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Students' Perception of the Digital Learning System for Junior High Schools in Padang, Indonesia

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Abstract: The learning differences before, during, and after the COVID-19 pandemic are very significant regarding the perceptions of offline education, where activeness in class activities is found to be excellent. These needs emphasize the positive effects of the learning method on the challenges of Indonesian education during the digital era. This study aims to evaluate the students' perception of the digital learning system from various phenomenal aspects, using the LMS Santiang. The method used in this research is descriptive qualitative and quantitative research. The informants or subjects of this study were 100 students were randomly selected as samples from class VIII Junior High Schools 7, 8, 12, and 25 Padang. The quantitative and qualitative data obtained from online Google-form questionnaires and WhatsApp interviews were also descriptively analyzed, respectively. According to the analysis of the questionnaire data, source and method triangulation techniques were analytically used. The findings showed that the students' perceptions of the digital learning system were quite good, regarding the use of the LMS Santiang with a percentage ≥ 70%. This analysis also exhibited the following results: (1) 75% of the students understood the LMS Santiang approach (75%); (2) 82% of them needed other learning resources or teaching materials; (3) 70% also demanded to use e-learning platforms; (4) 88% of the students needed e-learning in the digital era; (5) 73% of them were satisfied using LMS. This article is a novelty in developing a digital learning system using LMS Santiang post COVID-19.

Keywords: perception, digital learning system, LMS Santiang.

学生对印度尼西亚巴东初中数字学习系统的看法

摘要：新冠肺炎大流行之前、期间和之后的学习差异对于线下教育的看法非常显着，课堂活动的活跃度非常好。这些需求强调了学习方法对数字时代印度尼西亚教育挑战的积极影响。本研究旨在使用学习管理系统三田从各个现象方面评估学生对数字学习系统的感知。本研究采用的方法是描述性定性和定量研究。本研究的信息提供者或受试者是 100 名学生，他们是从巴东的 VIII 初中 7、8、12 和 25 中随机抽取的样本。还分别对从在线谷歌表格问卷和 WhatsApp 访谈中获得的定量和定性数据进行了描述性分析。根据对问卷数据的分析，分析使用了来源和方法三角剖分技术。调查结果显示，学生对数字化学习系统的认知相当好，使

用学习管理系统三田的比例≥70%。该分析还显示出以下结果：(1)75%的学生理解学习管理系统三体方法(75%)；(2)82%需要其他学习资源或教材；(3)70%还要求使用电子学习平台；(4)88%的学生在数字时代需要在线学习；(5)73%的人对使用学习管理系统感到满意。本文是在新冠肺炎 后使用学习管理系统三田开发数字学习系统的新颖之处。

关键词：感知，数字学习系统，学习管理系统三田。

1. Introduction

The emergence of the COVID-19 pandemic has caused many policy changes, especially in the educational system, where learning activities are directly (face-to-face) or cooperatively (blended) carried out. To anticipate the spread of the virus, the Padang Junior High Schools implemented online learning, whose improvements continuously facilitated and expedited educational activities. In this learning process, various free-to-paid platforms are also used, to maintain the effectiveness of distance academic activities. Additionally, online learning has the advantage of training student-centred independence skills [1].

Based on several previous reports, many differences in the learning situations before and during the pandemic were observed. This indicated that class activeness was quite good and less categorized in conventional (offline) and distance (online) learning, before and during the emergence of COVID-19, respectively. Many challenges were also encountered by students and teachers in the implementation of this online education during the pandemic. This agreed with Saiful Mujani Research and Consulting [2], where 92% of students experienced many problems in online learning during the pandemic [2]. Here, the use of the learning process highly varies with several platforms, such as Zoom, as well as Google Meet and Classroom [3]. Additionally, the availability of various platforms specifically has a different impact and purpose. This is presented in Fig. 1, which emphasizes the challenges of online learning at home.

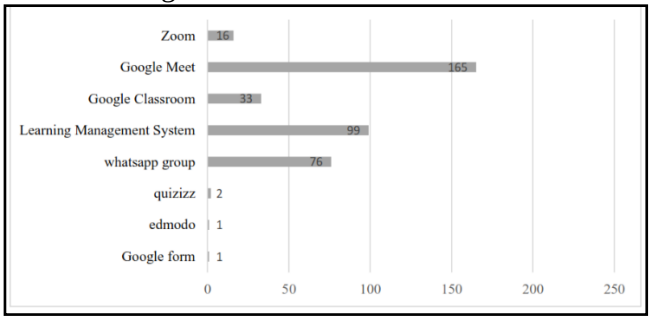

Fig. 1 Challenges of online learning at home (https://databoks.katadata.co.id/)

Based on Fig. 1, approximately 38% of students lacked teachers' guidance. This showed that the teachers need to be able to effectively prepare online learning for the students, including the selection of appropriate academic media. They should also be capable of selecting appropriate online-learning strategies and resources, to maintain the substance of the delivered content. The limitations of distance, time, and guidance should subsequently be considered in the development of appropriate solutions.

According to several previous reports, all resources need to be mobilized for developing online learning until 2025 [4]. This process is observed to positively influence the challenges of Indonesian education. In this context, blended learning becomes an important solution to the needs of the present conditions. Regarding the digital era, some experts have stated that this learning method was appropriate for use as a modern strategy [5]. The development of blended learning has also reportedly become a trend in all educational aspects after COVID-19. This agreed with the decisions of the Indonesian Ministry of Education and Culture to socialize limited face-to-face learning, due to the performance of blended literacy. Teachers and students were also "forced" to be technologically competent to support the new learning method. This process emphasizes the subsequent requirements to possess digital learning abilities in the era of increasingly sophisticated technological disruption.

Previous research on digital learning systems is somewhat limited. First, according to the results, the external rewards did not undermine students' motivation. However, students in the reward condition showed significantly larger gains in conceptual (proximal) understanding, non-significantly larger gains in achievement with the usage of a mobile social learning platform with LMS Santiang in Junior High Schools in Padang. The perspectives and experiences of students and educators were documented [6]–[8]. Second, the authors of small studies give their opinion of higher education students' perception of digital learning systems. Finally, it is challenging for college students and teachers to accept digital learning systems as an assessment tool, and it needs to be continuously practiced in Junior High Schools in Padang to prove its practicality.

The availability of computer laboratories and internet networks within the Junior High Schools in

Padang is also sufficient. This reportedly aligns with the information from the Padang City Education Office, where every provincial school had computers connected via a LAN (local area network). They also had technicians skilled at using computers, especially those related to the internet. This supported the online learning system, although several reports such as [9] and [10] stated that the weakness of this educational method for teachers emphasized the inability to attach document files.

Based on the challenges of online [9], [10] and blended [11], [12] education, the considered solutions are reportedly capable of facilitating the development of an LMS (Learning Management System), which is used to support and manage e-learning. Based on Trivedi [13], LMS is an integrated and comprehensive system used as a learning platform. [14] also concluded that the Moodle LMS had various support features, which were easily accessible from the e-learning portal [15], [16]. Irrespective of these conditions, the development of the Moodle LMS, such as the Padang geschool.net platform, is still unable to be carried out due to limited content. This inability subsequently emphasizes the absence of students' interactions with teachers, as well as the inadequacy of learning materials/video uploads, practice questions, and discussions. It also prioritizes the lack of various questions, regarding the availability of only multiple options. Additionally, the materials provided only focus on files and daily learning assessments, as shown in Fig. 2.

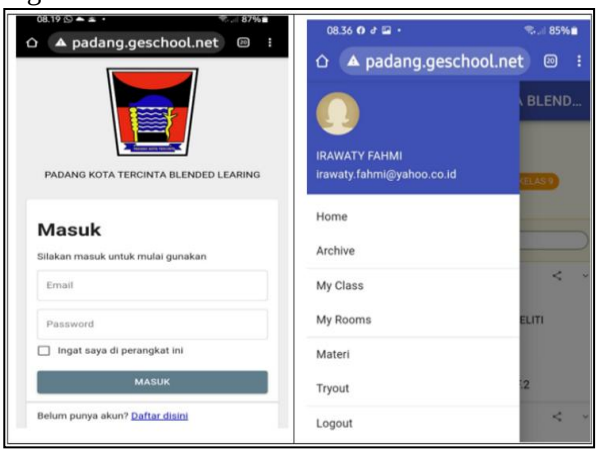

Fig. 2 Geschool.net e-learning of Junior High Schools in Padang City (Education office of Padang city)

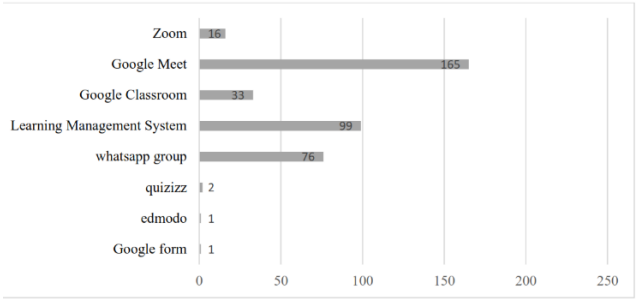

Fig. 3 Most effective learning platform (https://databoks.katadata.co.id/)

The searched references also emphasize the online learning performed and the expected needs, such as the most effective platform, as shown in Fig. 3. Based on Fig. 3, the face-to-face learning habit was still unable to be eliminated because the Google Meet platform (165 or 74.66%) was used in synchronous online face-to-face learning. Meanwhile, 44.80% of the samples stated that the LMS method was highly effective. This indicated the will of a teacher to continue learning despite the various potential challenges to be encountered when using the e-learning method. Irrespective of this determination, the teacher's insight into the LMS process should still be qualified. This is because the teacher managing the class at a later time is likely to play the role of the student.

The implementation of learning through various platforms is reportedly analyzed more deeply through the students' responses to the e-learning process. This subsequently exhibits the form of learning (using LMS) they preferably desire. A person's willingness to use technology products, such as LMS, is also strongly influenced by the perception, a process starting from the use of the five senses. This is carried out by obtaining an organized and interpreted stimulus, leading to the understanding of sensed phenomena. For Junior High Schools in Padang City, the use of LMS already exists under LMS Santiang (https://lcms-santiang.com), where learning implementation needs to be analyzed more deeply to achieve the appropriate academic-process preference for the students. Therefore, this study evaluates the perception of Junior High School students in Padang City, regarding the use of e-learning through LMS Santiang. The results obtained are expected to be reference material to futuristically improve the learning system. Based on this background, this study evaluates students' perception of e-learning from various phenomenal aspects, using the LMS Santiang.

2. Methods/Materials

This paper used qualitative research with a quantitative analysis methodology, which is an effective method Q-A to study people’s perception, i.e., (a) Understanding e-learning or LMS Santiang, (b) Mastering the types of e-learning based on CMS, LMS, and LCMS, (c) E-learning education, (d) Needing other learning resources or teaching materials, (e) Using e-learning, (f) Accessing e-learning, (g) Needing e-learning in the digital era, and (h) Satisfaction using e-learning. This method enables the use of “a by-person factor analysis order to identify groups of participants, and the Q-A method to find participants who held three distinctive viewpoints about valued socio-behavioral competence. The Q-A methodology is used to explain the main viewpoints favored by specific participants, regardless of the number. Wheeler and Montgomery

explored the views of students on learning mathematics and used the Q-A methodology. The Q-A method is used to discuss students' perception of collaboration in a digital learning system.

2.1. Methodology for Analyzing Students' Perception

These methods of qualitative with quantitative analysis are conducted through a survey of Junior High School students in Padang City, Indonesia [17]. Here, the used data collection technique was a Google Form questionnaire, which was distributed to eighth-grade students in the July-December 2022 semester, to determine the implementation of e-learning, such as LMS Santiang. The analytical stages carried out were as follows: (1) The preparation of the questionnaire instrument used for data collection, whose information includes knowledge, accessibility, usefulness, and satisfaction with e-learning; (2) The questionnaire compiled was tested for validity, using the opinion conducted by two e-learning literate experts, The questionnaire was developed based on the ones used in earlier research investigations by Saifuddin [18] and Anat Cohen [19]. As a tool to collect the data, the questionnaire provided no opportunity for interviewers' bias [20]; (3) Data were obtained responses from 100 randomly-selected students were received and considered valid from State Junior High Schools 7, 8, 12, and 25 Padang. The quantitative and qualitative data obtained from an online tool were created using Google Forms and WhatsApp.

The researchers sent the respondents the questionnaire's web link via the WhatsApp platform, respectively, to complete the questionnaire and submit it back [21]. Since it was an online form when respondents submitted their responses, they were all received in real-time. WhatsApp interviews were then descriptively analyzed. The responses were extracted from Google forms as an excel file and then coded in SPSS (Statistical Package for the Social Sciences) software version 26 for windows for analysis. The correctness of the results was also analyzed through source and method triangulation techniques. Here, the data credibility strategy was used to analyze the information obtained through similar subject sources and different techniques, such as interviews. Additionally, a qualitative analysis was carried out during and after data collection within a specific period, leading to the presentation of a conclusion or verification.

The research methodology as described above can be summarized in the following flowchart in Fig. 4.

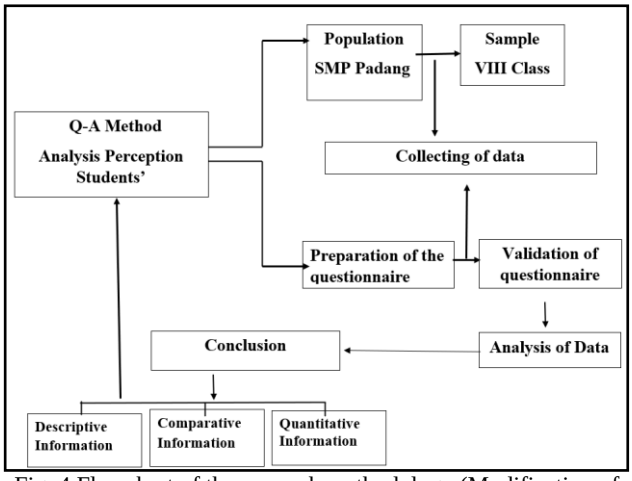

Fig. 4 Flowchart of the research methodology (Modification of Wheeler and Montgomery)

2.2. Context

The study occurred in the context of a mathematics course offered to junior high school students by the SMPN in a Padang city. The course contained theoretical teaching and computer experiments in a twice a week. The duration of the course was almost 6 weeks. The plan was to arrange five subjects and homework assignments, using a mixed online and offline teaching model. The LMS Santiang platform (Fig. 5) was designed to support self-directed and collaborative learning activities, provide a participatory platform for teachers and students to submit assignments, grade and award badges; and contribute, share, and give feedback. The researcher used some badges ranking plug-ins that LMS Santiang supports to build a competitive mechanism.

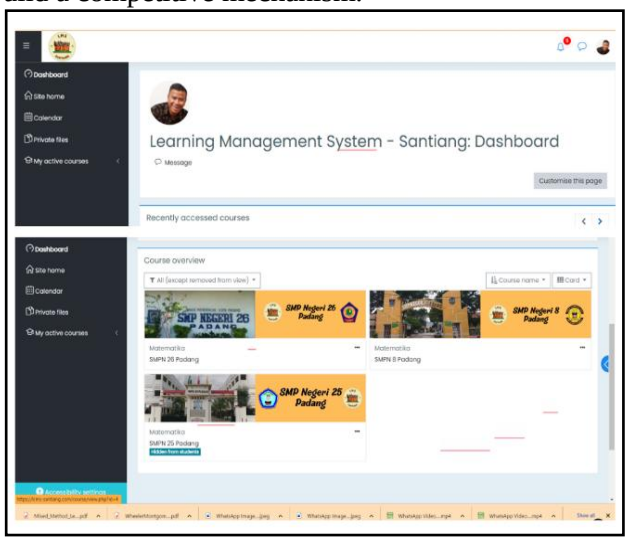

Fig. 5 The course LMS Santiang (Developed by the authors)

When LMS Santiang had been set up, each student was given an account number (i.e., ID). Teachers created criteria with modules of mathematics digital and uploaded their class resources, such as videos, images, and other types of course files to the LMS. The process of awarding a digital learning system for this study consisted of three steps: First, the teachers

introduced the offline learning system to confirm the course tasks and rules, and students were given face-to-face lectures, discussions, group reports, and other activities were organized. Second, they first enter the LMS Santiang system. The difficulty of the task was gradually increased, and the time allotted to complete them was adjusted accordingly. Third, the discussed results were published (Fig. 6).

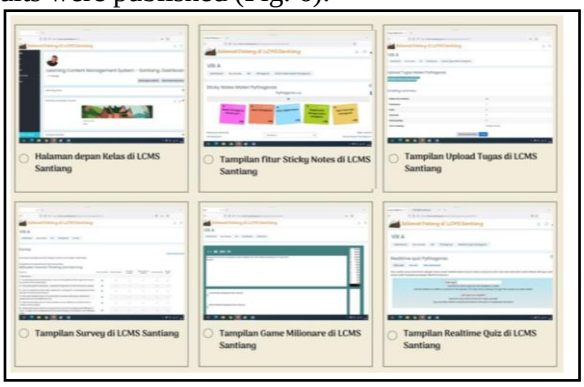

Fig. 6 Peer assessment activity (Developed by the authors)

The specifications of the components of the digital learning system of the LMS Santiang criteria: 1) teaching materials, 2) material organization maps, 3) live worksheet, 4) discussion forum, 5) quiziz and learning outcomes, 6) synchronous and asynchronous learning activities.

2.3. Participants

The participants in this research are all students of the VIII class of SMPN 7, 8, 12, 25 Padang. As for the sampling method, a combination of a non-random sampling technique involving self-selection and snowball sampling was employed to ensure a reasonable response rate. The researchers chose these strategies because of their simplicity and cheap cost. A sample size representative of the total student enrollment (N = 100) in the 8th-class was used in this study. Fig. 7 presents all participants to answer the questionnaire.

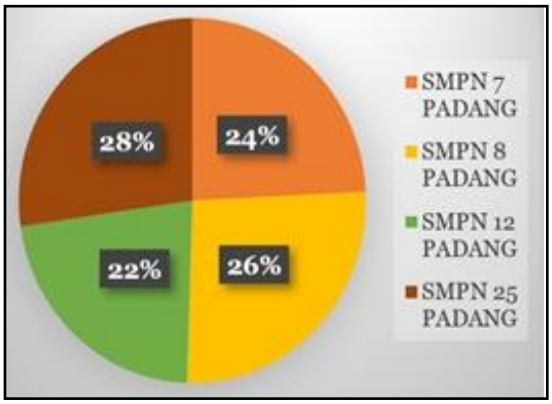

Fig. 7 Students' perception of 8th-class SMP Padang (Developed by the authors)

When users have a clear goal, their performance improves hence, it was important to clarify the task content in the course of planning and curriculum design. The ranking scores are presented in Fig. 8.

Fig. 8 LMS Santiang ladder (Developed by the authors)

2.4. Research Instrument

The instrument for data collection was a 10-item questionnaire designed by the researchers and tagged "Perception student questionnaire'. The instrument was observed phenomena as follows: (a) Understanding e-learning or LMS Santiang, (b) Mastering the types of e-learning based on CMS, LMS, and LCMS, (c) E-learning education, (d) Needing other learning resources or teaching materials, (e) Using e-learning, (f) Accessing e-learning, (g) Needing e-learning in the digital era, and (h) Satisfaction using e-learning. Ten feedback statements were collected, and statements were extracted from them to ensure that the number of availing and unavailing statements was balanced. The final statements were selected from a comprehensive reflection of students' views on digital and divided into four themes (i.e., teaching and learning, accessing, and satisfaction).

2.5. Data Analysis

The researchers were divided into yes or no choices and a four-dimensional multiple choice. The quantitative descriptive statistical analysis, which includes percentages, was performed using SPSS to answer the research questions. To acquire the overall category of students' experiences and opinions on the perception, the presentation criteria in categorizing the data were employed. Thus, the categories referred to for data categorization are as follows: 8 to 10 - good category, 4 to < 8 - good enough category, 0 to < 4 - poor category.

3. Results

From the results of the questionnaire recapitulation, the minimum score is 26, the maximum score is 88, the average score is 66.88, and the standard deviation is 19.28. So, it can be said that students' perceptions of the implementation of a learning management system is quite good. More details can be seen in Table 1.

Table 1 The data description

Descriptive Statistics	Score	Criteria
Minimum Score	26	Quite Good
Maxmum Score	88	
Mean	66.88	
Deviation standard	19.28	

The data shown in Fig. 9 indicate that through a questionnaire, regarding the perceptions of Padang Junior High School students on e-learning. This emphasized the observed aspects and descriptive qualitative explanation, regarding the students' responses submitted. Based on these data, 74% of the samples understood e-learning through the LMS Santiang method.

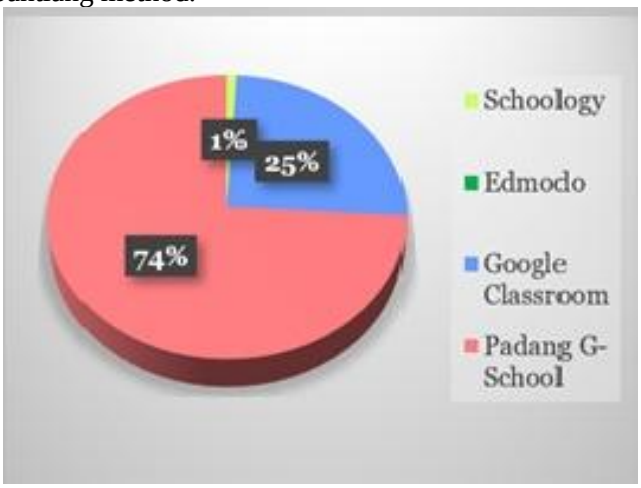

Fig. 9 Types of e-learning ever used (Developed by the authors)

This showed that students know about e-learning from their special experiences during the pandemic, by understanding the LMS Santiang application. These results were supported by various descriptions of students' knowledge about LMS, where 25% of them were educated through the Google Classroom. From their perceptions, LMS Santiang was digitally carried out through material access, assignment collection, and daily tests. This agreed with, where teachers and students were separated by cyberspace.

The types of modern LMS platforms existing today are often very diverse, with the developed questionnaire containing the kinds commonly used in Indonesia. Here, LMS Santiang was the most widely used platform (74%), according to the perceptions of the study samples. This was accompanied by Google Classroom (25%) and Schoology (1%). Based on the interview sessions, these students were not familiar with LMS due to their illiteracy about the various types of e-learning platforms. The questionnaire did not also provide the information that the managed e-learning (LMS Santiang) was an LMS. The results agreed with many previous studies, where LMS platforms were widely used because of their very complete features, regarding discussions, teleconferences, task collection, and peer assessment. Here, the Moodle LMS was highly recognized, where Coates et al. stated that the platform had easy configurational characteristics, as well as facilitated the development of a student assessment process (online questionnaires and tests) and task management [22].

Based on these results, the students had good LMS perceptions, regarding the following observed phenomena, (a) Understanding e-learning or LMS Santiang, (b) Mastering the types of e-learning based on CMS, LMS, and LCMS, (c) E-learning education, (d) Needing other learning resources or teaching materials, (e) Using e-learning, (f) Accessing e-learning, (g) Needing e-learning in the digital era, and (h) Satisfaction using e-learning. These phenomenal observations are presented in Fig. 10.

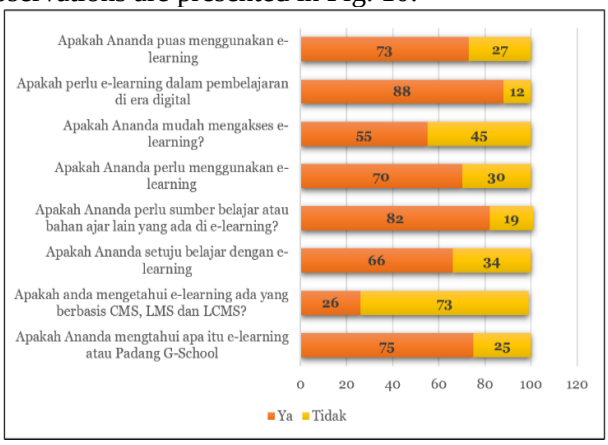

Fig. 10 Students' perception of e-learning (Developed by the authors)

Based on Fig. 10, 75% of students understood e-learning, with the available related platforms emphasizing diverse characteristics, such as CMS, LMS, and LCMS. Approximately 73% of the samples did not know about e-learning, with 66% in agreement over the usage of the platform to learn. This result was supported by various previous reports, where students preferred the full implementation of the learning process. Furthermore, the role of educational technology emphasized the effect of technological developments, which influenced learning transformation. Based on the online interviews regarding the best applicable learning method post-pandemic, the use of e-learning (70%) was preferred with appropriate and maximum methods, media, and evaluations. This proved that learning should have a direct interaction between teacher and students, to easily solve the problems of difficult material knowledge. The results also showed that students expected to always use an easy platform (55%).

4. Discussion

The qualitative with quantitative analysis is an approach that can be employed to understand students' perspective of the use of digital learning system in junior high school. The qualitative with quantitative analysis was used for the data collection and analysis in this study to explore the perspective of students with different types of characteristics of the use of digital learning system. A survey was used to collect the students' opinions on the functions of a digital learning system so that they can be improved to motivate students' learning by focusing on an instructional

strategy.

According to the analysis, approximately 82% of the samples stated the need for other e-learning resources or teaching materials, such as modules, pictures, videos, and audio. This emphasized the continuous repetition of the highly-used learning materials. Furthermore, content quality is critical in e-learning, regarding the user-friendly characteristics [23] and motivation encouragement [24]. Here, the need for learning resources agreed with the student's preference to use e-learning (70%). Irrespective of this condition, 55% of the samples still had problems in accessing the digital learning method. Previous research on online media that students are most interested in when learning online is Google Classroom (46.8%), Whatsapp (27.4%), Edmodo (19.4%), and Zoom (6.4%), although 93.5% prefer offline learning in face-to-face classes compared to online learning [25]. To achieve related goals in accessing e-learning, accessibility was also observed as a comfort level for students, using a web browser from a smartphone or laptop. This proved that the ease of using the digital learning method influenced user attitudes [26]. These results were supported by Fig. 9, where the need for e-learning was observed in the digital era (88%). [27] subsequently stated that the technology interactively used with discussions and guides had many opportunities, regarding the acquisition of deeper information from the teacher.

Based on the results, 73% and 27% of the students were satisfied and dissatisfied after using e-learning, respectively. This agreed with [28], where the learning method was flexible, as well as promoted the great activeness of independent learning and motivation. [29] also confirmed that a deeper study was needed due to the new implementation of e-learning, which emerged during the COVID-19 pandemic. This implementation is then expected to be carried out through the student's perception of the learning process.

Based on the data presented, there are several findings in the study that can be used as a reference in the application of learning management systems, especially media. Constraints and obstacles in online learning also come from the selection of inappropriate media. Creative learning media and learner readiness are the key points for successful learning [30]. Another study also stated that 60% of respondents consisting of students stated that they were satisfied with online learning, and 40% were dissatisfied because of limited access, network instability, unclear material, assignments from lecturers, and lecturer guidance patterns, and lack of feedback on students' work [31]. This student dissatisfaction needs to be a concern for educators in seeking the quality of online learning. Lecturers also should develop clear rules for learning in the event of obstacles such as networks, lack of facilities, and the right form of guidance. Meanwhile, in this study, 100 students from four Padang Junior High Schools considered LMS Santiang the most effective platform for online learning. However, only 25% of the respondents consider the Google Classroom platform the most effective.

A further analysis of the consensus statements between factor types showed that all the students agreed that peer assessment increases the chances of learning from each other, and they were all interested in the interactive activities to obtain LMS Santiang, which increased their enthusiasm. This result is consistent with Costello, E's findings [32]. It was also found that the mechanism of LMS Santiang enhanced participants' motivation and that rewards based on achievements increased their intrinsic motivation to learn. Furthermore, almost all the participants described LMS Santiang as authentic and innovative compared with traditional classroom education. However, LMS Santiang could provide a more detailed framework to assess college students' knowledge and skills, could provide evidence of their learning, and could demonstrate their ability to respond to significant change. Simultaneously, they enable students to obtain overall information in a more timely fashion than a final exam by being an informal way to receive feedback. Their functions are determined through this course practice, and some suggestions for teaching are proposed. The digital learning system of LMS Santiang is needed for current and future learning. The researchers also argue that the results derived from these participants in practice may be influenced by external factors in field settings such as the LMS Santiang platform. Because of time constraints, this research is only at the preliminary stage and has not yet been piloted. Suggestions for researchers, it is hoped that this research can be continued until the trial stage so that the practicality and effectiveness of this digital learning system in LMS Santiang as learning media in mathematics learning can be known.

5. Conclusion

Based on the results, the student's perceptions of e-learning were quite good, regarding the use of LMS Santiang LMS e-learning with a percentage $\geq$ 70%. This was observed through the following conclusions: (1) Main findings of perception students' toward the LMS Santiang e-learning (75%), (2) Needing other learning resources or teaching materials (82%), (3) Demanding to use e-learning (70%), (3) Needing e-learning in the digital era, (88%), and (4) student satisfaction using LMS (73%). For the interview results, students were not familiar with LMS, due to their inability to understand the various types of e-learning platforms.

Comparison with other studies: According to Balaji, Al-Mahri, and Malathi, creative learning media and learner readiness are the key points for successful

learning. Another study, Triyanti also stated that 60% of respondents consisting of students stated that they were satisfied with online learning and 40% were dissatisfied because of limited access, network instability, unclear material, assignments from lecturers, lecturer guidance patterns, and lack of feedback from students' work.

The implication of study is that these digital learning systems can be used as complementary teaching materials in LMS of teaching and learning.

Strengths of the digital learning system of LMS Santiang are needed for current and future learning.

Limitations: Due to time constraints, this research is only at the preliminary stage and has not yet been piloted.

Researchers recommend that more in-depth research be done to improve the produced products. Researchers realize that there are still so many shortcomings during the study from start to finish and can be used as a reference in developing other learning media.

Future research: It is hoped that this research can be continued until the trial stage so that the practicality and effectiveness of this digital learning system in mathematics learning can be known.

This research is a novelty because it is the development of a digital learning system using the Santiang LMS platform. The name Santiang interprets the word Santiang (Minang language) by incorporating Minangkabau culture as its implementation both in appearance and in the learning process. To support digital learning materials, electronic modules with flipbook media are used. The digital learning system developed is a form of innovation effort that is thought to be able to improve students' achievement.

Acknowledgments

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