

It is anticipated that educational innovation will contribute to raising educational standards and addressing the problems with digital learning around the world (Popkova *et al*., 2022). Minister of Education and Culture, Nadiem Anwar Makarim, issued Circular Number 4 of 2020 concerning the Implementation of Education during the Covid-19 Emergency. One of the policies concerns the implementation of home-based learning, which requires new adaptations. As a result of this policy, schools have started to use several E-learning applications as an alternative to conventional learning methods (Sitamala & Danial, 2022). The lack of appropriate media and equipment cannot solely be attributed to the students or the teachers. It is due to the suboptimal application of technology, and the absence of effective systems to regulate and provide solutions to all existing problems. According to Muslim (2021), school principals must be able to identify opportunities to apply adaptive and relevant technological innovations, especially in the realm of education, and align them with their leadership vision. One way to achieve this is by deepening their insights into the concept of digital technology application in education and by continuing to provide exemplary leadership

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and motivation to all teachers and stakeholders regarding its importance.

Learning media plays an important role in supporting the achievement of learning objectives (Wardoyo *et al*., 2021). Whether during the Covid-19 pandemic or when the situation has returned to normal, the use of appropriate and varied learning media in the learning process can increase students' motivation and reduce their passivity (Ramli *et al*., 2018). The development of technology causes changes that must be aligned with the current learning development model. Today's technology introduces learning models that reduce the use of paper, books, and conventional teaching aids such as maps. Thus, supporting tools for the learning model such as computers, laptops, smartphones, and other gadgets are necessities that must be owned by everyone, including teachers and students (Beauchamp & Hillier, 2013). Therefore, it is necessary to have a role model in implementing digitalization of education that can answer existing problems. One of them is educational innovation based on digital class services (Kong, 2014). The most important element that needs to be considered in implementing a digital class is the use of portable devices such as laptops, computers, tablets, or smartphones that can be used to access the internet anytime and anywhere (Gikas & Grant, 2013). Not only that, each device used has various characteristics that need to be adapted to the needs of the school. The development of various digital applications is currently starting to offer various learning support services.

Research conducted by Melati (2017), obtained the result that in their daily activities, SMPN 1 Surakarta students use cellphones starting from grade 7, 8, and 9, and many of them also use cellphones that are connected to the internet. The features used include chatting (WhatsApp, Line), social media, browsers, YouTube, games, and Edmodo. From the use of mobile phones, it turns out to have an impact on students, both positive and negative impacts. The positive impact is that it facilitates communication, makes it easier to obtain information, and makes students or teachers more creative. While the negative impacts are dependence on mobile phones, waste, being lazy, juvenile delinquency, and indifference. The use of mobile phones in learning provides limitations for students, especially in several aspects. Not all students use cellphones with the same specifications, so that will affect the system to be implemented. Also, the cross-section of the cellphone screen is relatively small, so it will be difficult for some students to read material or carry out other digital activities. Another problem is that there is no system that can provide supervision of these devices. So it is not uncommon for students to misuse these devices to access things that are not in accordance with learning (Flavin, 2017).

Previous research conducted by Abidah *et al*. (2020), discussed the causes of a lack of understanding of digital technology usage in learning. As the use of technology has not yet

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become a habit in education, various problems have arisen, leaving many educational institutions confused about the concept of digitizing learning. On one hand, schools must be able to quickly adapt to the demands of the times, but on the other hand, they do not want to be trapped in unproductive policies. Problems can arise due to a lack of innovative leadership among school principals in formulating digital concepts, slow-moving teachers who are hesitant to leave their comfort zones, and difficulties faced by students and parents, which add to the anxiety of stakeholders regarding which system and model to apply (Nasirun & Yulisdeni, 2020). Much research has been conducted on the implementation of digital-based education, but most of it only focuses on the positive and negative impacts (Pegrum *et al*., 2013). However, in terms of the technical implementation and the details of the equipment used, not much research has been conducted on the implementation of digital-based education. This research gap highlights the need for further research that specifically explores the concept of implementing digitalization in education.

Al Azhar 21 Solo Baru Islamic Middle School, has implemented a progressive program in its effort to find an education digitalization system. The program is in the form of digital class services that students and parents can use as an option to carry out digital-based and e-learning activities. Moreover, the digital system used is relatively new and not widely used in Indonesia, namely the use of iPad 1:1 (one iPad per student) as the main device, with various Apple for education applications integrated into it. This choice of platform is interesting for further research regarding its implementation, specifically the advantages and privileges it offers, as well as the problems and constraints it faces. Thus, it can be recommended or further developed for all parties interested in implementing the latest Apple iPad-based technology to improve the quality of schools and education.

Method

The types of data used in this study are qualitative data and quantitative data. Qualitative data were obtained through interviews and direct observation. The interviews were conducted in a semi-structured manner, using this technique to facilitate informants in conveying information more easily and naturally without creating a formal impression (Henriksen *et al*., 2022). The quantitative data include information on the enrollment of new students who join the digital class program. This data is used to assist researchers in analyzing student participation in digital class programs. The purpose of this study is to gain a comprehensive understanding of digital school programs, digital-based learning events, learning activities in digital spaces, the process of interaction between teachers and students in learning in digital classes. Using both qualitative and quantitative research methods, this study aims to collect

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and analyze relevant data to draw meaningful conclusions and insights (Donaires *et al*., 2023).

Based on this understanding, this study investigates the implementation of digital class services at Al Azhar 21 Islamic Middle School Solo Baru and the impacts that arise from this policy. The research was conducted in May 2023 at Al Azhar 21 Islamic Middle School, Solo Baru, Sukoharjo, located at Jl. Raya Solo Baru-Baki, Kudu Baki Sukoharjo, Central Java. Various methods of data collection are used, including observation, interviews, documentation, and literature review. The collected data is then analyzed to describe the situation and to investigate how schools adopt digital technology in their learning processes. The researchers made classroom observations, conducted interviews with students and teaching staff, examined school programs and policies, analyzed data on the use of digital technology, as well as student learning outcomes. By studying this research object, researchers can provide valuable recommendations for schools and related stakeholders to enhance the implementation of digital classroom services.

The quantitative data analysis step is carried out by first defining the variables associated with the use of digital technology. This can include variables such as the frequency with which digital technology is used and the type of digital tools used. Data in the form of student participation in digital classes were analyzed using descriptive analysis, which started by summarizing and describing the data using descriptive statistics. The number of students enrolled in digital classes was calculated to understand the overall distribution and central trend of the data on students enrolled in digital classes. The qualitative data is analyzed using thematic analysis techniques, which is done by first identifying general themes or patterns related to the use of digital technology and student learning outcomes. The results of the interview transcripts were used to identify key ideas, perspectives, and experiences. Categorize and code data to develop themes that provide insight into the relationship between digital technologies and student learning outcomes.

Results and Discussion

Based on the results of research conducted through document analysis and field observations, Al Azhar 21 Solo Baru Islamic Middle School has a total of 13 study groups or classes. These services are categorized into bilingual classes, digital bilingual classes, digital classes, tahfizh classes, and digital tahfizh classes. The current number of students is 353, with 40 teachers and staff. The school's organizational structure consists of a principal as the top leader, assisted by a vice principal. The functions underneath include the field coordinator, which comprises the curriculum coordinator, student coordinator, school resilience coordinator, public relations coordinator, religious coordinator, tahfizh coordinator, and

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infrastructure and facilities coordinator.

Having reached its 15th year in school management (Al Azhar 21 Islamic Middle School Solo Baru was founded in 2008), the high level of parental trust in the education provided by the school is evident. This is shown by the increase in new student admissions after the digital class program was introduced, see Table 1, although it has decreased slightly in the last 2 years due to the Covid-19 pandemic. The digital class services are presented as one of the school's branding efforts to attract prospective students, especially those from elementary schools such as SD Al Azhar 28 Solo Baru. One of the promotional concepts involves inviting new grade 6 students from SD Al Azhar 28 Solo to participate in a trial class program, and the digital class program has generated the most interest. This is supported by the school's academic and non-academic achievements, which have made it highly regarded by the local community in Solo Raya.

Table.1 New Student Enrollment Data at Al Azhar 21 Solo Baru Islamic Middle School

Year	*Total number of students*	*Information*	*Class Service Program*	*New Student Admission Progress*
2015/2016	252	Kelas VII, VIII dan IX	Bilingual dan regular	Meningkat
2016/2017	245	Kelas VII, VIII dan IX	Bilingual dan regular	Menurun
2017/2018	281	Kelas VII, VIII dan IX	Bilingual, Digital, dan reguler	Meningkat
2018/2019	323	Kelas VII, VIII dan IX	Bilingual, Digital, dan reguler	Meningkat
2019/2020	356	Kelas VII, VIII dan IX	Bilingual, Digital, Tahfizh	Meningkat
2020/2021	381	Kelas VII, VIII dan IX	Bilingual, Digital, Tahfizh	Meningkat
2021/2022	368	Kelas VII, VIII dan IX	Bilingual, Bilingual digital, tahfizh, Tahfizh Digital	Menurun
2022/2023	353	Kelas VII, VIII dan IX	Bilingual, Bilingual digital, tahfizh, Tahfizh Digital	Menurun

Based on the results of the interviews, it can be seen that the rationale behind the implementation of digital classes at SMP Al Azhar 21 Solo Baru is a policy that has been established by the Al Azhar Jakarta Islamic Boarding School Foundation (YPI). This policy has motivated SMP Al Azhar 21 Solo Baru, as an affiliated school, to develop digital classes that are in line with technological and informational advancements. In addition to keeping up with technological developments, this effort is also aimed at branding the school as modern and innovative. Considering that students in this era are highly engaged with technology, this program is expected to provide added attraction to the community, especially parents and prospective students. Fig. 1 is a brochure and information on new student registration services for SMP Islam Al Azhar 21 Solo Baru.

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Fig 1. Brochure and Class Service Information for SMP Islam Al Azhar 21 Solo Baru

The first step taken by the school principal was to coordinate and brainstorm with the foundation regarding the process of initiating the formation of a digital class and discussing the concepts that would be applied. Then, a team consisting of the principal and several teachers was formed to conduct observations and replicate studies from several schools in Jakarta that had already implemented digital classes, such as Al Azhar 1 Kebayoran Baru Islamic Middle School, Al Azhar 10 Kembangan Islamic Middle School, and Sudirman Jakarta Middle School. Based on the team's observations, it was decided to implement the iPad-based digital class at the beginning of the 2017-2018 school year.

Based on the data from Table 1, initially, the school only opened one digital class service out of three available classes. One digital class can accommodate a maximum of 28 students. Currently, there are three digital-based classes out of five existing classes. The digital class concept that is applied requires the use of 1:1 devices, meaning that each student is assigned one device. While the funding for student iPads can be borne by parents, the iPad used by teachers for teaching involves a special policy from the foundation in its budget approval. This requires the school and foundation to agree and facilitate the provision of similar iPad devices to the teachers for teaching purposes.

The digital class is a new innovation that has been continuously developed by SMP Al Azhar 21 Solo Baru for the past 6 years. Prior to joining digital classes, students are required to take several proficiency tests to assess their technological skills. Students who score below the school's set standard are not allowed to participate in the digital class program. In the following stage, parents are provided with an understanding of the concepts and rules that are specific

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to digital class programs and are required to sign an integrity pact. Apart from special funding for procuring student iPads and management costs, there is also a task of monitoring the use of children's iPads at home.

Why did the school choose iPads for the digital class program? The school principal explained that several studies and observations were conducted to determine the device options that could be used in implementing digital classes. Laptops, cellphones, Android tablets, and even locally-made devices were discussed to reduce operational costs. However, iPads were chosen because they offer many advantages in terms of hardware and software, and they are also suitable for the upper-middle-class segment of parents at SMP Islam Al Azhar 21 Solo Baru. The teacher in charge of the digital program also added that Apple is a popular brand among young people and offers a highly adaptive and high-quality ecosystem. Additionally, the default application, Apple Classroom, is an excellent feature that no other operating system has. This application is very useful for teachers and homeroom teachers to monitor students' iPad usage.

Regarding school management, the procurement of iPads for teachers will be carried out in stages. In the first year, only 4 teachers were provided with iPads by the school due to the high procurement costs. The school then continued to add more teacher iPad facilities in the following year. The school collaborated with an iPad provider vendor and conducted several observations before deciding to work with iBox, a leading Apple Premium Reseller in Indonesia specializing in Apple products and a wide range of complementary accessories, software, and other products. During the collaboration, they agreed on several things, including technical provisions of the iPad, providing training to teachers and students, and warranty service support and servicing in case of iPad damage. Furthermore, the school formed a digital team to prepare for the implementation of digital classes and develop the necessary standard operating procedures. Fig. 2 is documentation of Unboxing and sharing an iPad working with iBox.

Fig 2. Documentation Unboxing and sharing iPad working with iBox

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The interview with Mr. Mukti Hanggara, the teacher in charge of the digital program, revealed the preparatory steps taken to start digital classes. One of these steps was embedding a supervision control system into each student's iPad. Apple's operating system supports mobile device management (MDM), which enables schools to securely configure and manage Apple devices. MDM capabilities build on existing operating system technologies. As shown in Fig. 3, the school's digital team can determine which applications are allowed to be installed, configure and update settings wirelessly, monitor compliance with school policies, manage software update policies, and even wipe or lock remotely managed devices using MDM. It is crucial to instill MDM at the beginning of each school year, despite the time and energy it requires from teachers and the digital team.

Fig 3. Setup Flow and MDM (Mobile Device Management)

The next preparation is to conduct training on the use of digital classroom for teachers, see Fig 4. The training will be carried out by presenting the iBox to provide practical explanations on the basics of using the iPad, as not many teachers are used to using Apple-based devices. The materials discussed will be focused on maximizing the built-in features and applications of the iPad. Similar training will also be given to students in the early days of learning. The materials emphasized will be related to the main features of the iPad, namely the use of writing applications such as Notes, Pages, Keynotes, how to do multitasking with a split screen, functions and benefits of screen time, drag and drop, and several other basic tutorials.

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Fig 4. Documentation of the MDM Implementation process by the Digital Team Teacher

Observations made in digital class 7C at SMP Islam Al Azhar 21 Solo Baru show that every student and teacher is required to bring an iPad to school. The facilities and infrastructure in the digital class can be considered adequate, with each class having its own WIFI and access point, Apple TV connected to an LCD projector, speakers, whiteboards, markers, erasers, and air conditioning. The learning process in the digital class is very interesting and enjoyable. The teacher starts the lesson by checking the connection between the students' iPads and the teacher through the default application, namely Apple Classroom (refer to Fig. 5). This application is exclusive to iOS and can be downloaded for free through the App Store. Through this application, the teacher can perform several actions such as viewing the students' iPad screens, navigating the students' iPads to open certain applications or links, and even blocking/locking the students' iPads if there is inappropriate use.

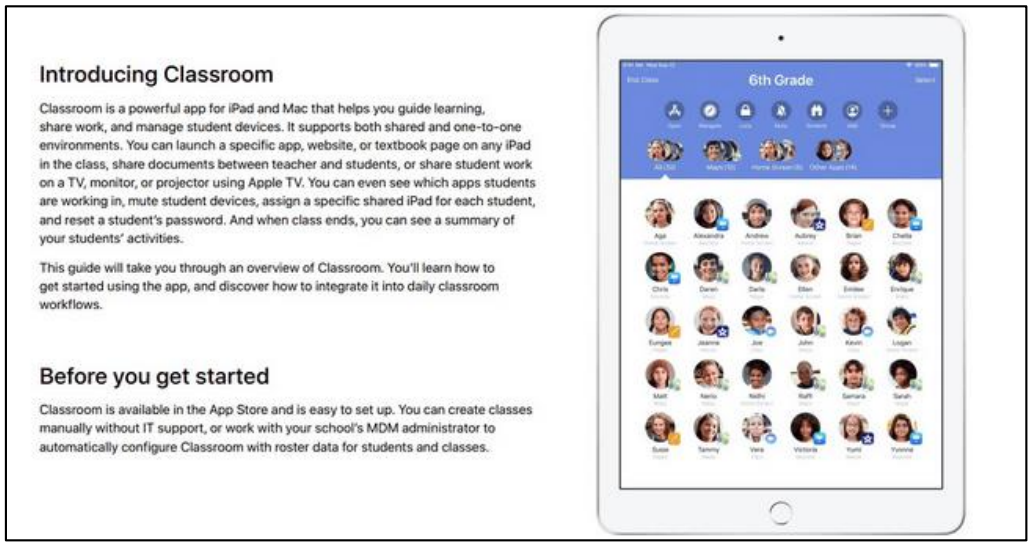

Fig 5. Apple Classroom Application

Teachers can display videos or images on the iPad and then connect to the projector wirelessly. This greatly facilitates teachers and students when giving explanations and reduces

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the need for physical movement in the classroom. The teacher explains the learning material using a PowerPoint presentation and combines it with the use of the Bamboo Paper application as a digital whiteboard. If there are additional materials or notes, the teacher will instruct students to write them on their respective iPad note applications. In addition to using PowerPoint, the learning materials in digital classes are also supported by interesting videos. It can be said that learning feels very active and engaging, and students are more easily interested and focused on participating in the learning process.

In addition to relying on commonly used applications, schools also supplement their learning systems through web-based Learning Management Systems (LMS) created in collaboration with vendors or programmer services. Through this LMS, teachers can upload required materials, announce learning schedules, give assignments, administer tests, and carry out assessments. In fact, it is integrated with student report cards, which can also be accessed by parents. LMS is also used by school principals to monitor teacher activities in accessing learning media, as the system will provide an automatic recapitulation of the use of LMS by teachers. The school also has its own server, so it is not overly reliant on hosting servers from third parties. This makes the school more flexible in managing the program and ensures the stability of its use. Fig. 6 is documentation of digital classroom learning.

Fig 6. Digital Class Learning Documentation

Student enthusiasm was very high when the teacher measured their understanding of the material that had been studied using the Kahoot application, see Fig 7. Kahoot is a game application that contains questions created by teachers and requires all teacher and student iPads to be connected to the internet or Wi-Fi. The practice questions in Kahoot are multiple-choice and last for 10 seconds, so each student has to choose the correct answer before time runs out. After that, the correct answer will be displayed along with the number of students who answered each answer choice. At the end of the game, the three best students who answered correctly and in the shortest time are given special appreciation with prizes and rewards in the form of good activity values. Apart from Kahoot, another very interesting web-

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based application is Quizlet. Based on observations in English lessons in grade 8D, with Quizlet, students learn material while actively collaborating in groups. Students join via a unique code displayed on the screen by the teacher. Then, the application randomly groups students and requires them to actively move to find their groups. In the group, each student answers questions on their iPad screen, which can be on their groupmates' iPads. This promotes discussion and communication between students in the group. The excitement increases as the teacher monitors which group answers the most questions correctly, and the progress can be displayed on the main screen via the teacher's iPad.

Fig 7. Using the Kahoot and Quizlet Apps

As for the results of the interviews conducted with one of the parents of digital class students, they show that there are still concerns about using the iPad, especially outside of class hours. Greater awareness and responsibility are needed for teenagers who are still in their play period. Excessive use of the iPad is a major complaint for parents, especially when it comes to playing games or watching YouTube. Even though parents are aware that efforts have been made to limit the system implemented by the school, teenagers in the current era are considered smarter and more shrewd in finding loopholes from the restrictions that have been instilled. In addition, parents feel that they have incurred greater digital costs, so the cost of buying physical books should no longer be borne by them. They hope that schools can provide solutions regarding this matter.

Based on the results of the observations and interviews that have been presented, there is a high motivation by the principal to improve the quality of the school through iPad-based digital class services. The graph showing the development of the number of students present proves a positive correlation. This is in line with the theory that school principals play a very important role in improving the quality of education in schools (Kurniawan & Hasanah, 2021). The innovation of iPad-based digital class services has also become one of the consequences of increasing school branding values (Shen *et al.*, 2023). Other results show that Al Azhar 21 Solo Baru Islamic Middle School has implemented stages of iPad-based digital classes that have not

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been disclosed by previous researchers. Research related to the application of technology in education is more limited in discussing certain applications and software or different digital devices such as cellphones and laptops (Melati, 2017).

However, in general, existing research reveals both the urgency of using technology in learning, as shown in Pertiwi and Sutama's research Pertiwi dan Sutama (2020), and the benefits of using technology in efforts to improve the quality of learning (Prasetya *et al*., 2023). The involvement of third parties in supporting the implementation of digital classes is an important matter to highlight, both in terms of providing the required iPad devices and training in usage skills that can make it easier for teachers and students to adapt the devices according to their learning needs. The MDM process that is carried out is also the most important factor in supervising the devices with the aim of minimizing misuse. Fig. 8 is the stages of implementing digital classroom services.

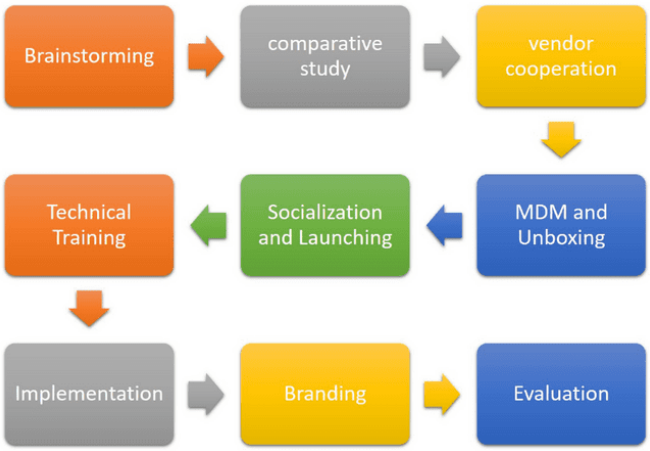

Fig 8. Stages of Digital Class Service Implementation

The perceptions of students and teachers regarding the implementation of digital classrooms are very positive, as shown by the results of the research that has been conducted. Learning using the iPad and its supporting applications creates a more interesting learning atmosphere than regular classes. The learning process is also combined with the LMS, where learning materials and practice questions can be accessed online. In addition, digital classes also utilize applications to support teaching and learning activities, such as the Kahoot and Quizlet applications that are used for learning English. This is in line with the implementation of synchronized digital classrooms, where the use of the internet can create a positive atmosphere in learning (Nana & Surahman, 2019). After six years of implementing digital classes, there are several advantages and disadvantages in its application. From a school management standpoint, it can be said that digital classes have been quite successful in attracting the interest of prospective millennial students, especially from SD Al Azhar 28 Solo Baru which is located in the same complex.

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The utilization of the latest software and applications as learning support makes teaching and learning activities more interesting because they provide audio-visual and interactive animations, which are very popular with students. In addition, the advantages of digital classes that teachers and students can immediately feel are the elimination of the need to carry lots of books in class, since all learning materials and exercises are stored on the iPad. A wider range of learning without limitations in terms of space and time is also an advantage of digital classes, allowing students and teachers to access information freely even when outside the classroom. However, unstable internet connection is a weakness of digital classes. A stable internet connection is crucial to support the continuity and smooth running of digital classes. This is due to the login system that students must use to enter the learning application. Moreover, applications used for learning must always be connected to the internet network, so if internet access is unstable, teaching and learning activities in digital classes will be disrupted. The class atmosphere may also not be conducive in digital classes, as students may be more tempted to play with their iPads rather than focus on learning, as suggested by Pettersson 2018 Pettersson (2018). Additionally, eye health problems, as studied by Sidabutar *et al*. (2019) are also a concern, apart from the risk of data loss on iPads, which concerns both teachers and students.

Conclusion

This research demonstrates that the iPad-based digital classroom is a new innovation in education. The role of the principal is crucial in motivating and leading subordinates to plan and implement innovative ideas effectively. The stages of implementing digital classrooms can be clearly delineated, providing parameters for other schools to adapt. Involving third parties is also important to easily achieve the planned goals. Compared to other devices such as laptops and cell phones, iPad-based digital classrooms offer several advantages. The learning process utilizes applications and software supported by audio and visual aids, attracting students' attention and reducing reliance on textbooks. This approach facilitates students' understanding of the material taught by the teacher. However, the iPad-based digital class still presents both advantages and disadvantages. One advantage is the ease it provides for teachers to convey material by maximizing the available facilities. The existence of Apple Classroom streamlines supervision and reduces paper usage as all learning and evaluation activities are conducted online. Moreover, students can more easily grasp the lessons delivered by the teacher. The Kahoot application further alleviates student boredom by introducing engaging learning activities through games. Conversely, the iPad-based digital class has certain drawbacks, including an unstable internet connection that may cause learning delays, limited interaction among teachers, students, and classmates, and the need to address associated costs

and potential health impacts. Based on the research findings, the researcher recommends further investigation to identify solutions for the weaknesses of digital classrooms and to enhance the effectiveness and efficiency of the learning process. Adopting different approaches will yield a more comprehensive understanding of budget formulation and financing for the implementation of digital classrooms.

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