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Integration of Hologram Technology in Entrepreneurship Lockers as Innovative Learning for Students

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Abstract

Entrepreneurship education has become very important in today's digital era, especially in preparing the younger generation to face global economic challenges. Sekolah Nasional Nusaputera has the potential to enhance entrepreneurship literacy through technology, but has experienced a decrease in the use of IoT-based entrepreneurship lockers and cashless payment systems post-Covid-19 pandemic. This research aims to address these issues through the development of hologram technology as a tool to improve students' and teachers' understanding of entrepreneurship and technology literacy. The methods used include needs analysis, the development of interactive hologram content, training, and information dissemination. The results indicate that the use of holograms successfully captured students' interest and improved their understanding of entrepreneurship lockers and digital promotion. However, students also desire further development, including the integration of AI technology and animation, to make learning more interactive. In conclusion, hologram technology has proven effective in enhancing digital promotion and student engagement at Sekolah Nasional Nusaputera, while also opening opportunities for further innovation in this field.

Keywords: *digital promotion, entrepreneurship, entrepreneurship lockers, hologram technology, technology innovation*

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Introduction

Entrepreneurship education is crucial to preparing the younger generation to face the challenges of the global economy. Recent research shows that financial literacy and technological understanding are key factors in developing entrepreneurial potential among students (Veronica, 2021; Widayanto et al., 2023; Yunita et al., 2025). However, there are still various challenges, especially related to the adoption of appropriate technology in educational environments. The development of technology is increasingly being used in almost all fields, even in education. In education, technology is used to help teachers deliver learning. The development of technology and communication science encourages humans to continue to adapt quickly. Digitalization is everything that was previously analog or traditional, reconstructed using technology so that it is digital (Sari et al., 2020).

Sekolah Nasional Nusaputera is one of the institutions that has great potential to improve entrepreneurial literacy among its students. During the Covid-19 pandemic, Sekolah Nasional Nusaputera received a technology grant in the form of an entrepreneurial locker that allows students and teachers to carry out the entrepreneurial process assisted by IoT technology and cashless payments with QRIS (Dewi et al., 2024; Putra, 2023; Cahyaprawira et al., 2022). The technology provided allows sellers and buyers to make transactions without face-to-face contact, thus reducing the risk of transmission of the Covid-19 virus. Currently, there is a decline in the use of IoT-based entrepreneurial lockers and QRIS payments, because many have returned to choosing direct transaction methods. This shows the need for innovation in the application of technology, considering that many students and educators are not yet familiar with the existing system.

Therefore, there needs to be a new technological innovation that can support technology-based entrepreneurial activities. Hologram technology, as a new approach to information dissemination and education about the entrepreneurial locker business model, can be used to present attractive visuals, but also encourage student interaction and participation in the learning process. Hologram technology itself has been used in various things, including as an interactive educational medium (Hassan et al., 2021; Nabila et al., 2024).

By providing interactive information dissemination sessions and direct training, it is expected that students can better understand important aspects of the world of entrepreneurship. The

activeness of teachers and students is very important to ensure the success of this program. Due to the use of new technology, information dissemination is one of the main factors for the success of this project. So that the holograms created can provide interesting and informative information to support the use of entrepreneurship locker technology, and other technologies as well. With the implementation of this project, it is expected to increase not only the utilization of fintech-based entrepreneurship lockers but also a deeper understanding of entrepreneurship, financial literacy, and cutting-edge technology among students at Sekolah Nasional Nusaputera.

Through a community service at Sekolah Nasional Nusaputera, the formulation of the problem raised is related to the development of hologram technology to improve literacy related to the use of existing technology interactively. This is due to the decline in interest in using entrepreneurial lockers after the Covid-19 pandemic, so it is necessary to study how to overcome this phenomenon and the factors that influence student and staff preferences. In addition, students' and teachers' understanding of Internet of Things (IoT) technology and the cashless payment system integrated into the locker are also important obstacles that need to be identified to determine the steps that can be taken to improve technological literacy in the school environment.

The lack of information dissemination and education about entrepreneurship lockers poses a challenge in introducing this concept to students and teachers. Therefore, efforts are needed to optimize information dissemination, as well as find the most effective learning methods to educate students and staff about the fintech-based entrepreneurship locker business model through hologram technology. By using holograms to simulate real-world business scenarios, such as financial management, marketing strategies, and locker operations, students can interact with these holograms, allowing them to practice decision-making and see the impact of those decisions in real time.

With the use of holograms, students can understand how entrepreneurship lockers work. They are no longer confused in using entrepreneurship lockers because information dissemination with holograms is carried out continuously every day. In addition to information disseminating entrepreneurship lockers, holograms can also be used to promote other activities and technologies because holograms are good for use as storage media, as they can record light intensity so as to provide additional information (Cantikasari, 2024).

Holograms are run or implemented via a TV screen, then the object is projected onto a prism-shaped projector media so that the object is displayed in 3D and can be viewed 360 degrees (Suharto & Priyanto, 2022). The design of a 3D hologram reflector can be in the form of a hologram pyramid made of glass, mica, or acrylic, which is arranged like a pyramid with the top cut off (Sari et al., 2020). Hologram technology can ensure detailed visualization for representations down to the smallest points, allowing students to understand more specific components in detail and clearly (Cantikasari, 2024). Hologram content that can be updated regularly according to the latest information developments. This ensures that the content delivered is always relevant and up-to-date. Students and teachers can also take part in creating the next content. Active participation from students and teachers is also expected to ensure the success of this program, so it is important to encourage their involvement in entrepreneurship activities and the use of entrepreneurship lockers. The school already has entrepreneurship lockers, as shown in Figure 1. However, their use is still minimal.

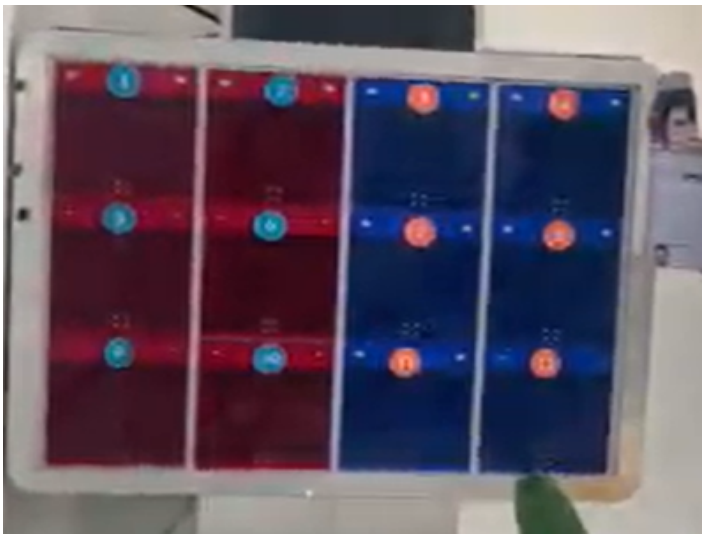

Fig. 1. Entrepreneurship lockers

Methods

Community service begins with finding out the needs of partners through to a service evaluation survey, which is shown in Figure 2. This community service approach began with interviews with partners. These interviews aimed to identify issues related to the low utilization of technology-based entrepreneurship lockers. The interviews revealed that many students were unfamiliar with how these lockers worked. Next, the community service team designed and

developed a solution, integrating hologram technology. This solution helped meet the partners' needs, enabling students to understand the function and operation of the entrepreneurship lockers. This development included creating and editing interactive and engaging educational hologram content, as well as creating a physical hologram framework.

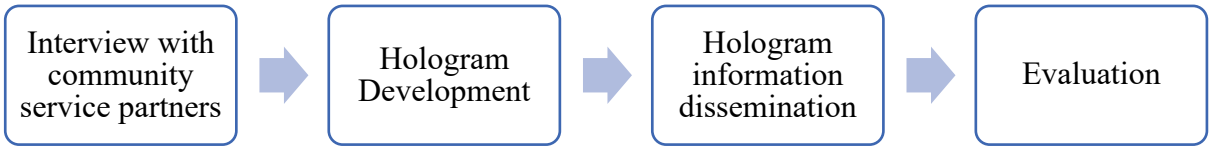

Fig. 2. Method's flow

After the hologram equipment was assembled, training and outreach were conducted for students and teachers regarding the use of hologram technology and the content that had been developed. The information dissemination process involved direct dissemination and the practice of creating simple hologram content. After the dissemination was carried out, an evaluation of the impact of the application of hologram technology on increasing understanding and use of locker entrepreneurship was carried out through observation of student and teacher participation in activities involving the technology.

Results and Discussions

The community service process began with an analysis of the needs of community partners. Figure 3 shows the interview process with partners, which identified issues related to the declining use of entrepreneurship lockers. Therefore, the resulting discussions led to an innovation to attract student and teacher interest in utilizing entrepreneurship locker technology.

Interviews with community service partners at the Sekolah Nasional Nusaputera led to the creation of an innovation in the form of hologram technology. This technology enables information to be conveyed through light reflections on the hologram device, and can be viewed from all angles. A hologram explaining the concept of a fintech-based entrepreneurial locker business model was created. This hologram will present information visually and

interactively, making it easier for students to understand. In addition to the hologram, a frame is also needed to support the hologram and a TV to display the content, as shown in Figure 4.

Fig. 3. Discussion with community service partner

The hologram creation process was carried out by the community service team, assisted by student assistants, starting with framework development and then continuing with content development. Once the framework was complete, the students proceeded to create sample hologram content. The content development in Figure 5 aims to promote entrepreneurship lockers.

Fig. 4. Hologram frame

Fig. 5. Hologram content development

After the content was ready, they continued with the editing process. The editing was done using an application that was important for producing a 4-sided video. When the video content was ready, the video was inserted into a flash drive. The flash drive was then inserted as input to the TV for the video to be played repeatedly. Next, the handover of the hologram technology to partners took place, followed by the process of information dissemination about the use of the technology so that the partners could operate the tool properly.

Fig. 6. Information dissemination of the use of hologram technology

Figure 6 shows that the information dissemination of entrepreneurship lockers had been conducted to all partners, including students, staff, teachers, and the leaders of Sekolah Nasional Nusaputera. During the event, students also participated in the practice of creating

video content that will be integrated into hologram technology. Content creation only requires a green screen, a camera phone, and a good microphone. Students were also invited to view the video results displayed in the hologram. Figure 7 shows that students paid attention to the explanation of the use of holograms and also how to create and edit content. They were also enthusiastic about practicing creating short content and seeing the results in the hologram.

Fig. 7. Student participation

After the event was completed, an evaluation process was continued using Google Forms. The form link was distributed to the students who participated in the training, and 20 students responded. Figure 8 shows the results of the survey. For a particular question, a score close to 5 means the respondent perceived it to be understandable, useful, or interesting. The results show that the majority of participants understood how holograms work. Furthermore, the majority of participants saw the benefits of hologram technology in enhancing innovation in digital promotion, and also expressed interest in the future development of holograms, which could enhance existing innovations related to digital promotion.

The next evaluation was an open question given to students. Figure 9 shows that some students expect further development related to hologram technology, such as the use of AI and animation. This shows students' enthusiasm for the development of technology that can be collaborated with holograms.

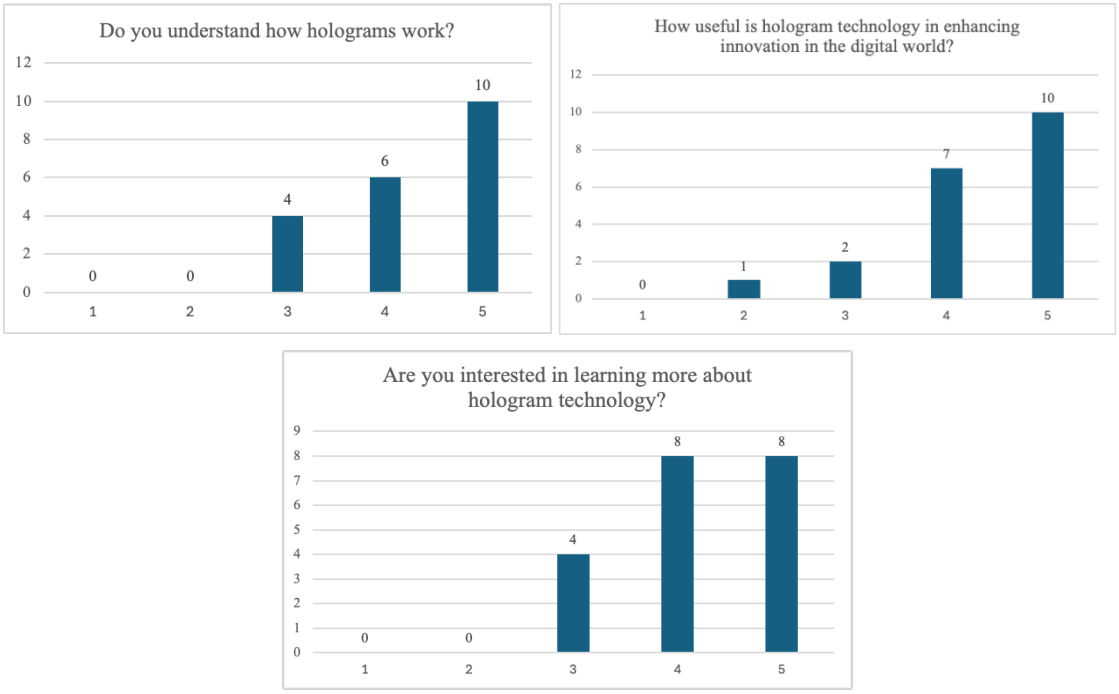

Fig. 8. Evaluation result 1

Teachers can also use holograms as one of the teaching tutorials, which can certainly attract interest and increase student motivation towards the learning process (Ramlie et al., 2022). Several studies on the use of 3D holograms as learning media have been conducted by Pamenang & Nathasya (2024). Their research has produced 3D hologram learning media for the molecular structure topics.

What are your suggestions for increasing innovation in the field of digital promotion?
- Further development in the digital field
- Further development in digital holograms and 3D
- Use holograms as billboards
- More workshop
- Add fitur AI
- Use animation
- Add fitur AI and animation
- etc

Fig. 9. Evaluation result 2

Conclusion

Entrepreneurship lockers are designed to make it easier for small business owners to sell goods through these lockers. In addition to business owners, students and teachers are also facilitated

in shopping. This tool allows users to control the locker remotely via an internet-connected device, such as a smartphone. This aims to reduce physical interaction between buyers and sellers. There was a problem that students' interest in using entrepreneurship lockers was starting to decline. From the results of interviews with community service partners, the use of hologram technology is one of the innovations to increase digital promotion at Sekolah Nasional Nusaputera. It can be concluded that the use of hologram technology can be used as one of the technologies for digital promotion. One of the digital promotions carried out is by promoting entrepreneurship lockers at partner locations. Students also feel enthusiastic about the training process carried out. Students are involved in taking content, editing content, and watching their videos on the hologram device. During the evaluation, many students showed interest, and in the open questions given to students, there is still a need to develop the hologram technology utilized to make it more interesting and interactive. Future studies could incorporate holograms into the learning process, potentially leading to innovative teaching methods. Furthermore, entrepreneurship lockers could be developed to market students' creative products.

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