Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

EXPLORING THE POTENTIAL OF EDUCATIONAL ANDROID GAMES FOR PROSPECTIVE ELEMENTARY SCHOOL TEACHERS: A RESPONSE

Ibrahim[1], Nurwahidah[2], Ni Made Yeni Suranti[3], Nurkhaerat Alimuddin[4]
[1,2,3,4]Primary School Teacher Education, University of Mataram, Indonesia
Surel: ibrahim14@unram.ac.id

Abstract

This research aims to explore the responses of prospective elementary school teachers to training in developing Android-based educational games as an innovative learning tool. By distributing questionnaires to 121 prospective elementary school teachers in NTB, this research identified the needs, interests, motivations and challenges faced in participating in the training. The research results show that prospective elementary school teachers show a high interest in using educational games as a learning tool, but prospective elementary school teachers face challenges related to technical skills and integration in the curriculum. These findings provide important insights for training providers in designing programs that better suit the needs of prospective teachers, as well as highlighting the importance of continued support for the development of skills in using technology in education.

Keywords: Games; Android; Prospective Elementary School Teacher; Response

INTRODUCTION

Education in the 21st century faces unique challenges amidst the dynamics of technological development and rapid social transformation. 21st Century education requires education to not only produce individuals who are academically skilled, but also who are able to adapt to change, think critically, collaborate, and solve problems creatively (Chalkiadaki, 2018; Care et al., 2018; Zahroh et al., 2023). In addition, globalization broadens educational horizons by introducing new challenges and opportunities, such as cultural integration and cross-border cooperation (Malik, 2018; Erfan et al., 2024; Bahtiar et al., 2023).

In line with these demands, 21st century education requires an innovative approach, where technology plays an important role (Bahtiar et al., 2022; Abesadze & Nozadze, 2020). Technology-based learning is becoming increasingly relevant in this context, as it enables wider access to information, provides a platform for interactive and personalized learning, and facilitates the development of crucial digital skills (Loderer, 2020). With the integration of technology, education can become more inclusive, dynamic and adaptive, preparing future generations to face complex challenges in the digital era (Maulidia et al., 2023).

Learning in the digital era marks a fundamental shift in the educational paradigm, driven by rapid advances in information and communication technology. The digital era has dramatically changed the way we access, present and interact with information. The emergence of the internet, mobile devices, and online learning platforms has opened the door to easier and faster access to knowledge from various sources.

The presence of technology has also changed the demands and expectations of education. It is no longer enough for students as prospective teachers to only master basic knowledge. Prospective elementary school teachers

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

must also have digital skills, information literacy, and the ability to think critically and creatively in navigating a world that continues to develop digitally. Therefore, education in the digital era is not only about transferring information, but also about preparing students to become independent learners and skilled problem solvers in an increasingly connected and complex environment.

Educational game development training for prospective teachers is becoming increasingly important in the era of digital education that continues to develop. Based on data and research conducted by Yu et al., (2021), it appears that the use of games in learning can increase students' motivation, involvement and understanding of the subject matter. Apart from that, educational games also have the potential to develop students' cognitive, social and emotional skills, such as problem solving skills, cooperation and creativity (Mayasari et al., 2024; Hung et al., 2019).

However, although educational games offer a variety of benefits, the development and implementation of games in an educational context often requires special skills and technical knowledge that not all prospective elementary school teachers possess (Partovi & Razavi, 2019). Therefore, appropriate training is key to preparing prospective teachers with the skills necessary to design, develop and use educational games effectively in classroom learning.

Thus, researchers are interested in knowing the responses of prospective elementary school teachers regarding training plans for developing Android-based educational games. Through the responses of prospective elementary school teachers, it is possible to understand the needs, interests and motivation of prospective elementary school teachers regarding the training. Apart from that, this research also helps in identifying challenges and obstacles that prospective elementary school teachers may face during training. By gathering input and feedback from prospective teachers, training providers can adapt training programs to better suit the needs and preferences of prospective elementary school teachers. This will help optimize the effectiveness of training and increase the likelihood of success in developing Android-based educational game development skills for prospective elementary school teachers.

RESEARCH METHODS

This research is a descriptive research. Descriptive research aims to describe observed characteristics and phenomena without producing causal inferences or conclusions (Remler & Van-Ryzin, 2021). In the context of this research, a descriptive approach is used to describe the responses of prospective elementary school teachers to Android-based educational games. The respondents in this study were 121 prospective elementary school teachers in NTB. The complete data on respondents in this study is presented in Figure 1 below.

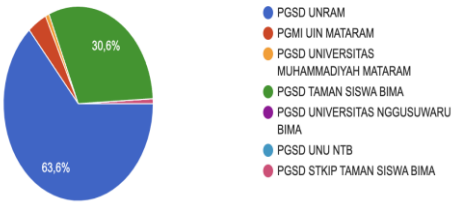

Figure 1. Origin of Prospective Teacher Institutions In NTB

The data collection technique uses a questionnaire in the form of Google form. This questionnaire was

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

distributed to gain an in-depth understanding of the experiences and perceptions of prospective teachers regarding the development of Android-based educational games. The data analysis technique used in this research is descriptive. This technique is used to describe and summarize the characteristics of data collected through questionnaires, such as frequency of use of educational games, participation in the development and training of educational games, and prospective teachers' perceptions of these games. Descriptive analysis can also be used to identify general patterns and trends in respondents' responses.

RESULTS AND DISCUSSION

This research aims to explore the response of prospective elementary school teachers in NTB regarding the development of Android-based educational games. In this study, researchers distributed a questionnaire to all prospective elementary school teachers in NTB to fill out the questionnaire. Distribution of the questionnaire begins on December 7, 2023 and ends on December 10, 2023. The questionnaire distributed consists of 9 questions. The first and second questions were to find out whether the respondent had ever participated in or had experience in creating or developing educational games that could be accessed via the Android platform. The responses of prospective elementary school teachers to the first and second questions are presented in Figure 2 below.

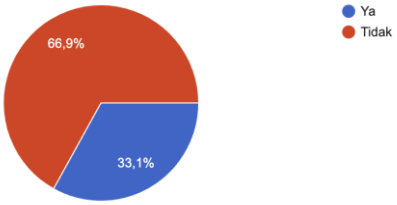

Figure 2. Responses of Prospective Teachers to Experience and Involvement

Figure 2 above shows that as many as 81 prospective elementary school teachers (66.9%) have never been involved and have no experience in developing Android-based educational games. This indicates that the majority of respondents do not have direct experience in the game development process. Most prospective teachers have never been involved in the development stage, either as lead developers or as team members. This can be caused by a lack of opportunities or opportunities to engage in educational game development, limited knowledge or technical skills in software development, or a lack of interest or motivation to engage in such activities. A study Lampropoulos et al., (2022) found that in some educational settings, students and teachers may not have adequate access or opportunities to engage in educational game development due to limited resources, both technological resources and support from educational institutions.

Figure 2 also shows that as many as 40 prospective elementary school teachers (33.1%) have been involved and have experience in developing Android-based educational games. This shows that a small number of respondents have direct experience in the process of developing Android-based educational games. There are variations in the level of involvement of

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

respondents in developing educational games, where a small number of them have been directly involved in the development process. Prospective elementary school teachers have a background or experience that allows them to be involved in Android-based educational game development activities, such as formal education or training in software development, a strong interest in educational technology, or previous work experience in the games or technology industry.

The questionnaire responses of prospective elementary school teachers regarding the development of Android-based educational games on questions aimed at evaluating the extent to which respondents have had special training or education in developing educational games that can be accessed via the Android platform. By answering this question, researchers can understand the level of technical readiness and knowledge about educational game development of the respondents. This is important because it can influence the perceptions, abilities and interest of prospective elementary school teachers in using technology for educational purposes. The results of the respondents are presented in the form of Figure 3 below.

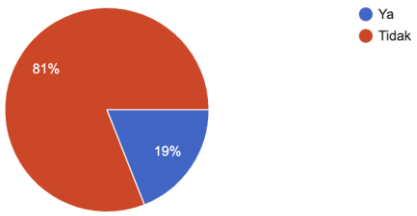

Figure 3. Response of Prospective Elementary School Teachers to Training

Figure 3 shows that there are 98 (81%) prospective elementary school teachers who have never participatedtraining to develop Android-based educational games. This indicatesthat the majority of prospective elementary school teachers have not had the opportunity or access to obtain relevant training in developing Android-based educational games. Factors such as limitations in training provision, lack of awareness about the importance of such training, or technical barriers in integrating technology are responsible for the high percentage of prospective teachers who have never received training.

Figure 3 also shows that 23 (19%) prospective elementary school teachers have participated in Android-based educational game development training. This indicates that there is a small number of prospective elementary school teachers who have attended training. Therefore, these results highlight the importance of efforts to increase the accessibility and availability of training in Android-based educational game development for all prospective elementary school teachers. In this way, prospective elementary school teachers can gain the skills and knowledge necessary to integrate technology in classroom learning. Research conducted by Litvinenko (2020) states that one of the main obstacles is a lack of technical knowledge or skills in the field of software development. This can be a challenge for teachers or individuals who want to get involved in game development, but lack a background in computer science or game design.

Questionnaires were also distributed to evaluate respondents' level of understanding of the basic concepts and principles underlying educational

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

games developed for the Android platform. By answering this question, researchers can gain insight into how well respondents understand how Android-based educational games are designed, how they work, and how they can be integrated into the learning process. Responses to this question provide an overview of the respondent's level of awareness and readiness in using Android-based educational games in an educational context. A high level of understanding can indicate that the respondent has understood the concept and potential of educational games in improving learning. Meanwhile, a low level of understanding may indicate that respondents need more information or additional education about the concept and use of Android-based educational games. The results of the analysis of the responses of prospective elementary school teachers are presented in Figure 4 below.

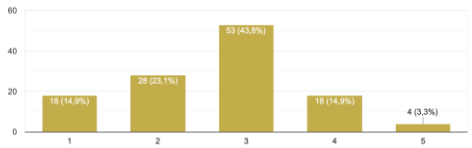

Figure 4. Primary School Teacher Candidate Responses to the Concept

Figure 4 shows that only 4 (3.3%) prospective elementary school teachers really understand the concept and potential of Android-based educational games. This shows that only a small portion of prospective elementary school teachers have a very in-depth understanding of how Android-based educational games are designed and how they have the potential to support the learning process. There are 18 (14.9%) prospective elementary school teachers who understand the concept and potential of Android-based educational games, there are 53 (43.8%) prospective elementary school teachers who understand the concept and potential of Android-based educational games, as many as 28 (23.1%) %) prospective elementary school teachers who do not understand the concept and potential of Android-based educational games, as many as 18 (14.9%) prospective elementary school teachers do not understand the concept and potential of Android-based educational games.

Interpretation of the data above shows that there is significant variation in the level of understanding of the concepts and potential of Android-based educational games among prospective elementary school teachers. This highlights the importance of increasing prospective elementary school teachers' understanding and knowledge of the concepts and potential of educational technology, so that prospective elementary teachers can integrate these tools effectively in classroom learning. Efforts to provide additional relevant training can help improve prospective elementary school teachers' understanding and strengthen skills in applying technology in the educational process. Research conducted by Passarelli (2019) highlights that a lack of interest or motivation to engage in educational game creation activities can be an inhibiting factor. Factors such as low perception of its benefits or lack of social support can reduce an individual's interest in getting involved in game development.

The next question that was also asked was related to "To what extent do you feel ready to use Android-based educational games?". This question aims to evaluate the level of readiness and confidence of respondents in using

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

Android-based educational games in a learning context. By answering this question, researchers can understand how confident respondents are in applying Android-based educational games in classroom learning activities. The results of the analysis are presented in the form of Figure 5 below.

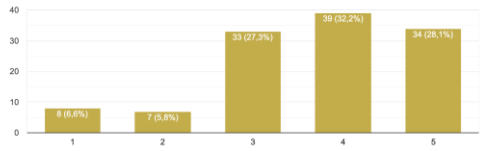

Figure 5. Primary School Teacher Candidate Respondents Regarding Readiness Level

Figure 5 shows that there are 34 (28.1%) prospective elementary school teachers who are very prepared and very confident in using Android-based educational games in learning contexts. Furthermore, there were 39 (32.2%) prospective elementary school teachers ready and confident in using Android-based educational games in learning contexts. As many as 33 (27.3%) prospective elementary school teachers were less prepared and less confident in using Android-based educational games in learning contexts. As many as 7 (5.8%) prospective elementary school teachers were not ready and unsure about using Android-based educational games in learning contexts. A total of 8 (6.6%) prospective elementary school teachers were very unprepared and very unsure about using Android-based educational games in learning contexts.

Interpretation of this data shows that there is significant variation in the level of readiness and confidence of prospective elementary school teachers in using Android-based educational games. This highlights the importance of efforts to provide the necessary training, support, and resources for prospective elementary teachers to feel more prepared and confident in integrating technology into the learning process.

The questions on the questionnaire are also related to "To what extent do you believe you can effectively integrate Android-based educational games into your learning activities?" This questionaims to assess the level of confidence of prospective elementary school teachers in their ability to use Android-based educational games effectively in learning contexts. The results of prospective elementary school teacher responses are presented in Figure 6 below.

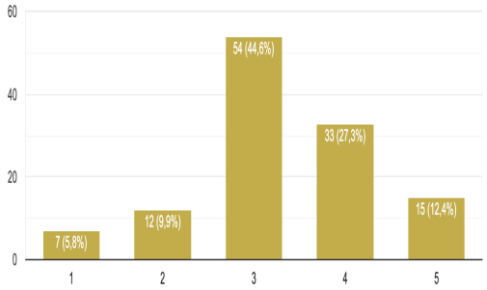

Figure 6. Responses of Prospective Elementary School Teachers to the Level of Confidence

Figure 6 above shows that there are 15 (12.4%) prospective elementary school teachers who are very confident about integrating Android-based educational games effectively in learning. There were 33 (27.3%) prospective elementary school teachers who were confident of integrating Android-based educational games effectively in learning. Then 54 (44.6%) prospective elementary school teachers were quite confident about integrating

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

Android-based educational games effectively in learning. There were 12 (9.9%) prospective elementary school teachers who were not sure about integrating Android-based educational games effectively in learning. And there were 7 (5.8%) prospective elementary school teachers who were very unsure about integrating Android-based educational games effectively in learning.

Overall, the response results show that the majority of prospective elementary school teachers have a fairly good level of confidence regarding their ability to integrate Android-based educational games in learning, although there are also a small number who are less confident or not at all confident. The questionnaire questions are also related to “Do you hope for Android-based educational game development training?" This question aims to understand respondents' interests, needs and potential for innovation related to Android-based educational game development training, as well as to plan training programs that suit the needs of prospective elementary school teachers. The results of prospective elementary school teacher responses are presented in Figure 7 below.

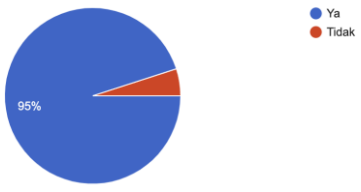

Figure 7. Response of Prospective Elementary School Teachers to Training

Figure 7 shows that of the total respondents of 121 prospective elementary school teachers, there were 115 (95%) prospective elementary school teachers who hoped for training in developing Android-based educational games.This shows that there is great interest among prospective elementary school teachers to develop skills in creating Android-based educational games.On the other hand, only 6 (5%) prospective elementary school teachers do not expect training in Android-based educational game development.

The data above shows thatAndroid-based educational game development training is considered important and expected by the majority of prospective elementary school teachers who were respondents in this survey. Some suggestionsfrom prospective elementary school teachers regarding the type of training desired in developing Android-based educational games, including: (1) prospective elementary school teachers expectThe training provides examples of good games to give to children according to the ongoing learning; (2) prospective elementary school teachers also hopetraining that is easy to understand to broaden your knowledge with education via Android-based media; (3) prospective elementary school teachers also hopetraining that enables teachers to develop educational games in detail, both offline and online so that they can be used in learning; (4) In Android-based educational game development training, prospective elementary school teachers expect an in-depth discussion of educational game design concepts, technical implementation using the Android platform, and strategies for integrating educational material into games. Also, focus on a user experience that is friendly and effective for learning.

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

CONCLUSION

The conclusion of this research shows that research into elementary school teacher candidates' responses to Android-based educational game development training is important and useful. The research results provide an in-depth understanding of the needs, interests and motivations of prospective teachers regarding the development of educational games. In addition, this research identifies challenges and obstacles that prospective teachers may face during training, and provides valuable input to improve the effectiveness of training programs. By paying attention to the results of this research, training organizers can design more appropriate and supportive programs, thereby helping prospective elementary school teachers develop Android-based educational game development skills more effectively.

REFERENCES

Abesadze, S., & Nozadze, D. (2020). Make 21st century education: The importance of teaching programming in schools. *International Journal of Learning and Teaching*, *6*(3), 158-163. http://dx.doi.org/10.18178/ijlt.6.3.158-163

Bahtiar, B., Ibrahim, I., & Maimun, M. (2022). Analysis of Students' Scientific Literacy Skill in terms of Gender Using Science Teaching Materials Discovery Model Assisted by PhET Simulation. *Jurnal Pendidikan IPA Indonesia*, *11*(3), 371-386. https://doi.org/10.15294/jpii.v11i3.37279

Bahtiar, B., Yusuf, Y., Doyan, A., & Ibrahim, I. (2023). The Trend of Technology Pedagogical Content Knowledge (TPACK) Research in 2012-2022: Contribution to Science Learning of 21st Century. *Jurnal Penelitian Pendidikan IPA*, *9*(5), 39-47. https://doi.org/10.29303/jppipa.v9i5.3685

Care, E., Kim, H., Vista, A., & Anderson, K. (2018). Education System Alignment for 21st Century Skills: Focus on Assessment. *Center for Universal Education at The Brookings Institution*.

Chalkiadaki, A. (2018). A systematic literature review of 21st century skills and competencies in primary education. *International Journal of Instruction*, *11*(3), 1-16. http://dx.doi.org/10.12973/iji.2018.1131a

Erfan, M., Suranti, N. M. Y., & Ibrahim, I. (2024). The Development of an Ethnopedagogical LMS to Enhance the Creativity of Elementary School Teacher Candidates in Learning Science Course. *Jurnal Penelitian Pendidikan IPA*, *10*(2), 886-895. https://doi.org/10.29303/jppipa.v10i2.6265

Hung, C. Y., Sun, J. C. Y., & Liu, J. Y. (2019). Effects of flipped classrooms integrated with MOOCs and game-based learning on the learning

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

motivation and outcomes of students from different backgrounds. *Interactive Learning Environments*, *27*(8), 1028-1046. https://doi.org/10.1080/10494820.2018.1481103

Lampropoulos, G., Keramopoulos, E., Diamantaras, K., & Evangelidis, G. (2022). Augmented reality and gamification in education: A systematic literature review of research, applications, and empirical studies. *applied sciences*, *12*(13), 6809. https://doi.org/10.3390/app12136809

Litvinenko, V. S. (2020). Digital economy as a factor in the technological development of the mineral sector. *Natural Resources Research*, *29*(3), 1521-1541. https://doi.org/10.1007/s11053-019-09568-4

Loderer, K., Pekrun, R., & Lester, J. C. (2020). Beyond cold technology: A systematic review and meta-analysis on emotions in technology-based learning environments. *Learning and instruction*, *70*, 101162. https://doi.org/10.1016/j.learninstruc.2018.08.002

Malik, R. S. (2018). Educational challenges in 21st century and sustainable development. *Journal of Sustainable Development Education and Research*, *2*(1), 9-20. https://doi.org/10.17509/jsder.v2i1.12266

Maulidia, L. N., Suparno, S., & Rosyidah, U. J. (2023). A Systematic Literature Review on Technology-Based Learning Media in ECE to Face Society 5.0 Era. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *7*(5), 5181-5195. https://doi.org/10.31004/obsesi.v7i5.4997

Mayasari, M., Mayasari, D., Anitra, R., & Ibrahim, I. (2024). Hubungan Motivasi Belajar Siswa dengan Hasil Belajar Kognitif IPA Siswa Kelas V SDN 11 Singkawang Tahun Ajaran 2022/2023. *Jurnal Ilmiah Profesi Pendidikan*, *9*(1), 546-557. https://doi.org/10.29303/jipp.v9i1.2054

Partovi, T., & Razavi, M. R. (2019). The effect of game-based learning on academic achievement motivation of elementary school students. *Learning and Motivation*, *68*, 101592. https://doi.org/10.1016/j.lmot.2019.101592

Passarelli, M., Dagnino, F. M., Earp, J., Manganello, F., Persico, D., Pozzi, F., ... & Haggis, M. (2019). Educational games as a motivational tool: Considerations on their potential and limitations. https://doi.org/10.5220/0007586503300337

Remler, D. K., & Van-Ryzin, G. G. (2021). *Research methods in*

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024

Vol. 8 No. 2 March 2024, pp. 366-375
p-ISSN : 2548-883X || e-ISSN : 2549-1288
https://jurnal.unimed.ac.id/2012/index.php/jgkp/article/view/56553
https://doi.org/10.24114/jgk.v8i2.56553

practice: Strategies for description and causation. Sage Publications.

Yu, Z., Gao, M., & Wang, L. (2021). The effect of educational games on learning outcomes, student motivation, engagement and satisfaction. *Journal of Educational Computing Research*, *59*(3), 522-546. https://doi.org/10.1177/0735633120969214

Zahroh, U., Rachmawati, N. I., Darmayanti, R., & Tantrianingrum, T. (2023). " Guidelines" for collaborative learning in 21st century education at Madrasah Tsanawiyah. *Assyfa Journal of Islamic Studies*, *1*(2), 1-15. https://doi.org/10.61650/ajis.v1i2.239

Received on: 08 March 2024 **Approved at :** 27 March 2024 **Published at** : 29 March 2024