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Use of Multimodal and Interactive Digital Teaching Materials in 21st Century Mathematics Learning

Arie Anang Setyo[a)], Muhamad Ruslan Layn[b)], Faida Musa'ad[c)], Irna Rusani[d)]

Universitas Muhammadiyah Sorong, Sorong, Indonesia

[a)]Corresponding author: arieanangsetyo.ums@gmail.com
[b)]ruslanlayn56@gmail.com
[c)]faidamusaad@gmail.com
[d)]irnarusani.ums@gmail.com

Abstract

Multimodal interactive digital teaching materials are learning materials that contain learning materials that are in accordance with learning objectives designed by utilizing various resources including text, images, audio, video, music, and social media in the form of YouTube, tik tok, and appropriate internet links and are interactive because they are digital based. The aim of this activity is to improve teachers' understanding and skills in using multimodal digital teaching materials in 21st century learning. Participants in the community service activity were 25 participants consisting of teachers. This activity was carried out at MTs Al Gebra, Sorong City and MI Al Islah, Sorong City. The methods used in multimodal digital training are material presentation, discussion and training simulation. The results of this training have a positive impact on teachers in managing the learning process. This can be seen from the analysis results that 80% of participants have increased knowledge, 80% of participants have increased creativity and 80% of participants need continuous training in increasing knowledge to prepare themselves in facing the digital era 4.0.

Keywords: Multimodal Interactive Digital, Teaching Materials, 21st Century, Mathematics Learning

INTRODUCTION

Technology is an important component in modern life, as well as in the world of education. To face the development of 21st century education, a teacher is required to have the ability to operate information and communication technology (ICT) so that he can keep up with educational developments in the 4.0 era (Aryana et al., 2022),(Auliya Vilda Ghasya & Kartono, 2020) (Riadi et al., 2022). Learning process in the 4.0 era. using digitalization so that teachers can package learning activities that attract interest and better facilitate learning for students (Yunansah et al., 2022), One of the digitization of learning is the use of teaching materials.

Multimodal digital teaching materials are one of the teaching materials that are effectively used in the digital era (Masfingatin et al., 2021). Multimodal teaching materials are a teaching strategy that uses a Learning Management System (LMS). This learning system can be accessed for free and can combine elements such as images, audio files, videos and illustrations so that students can use visualization and auditory learning methods (Al Fajri, 2018); (Pérez-Marin et al., 2022).

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Digital-based teaching materials can support the learning process during class, especially in mathematics learning which requires teacher innovation to be able to create an interesting learning process and of course make it easier for students because they can access lessons anywhere and anytime without being bound by time and place (Yunansah et al., 2022). However, there are still many teachers who do not use digital teaching materials to support the mathematics learning process, this is because teachers do not know what teaching materials should be used for mathematics subjects. The learning process carried out using digital will increase the quality of education for students, so there is a need for multimodal digital media training and assistance aimed at teachers. This is in line with Setyo et al., (2022) who conducted research at the student level which stated that multimodal digital teaching materials were effectively used to facilitate the learning process.

The aim of this program is to increase teachers' knowledge and abilities in using multimodal digital teaching resources in 21st century learning and is aimed specifically at teachers. Apart from that, this training is also expected to help teachers understand and have skills in utilizing multimodal digital teaching materials in 21st century mathematics learning.

METHOD

This community service activity was carried out at MTs Al Gebra, Sorong City on 19-20 July 2023 and MI Al Ishlah, Sorong City on 21 and 22 September 2023, with a total of 35 participants and was carried out to provide insight and knowledge related to learning. 21st century and interesting, digital-based learning strategies with stages: Presentation of material, discussion, and simulation. The data collection instrument was a questionnaire regarding participant responses before and after the activity. This activity is carried out in three activity methods presented in the diagram below.

Figure 1. Activity diagram

Material Presentation

This activity aims to provide insight and knowledge about 21st century learning and multimodal interactive digital teaching materials for 21st century mathematics learning, especially to teachers at MTs Al Gebra Sorong City and MI Al Ishlah Sorong City by providing materials regarding 21st century learning and materials. multimodal interactive digital teaching for 21st century mathematics learning, multimodal features that can be used in learning accompanied by providing examples of account registration, use of video, audio, material features, interactive digital teaching materials via https://heyzine.com/, this activity is carried out offline.

Discussion

Activities in the discussion process with teachers aim to discuss where teachers lack understanding, either regarding the material or various features that have been provided and the benefits of using them.

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Training Simulation

Teachers at MTs Al Gebra, Sorong City and MI Al Islah, Sorong City, took part in an introduction and simulation of using https://heyzine.com/ with the aim of helping participants better understand how to use the service and utilize it in creating interactive digital teaching materials.

RESULTS AND DISCUSSION

Community service activities related to the use of multimodal interactive digital teaching materials in 21st century mathematics learning was attended by 35 participants from two schools in Sorong City, namely MI Al Ishlah and MTs Al Gebra. This community service activity uses 3 stages, namely presentation of material, discussion, and simulation of making multimodal digital teaching materials for 21st century mathematics learning with the hope of increasing the teacher's insight and knowledge so that it can be used during the learning process. This can be seen in the results of giving a questionnaire using Google Form in diagram 1 below.

Increasing teacher insight and knowledge in 21st century learning

One of the objectives of this community service activity is to increase insight and knowledge related to 21st century learning. Increasing teacher insight and knowledge is carried out through the presentation of material and discussions related to 21st century learning and multimodal interactive digital teaching materials for 21st century mathematics learning. The results of implementing activities are measured through online participant response questionnaires obtained data as in Figure 1.

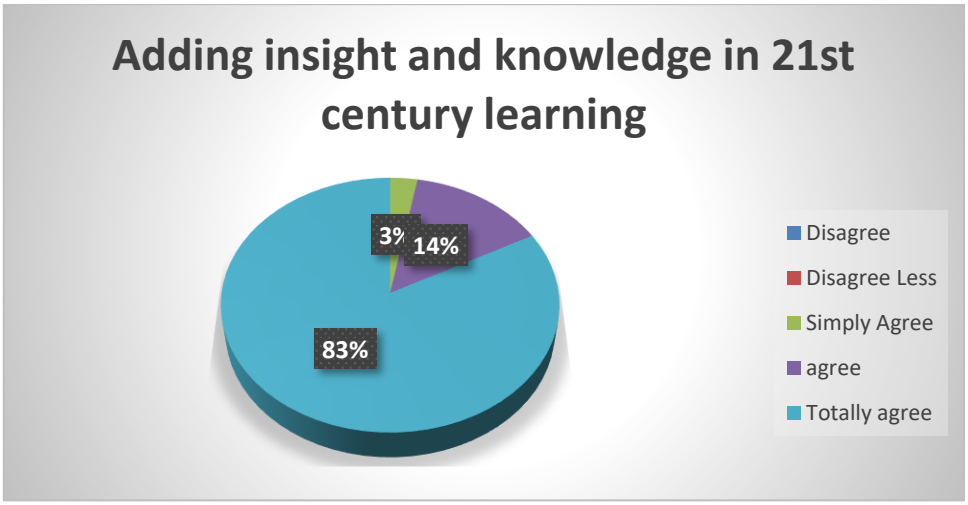

Figure 1. Data on Participants' Responses to Increased Insight and Knowledge

In line with Figure 1. It can be seen that of the 35 participants, 3% stated that they quite agreed, and 83% stated that they strongly agreed that the implementation of activities could increase insight and knowledge related to 21st century learning, so it can be concluded that community service activities with the title utilization Multimodal interactive digital teaching materials for 21st

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century mathematics learning increase the insight and knowledge of MTs Al Gebra and MI Al Ishlah teachers in Sorong City. Apart from increasing teachers' knowledge and understanding, this training also increases teachers' creativity in managing learning during, the results of the questionnaire can be seen in Figure 2.

Develop teacher creativity in managing 21st century learning.

This community service activity is also an effort to foster the creativity of MI Al Ishlah and Mts AL Gebra teachers in Sorong City in managing 21st century learning and creating multimodal interactive digital teaching materials for 21st century mathematics learning. Data related to teacher responses are presented in Figure 2.

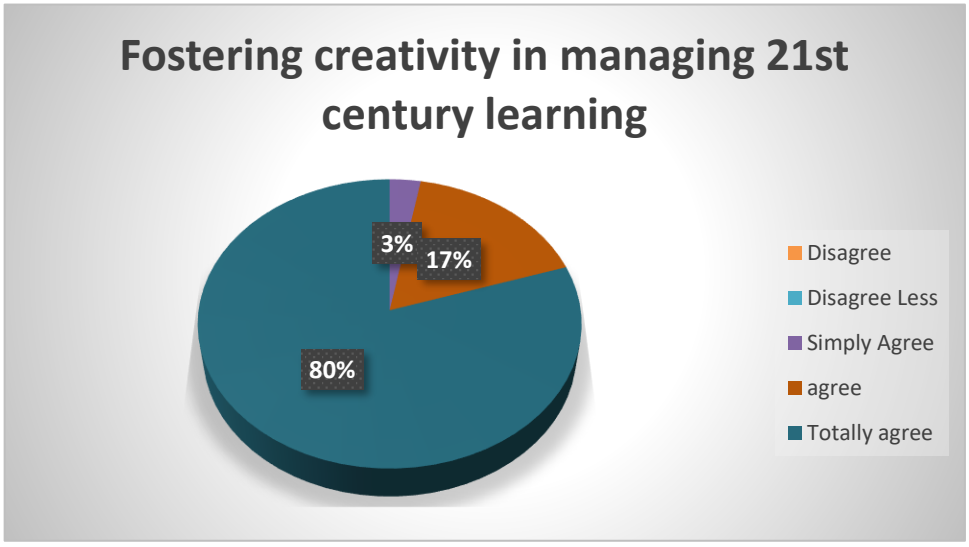

Figure 2. Results of analysis of teacher creativity in managing 21st century learning

Figure 2. Illustrate that the highest response was strongly agree and the lowest was quite agree with percentages of 80% and 3%. These data show that, through this community service activity, teachers can foster creativity in managing 21st century learning and creating multimodal interactive teaching materials based on 21st century learning. So, it can be concluded that with this training teachers are helped in designing 21st century learning, implementing the learning process 21st century, and create multimodal interactive teaching materials based on 21st century learning, so that teachers can carry out learning in a more interesting and enjoyable way for students and can improve students' 21st century skills.

The need for self-development activities to be carried out on an ongoing basis.

In addition to participants' responses regarding the benefits of service activities for increasing insight and knowledge as well as fostering teacher creativity in managing 21st century learning and developing multimodal interactive digital teaching materials for 21st century mathematics learning, data was also collected regarding whether similar activities are carried out sustainably, the results of which are presented in Figure 3.

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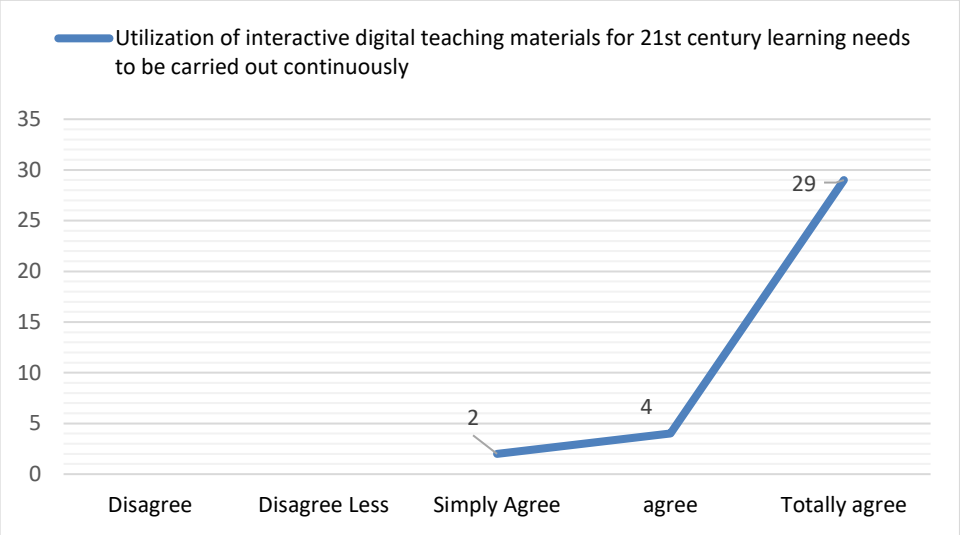

Figure 3. Results of analysis of participant responses regarding the continuity of activities

It can be seen in Figure 3. 80% (29) of the participants who took part in this community service activity stated that activities related to multimodal interactive digital teaching materials and 21st century learning need to be carried out continuously so that teachers have the knowledge to face the challenges of the 21st century. So, it can be concluded that enthusiasm The same thing needs to be done on an ongoing basis to improve teacher professionalism. The activities carried out at MTs Al Gebra, Sorong City and MI Al Ishlah, Sorong City, ran smoothly and received full support from the school principals and participating teachers. The description of the situation in implementing multimodal digital training was met with enthusiasm when providing the material.

Figure 4. Documentation at MTs Al Gebra

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Figure 5. Documentation of activities at MI Al-Ishlah, Sorong City

The results of this community service activity can be concluded that this community service activity can increase insight and knowledge as well as foster teacher creativity in managing 21st century learning and creating multimodal digital teaching materials for 21st century mathematics learning. This is in line with the data analysis results. It can be concluded that there is an increase insight and knowledge as well as teacher creativity in managing 21st century learning and the use of multimodal interactive digital teaching materials in 21st century mathematics learning, this activity can help teachers to be more creative in planning, implementing and designing 21st century learning, this is in line with the opinion of (Irianti et al., 2020), (Anggreini & Priyojadmiko, 2022); (Shalahudin, 2020); (A A Setyo et al., 2022) ; (Musa et al., 2023); (Arie Anang Setyo et al., 2019) which states that multimodal digital training can increase teacher motivation in carrying out digital-based learning and increase teacher ability to make the learning process more quality in facing the challenges of the 4.0 era.

CONCLUSION AND RECOMMENDATIONS

The implementation of community service activities carried out by MI Al Ishlah and MTs Al Gebra teachers in Sorong City went smoothly and was able to increase insight and knowledge as well as foster teacher creativity in managing 21st century learning and

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creating multimodal digital teaching materials for 21st century mathematics learning. Similar activities were also carried out. needs to be done on an ongoing basis.

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