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Student Survey on Creative Technology-Based Summary Tasks to Strengthen 21st-Century Teaching Skills

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Abstract
21st-century education demands that prospective educators possess creativity, critical thinking, communication, collaboration, and digital literacy. This study aims to determine students' responses to the implementation of the Creative Technology-Based Summary Task as a strategy for strengthening 21st-century teaching skills. The study used a survey method with a five-point Likert scale questionnaire instrument given to 20 students of the Physics Education Master's Program at the State University of Malang who had taken the Physics Learning Foundations course. Data were analyzed descriptively to obtain an overview of the tendencies of student responses. The results showed that the majority of students responded positively to the implementation of this task. 85% of respondents considered this task to strengthen critical thinking skills, 90% considered it to increase creativity, 75% considered it contributed to communication skills, and 80% stated that it was able to increase engagement and digital literacy. The variety of creative products produced by students included posters, comics, educational games, Instagram feeds, educational videos, and TikTok content. Reflecting students' ability to integrate technology into learning. This study concluded that the Creative Technology-Based Summary Task plays an important role in equipping students with 21st-century pedagogical competencies. It is recommended that further research involve a wider range of respondents, across study programs, and examine the long-term impact on teaching practices in schools.

Keywords: 21st century education, Creative Technology Based Summary Task, Digital literacy, Creativity, and Teaching skills

INTRODUCTION

21st-century education demands that prospective educators possess skills beyond mere mastery of academic content. Creativity, critical thinking, collaboration, and digital literacy are essential competencies that must be developed in the learning process. Technology is no longer merely a complement but has become an integral part of teaching strategies in the digital age, including in teacher education and teacher candidates (Siregar, 2024).

21st-century teaching skills require teachers not only to master subject content but also to design learning that encourages active student participation through the use of technology and creative learning media. Previous research has emphasized that teachers skilled at integrating technology into teaching practices are better able to create interactive and meaningful learning environments (Usman et al., 2025; Kamilasari, 2025). Furthermore, teachers' readiness to innovate is crucial for students' success in facing the demands of 21st-century competencies (Theodorio et al., 2024). In line with these demands, in the Learning Foundations course in the Physics Education Master's Program at the State University of Malang, students are not only required to understand theoretical concepts but are also trained to express these concepts in creatively developed *Creative Technology-Based Summary Tasks*. *These Creative Technology-Based Summary Tasks* are designed into infographics, digital presentations, or application-based learning media, so that students become accustomed to presenting material with innovative approaches. In this way, the Learning Foundations course serves not only to reinforce theoretical aspects but also as a strategic provision in teaching skills that are appropriate to the needs of 21st-century learning.

Previous research has shown that technology integration in teacher education plays a crucial

role in improving teaching readiness and strengthening pedagogical and content skills (Wilson et al., 2020). With the implementation of the *Creative Technology-Based Summary Task* at Malang State University, it is important to understand how students assess the *Creative Technology-Based Summary Task* in an effort to strengthen their skills as future educators.

Therefore, this study was conducted with the aim of surveying students' responses to the *Creative Technology-Based Summary Task* in the Learning Foundations course. This survey is expected to provide an overview of the extent to which this learning strategy is able to strengthen 21st-century teaching skills, including creativity in developing materials, digital literacy, pedagogical skills, and readiness to face the challenges of modern learning.

METHOD

This study used a survey method with a questionnaire as the instrument. The questionnaire was compiled using a five-point Likert scale, namely score 1 (very negative), score 2 (negative), score 3 (sufficient), score 4 (positive) and 5 (very positive). The instrument used was a questionnaire sheet. This instrument was designed to obtain quantitative data regarding students' responses to the implementation of the *Creative Technology Based Summary Task* in the Learning Foundations course. Respondents in this study were 20 students of the Physics Education Masters Program at the State University of Malang who had taken and completed the course. The questionnaire data were then analyzed descriptively to describe the tendency of students' responses to the contribution of the *Creative Technology Based Summary Task* in supporting the strengthening of 21st-century teaching skills. The respondents' answer scores for each question were presented using the equation:

$$P_s = \frac{S}{N} \times 100\%$$

Information:

Ps = Percentage size

S = Number of respondents' answers

N = Maximum number of answers in an item (Sugiyono, 2016).

RESULTS AND DISCUSSION

Based on the results of a survey of 20 Master of Physics Education students at the State University of Malang, it was found that the majority of respondents gave a positive response to the implementation of the *Creative Technology Based Summary Task*. The *Creative Technology Based Summary Task* in this paper is intended as a summary of lecture discussions in one meeting packaged in various types. Most students stated that the activity of summarizing other groups' presentation materials and packaging them in the form of digital innovations, such as videos, comics, educational games, or social media designs, was able to improve their understanding and pedagogical skills. This shows that this kind of task does not only function as a passive evaluation, but also encourages active student involvement in the learning process.

Of the 13 questions asked in the survey, all student responses were then classified into six main aspects relevant to the research objectives, namely (1) critical thinking (HOTS), (2) creativity, (3) communication, (4) involvement/attention, (5) digital literacy, and (6) technical/time constraints. This classification was carried out by grouping questions that had a similar focus, for example, questions that touched on students' ability to filter and organize information were included in the critical thinking aspect, while questions related to media innovation were placed in the creativity aspect. After that, the frequency of positive answers in each aspect was calculated and converted into percentages, so that a general picture of the tendency of student responses to the effectiveness of the *Creative Technology Based Summary Task was obtained*. The results of the classification and calculations can be seen in Figure 1.

Survey results indicated that 85% of respondents considered this assignment to strengthen critical thinking skills because they had to filter, organize, and repackage information. This finding aligns with research by Hery (2024), which emphasized that technology-assisted creative task-based learning strategies can train students to integrate conceptual understanding with scientific communication skills. Therefore, the technology-based *Creative Technology-Based Summary Task* can be a means of strengthening *higher-order thinking skills* (HOTS) in higher education.

In terms of creativity, 90% of respondents assessed that this assignment required innovative

thinking in selecting relevant media. Some students chose to create comics to convey abstract concepts visually, while others developed short videos or simple games. This supports the findings of research by Zain and Andriany (2024), which states that utilizing digital media in college assignments can improve 21st-century skills, particularly creativity and collaboration. The survey also revealed that 75% of respondents felt their communication skills improved because they had to adapt their presentation style to the digital platform used. For example, creating an Instagram *feed* requires concise messages, engaging visuals, and easy-to-understand content. Meanwhile, video creation emphasizes a clear narrative flow. This aligns with the opinion of Putri et al. (2023) that effective communication is one of the core competencies within the 21st-century skills framework that can be trained through technology.

As many as 80% of respondents stated that this assignment encouraged them to be more active in participating in their peers' presentations, as the presentation results became the basis for resumes that needed to be repackaged. In other words, this activity increased students' attention and engagement during the lecture. These results support a study by Yasin et al. (2024) which found that the strategy creative resume-based learning can increase active student participation while fostering individual responsibility for learning. Furthermore, this assignment is considered effective in improving digital literacy. Most students reported the need to learn new applications, such as graphic design applications, video editing software, or digital comic creation platforms. This aligns with the findings of Sudarman et al. (2024) that integrating technology into coursework can develop students' *digital literacy skills,* a crucial competency in the era of the 4.0 industrial revolution.

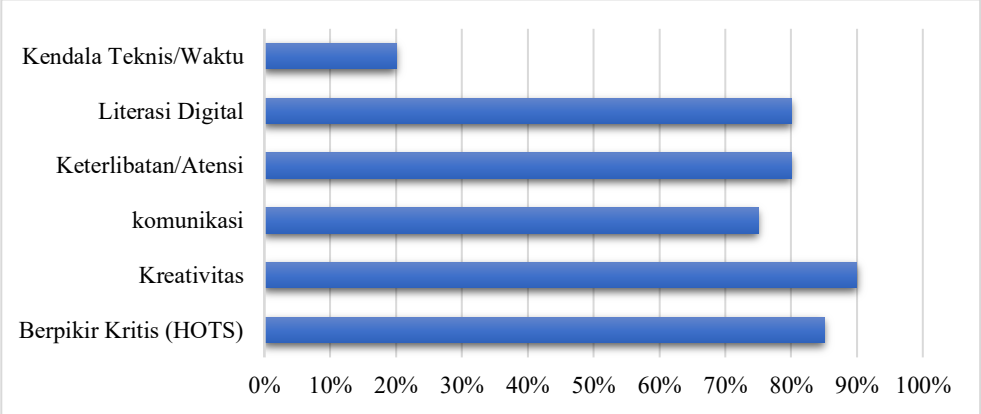

Figure 1. Survey Classification Results

However, the survey results also noted challenges. Around 25% of respondents cited constraints related to time constraints and technical skills in using certain applications. However, these constraints did not diminish the primary benefits; instead, they motivated students to be more adaptable. This is consistent with a study by Satriani and Khoirul Anwar (2023), which found that initial difficulties in utilizing technology can actually stimulate students to improve their independent learning and *problem-solving skills*.

From a pedagogical perspective, respondents assessed that the experience of developing this technology-based *Creative Technology-Based Summary Task* provided a concrete illustration of how they could integrate technology into their future teaching practices. In other words, this assignment not only enriched the students' learning experience as participants but also equipped them with innovative models that they could apply as educators. This finding is supported by Panggabean et al. (2022), who emphasized the need for prospective teachers to practice using technology meaningfully in the teaching and learning process.

In addition to students' positive responses to the benefits of the *Creative Technology-Based Summary Task,* this study also found a variety of creative products. In the Behavioral Learning Theory material in the Physics Learning Foundations course, students were able to express their understanding in various different digital media, ranging from posters, educational games, Instagram feeds, educational videos, TikTok posts, to comics. This variety of products demonstrates the broad potential of technology integration in channeling students' pedagogical ideas. The results of the students' *Creative Technology-Based Summary Task* are as shown in Figure 2.

The poster product highlights students' ability to present information concisely and visually with

attractive graphic designs. This finding aligns with research by Haidar et al. (2025), which emphasized that scientific posters not only serve as information presentation tools but also can train students' analytical and aesthetic thinking skills. Furthermore, these results support the opinion of Wisanti et al.. (2024) found that the use of posters in science learning can improve students' attention, conceptual understanding, and scientific communication skills. Thus, the use of posters as a *creative Technology-Based Summary Task* has proven effective in developing the cognitive and affective dimensions of prospective teachers.

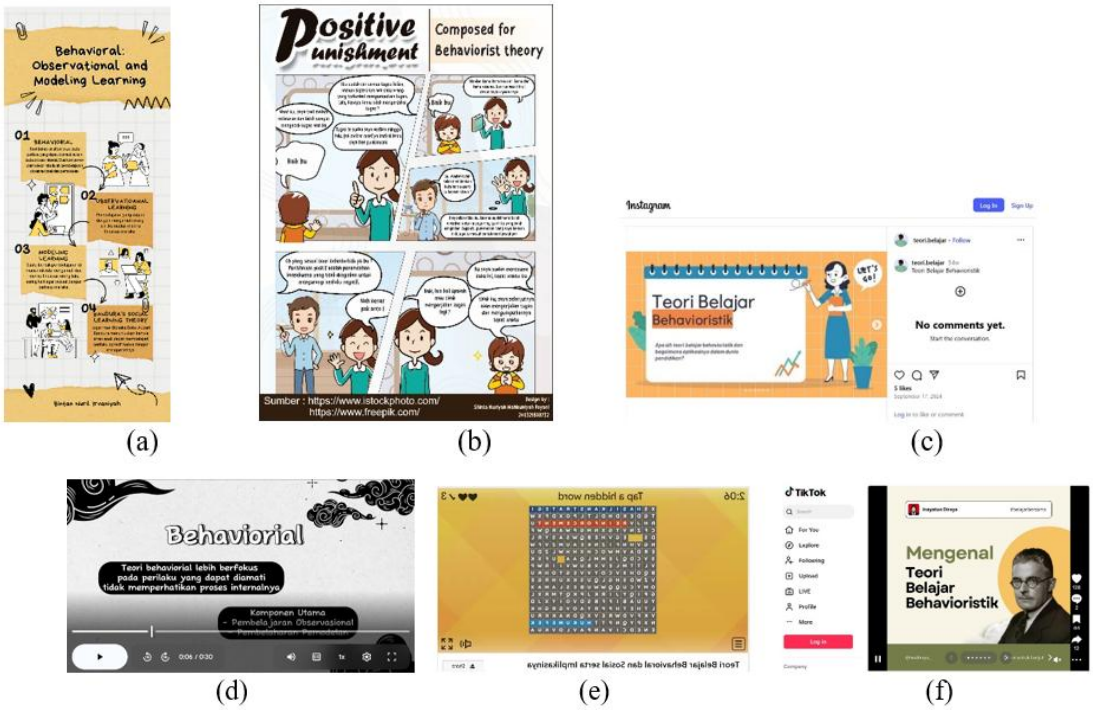

Figure 2. Types of Creative Technology Based Summary Tasks: (a) posters, (b) comics, (c) Instagram feeds, (d) videos, (e) educational games, and (f) TikTok posts

Educational comics have also emerged as student work. Comics allow for simple story representation with easy-to-understand characters, allowing stimulus-response concepts to be explained narratively and in a fun way. This supports the findings of Ulviah et al. (2021) ; Handayani and Koeswanti (2020) even showed that comics can motivate students, increase reading interest, and help them understand abstract science content. Furthermore, Setiani et al. (2021) found that the use of digital comics in physics learning can strengthen concept retention because the narrative presentation makes it easier for students to connect theory to everyday experiences. Thus, these student comics demonstrate the integration of visual, narrative, and conceptual literacy that supports 21st-century pedagogical competencies.

The educational games developed by students demonstrate a high level of skill in combining entertainment and education. This aligns with the findings of Islam et al. (2024), who stated that *game-based learning* can increase learning motivation while strengthening in-depth conceptual understanding. Similar findings were also expressed by Mahmubi and Homaidi (2025), who stated that games can create a challenging, interactive, and contextual learning environment, making it easier for students to build knowledge. Research by Sari and Yustiana (2022) also supports that game elements can foster students' emotional and cognitive engagement in learning. Therefore, the educational games produced by students not only demonstrate creativity but also demonstrate the application of innovative, technology-based learning.

The Instagram feed product emphasizes students' skills in crafting concise yet effective content. Research by Rachma et al. (2024) shows that social media can be a participatory learning space that encourages collaboration and reflection. Furthermore, these results align with the findings of Hapsari et al. (2020) who demonstrated that using Instagram as a learning medium can enhance students' motivation, creativity, and communication skills. Therefore, the Instagram feed, as a creative product

of *the Creative Technology-Based Summary Task,* equips students with digital literacy skills appropriate to 21st-century needs.

Meanwhile, the educational videos created by students demonstrate their ability to package abstract concepts into communicative narratives. This supports Alifah and Murtianto's (2024) argument that *multimedia learning* can strengthen understanding because it simultaneously involves visual and auditory channels. Research by Syafruddin and Nugraha (2025) ; Nurwahidah et al. (2021) confirms that student-produced videos provide a more meaningful, active learning experience than simply watching. Therefore, students' educational video products not only hone technical skills but also support pedagogical skills in designing effective learning media.

Interestingly, students also produced TikTok posts as a form of *creative Technology-Based Summary Task*. TikTok, which is usually synonymous with short entertainment, was transformed into an educational tool that presents behavioral learning theory in a popular and accessible way. This aligns with research by Krisdiyansah and Hakim (2022) ; Krisdiyansah and Hakim (2022) who found that using TikTok as a learning medium increases students' interest in learning because its short duration and light format make the material easier to absorb. Furthermore, Asgar et al. (2025) emphasized that integrating TikTok into learning can build digital literacy as well as creative communication skills. Thus, the TikTok posts produced by students demonstrate their ability to adapt to technological trends while utilizing them productively for pedagogical purposes.

The variety of media chosen by students represents a concrete application of the principle of *differentiated instruction,* which emphasizes the importance of varied strategies for more inclusive learning. This is highly relevant to the needs of physics education, which is often considered abstract and difficult to understand. Through this technological innovation, theoretical material such as *Behavioral Learning Theory* can be presented in a more concrete and applicable form. Thus, this research makes a real contribution to innovative learning strategies in higher education, particularly in pre-service teacher education programs. Support from previous research further emphasizes the urgency of implementing creative and reflective technology-based assignments. Furthermore, this strategy can be expanded to broader contexts, for example by integrating *project-based learning* or *collaborative online learning* to further strengthen students' 21st-century competencies. Furthermore, the resulting work also serves as *a best practice* that can be adapted to the context of physics learning in schools, so its contribution extends beyond postgraduate classes to broader educational practices.

CONCLUSION

The results of the study indicate that the *Creative Technology-Based Summary Task* received a positive response from Physics Education Master's students. This assignment was effective in improving critical thinking skills, creativity, communication, engagement, and digital literacy, while providing real-life experience in utilizing technology for learning. The variety of products produced reflects students' ability to select relevant digital media and support 21st-century teaching competencies. Further research is recommended to involve a wider range of respondents and across study programs for more comprehensive results. Further studies are also needed to examine the long-term impact to strengthen its contribution to the professional development of prospective teachers in the digital era.

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