Development of Technopreneur Learning Modules through Transformative Learning Strategies to Increase Student Entrepreneurial Interest

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Abstract: The development of the Technopreneur learning module by implementing transformative learning strategies at Taruna Bakti Kertosono Vocational School is an effort to increase students' interest in entrepreneurship field. The use of technology in supply chain management has opened the door to real-time monitoring, inventory optimization, and better collaboration with business partners. With the adoption of the right technology, businesses are able to adapt market changes quickly, create competitive advantages, and respond more responsively to customer needs in an ever-evolving business environment. Even in the industrial sector, technology has increased production efficiency, led to innovation in manufacturing processes, and created more sophisticated and high-quality products. Overall, technological developments have become the foundation that allows humans to optimize their potential and fulfill their needs and desires better. This research integrated the concept of technopreneurship and a learning approach that emphasized practical application, skill development, and student creativity. Through the use of qualitative methods, data was collected from literature studies, interviews, and observations to evaluate the impact of developing this module on students' entrepreneurial interest. The research results show that the Technopreneur module implemented with a transformative learning strategy provides a significant boost and increase the students' interest to be involved in the technology-driven business world.

Keywords: Interest in Entrepreneurship; Learning Module; Learning Strategy; Technopreneurship; Transformative

Introduction

Technological developments have become the main driver in meeting human needs and desires in various aspects of life (Priemer et al., 2020). In the healthcare sector, technology has brought about incredible breakthroughs, enabling more accurate diagnoses, more efficient treatments and more advanced medicines (Akhtar et al., 2022; Chikhaoui et al., 2022; Roy et al., 2022);. Moreover, in the field of communications, technology has revolutionized the way people connect with each other with the emergence of social media, chat platforms, and the ability to share information instantly from different parts of the world (Chodzirin, 2016);

(Özgen & Saydam, 2022). In the realm of education, technology plays an important role in providing access to wider and more varied learning resources, enabling distance learning, and enriching the learning experience through various interactive applications and platforms (Akhtar et al., 2022; Chikhaoui et al., 2022; Roy et al., 2022). Even in the industrial sector, technology has increased production efficiency, led to innovation in manufacturing processes, and created more sophisticated and high-quality products. Overall, technological developments have become the foundation that allows humans to optimize their potential and fulfill their needs and desires better

(Ahmad et al., 2018; Hawari & Noor, 2020; Ritonga et al., 2020; Sukmawati et al., 2023).

The use of technology has become the main pillar in the modern business management paradigm. In this digital era, technology is not only a supporting tool, but also fundamentally changes the way businesses run and managed. Some innovations, such as artificial intelligence, data analytics, cloud computing, and process automation have provided the ability to optimize operational efficiency, improve data-driven decision making, and create more personalized and connected customer experiences. Not only that, technology also enables the adoption of new business models, such as subscription-based services, sophisticated e-commerce platforms, and cross-platform integration that makes customer access easier (Janssen et al., 2019; (Holland & Gutiérrez-Leefmans 2018; Tolstoy et al., 2021). Additionally, the use of technology in supply chain management has opened the door to real-time monitoring, inventory optimization, and better collaboration with business partners. With the adoption of the right technology, businesses are able to adapt market changes quickly, create competitive advantages, and respond more responsively to customer needs in an ever-evolving business environment (Lampang Rajabhat et al., 2022; Von Kotzebue, 2022).

Entrepreneurs are currently competing to build digital companies with the aim of increasing competitiveness and efficiency of business processes through the use of science and technology. They understand that the digital era is not just a trend, but a necessity in running a business. By utilizing the latest information technology and innovation, entrepreneurs can create products and services that are more efficient, responsive to market needs, and can be accessed more easily by consumers in various parts of the world. Digital transformation is not just about creating applications or websites, but also changing the business paradigm as a whole from product development models to adaptive marketing strategies. This involves the application of artificial intelligence, data analytics, cloud technology, and a deep understanding of consumer behavior to ensure that the business not only exists, but also thrives in a competitive and dynamic business environment (Kapici & Akcay, 2023). The development of Technopreneur learning modules and the application of transformative learning strategies has great relevance in increasing students' entrepreneurial interest at Taruna Bakti Kertosono Vocational High School. This background is based on a global paradigm shift, where the need for entrepreneurial skills and technological understanding is increasingly becoming the main focus. In today's digital era, the ability to integrate technological innovation with an entrepreneurial spirit

is the key to success (Guo et al., 2020; Pan et al., 2019; Sjahruddin et al., 2022).

Vocational schools as secondary education institutions have a strategic role in preparing students to enter the world of work or become entrepreneurs. However, in a continuously developing context, the lack of learning modules that holistically combine aspects of technology and entrepreneurship can be an obstacle in building students' interest and readiness to be involved in the modern business world (Fahmi et al., 2021; Oktariyana et al., 2021). In addition, through transformative learning strategies, students' perspectives on entrepreneurship and technology can be broadened. Transformative learning encourages students to not only be consumers of technology, but also creators and innovators. Through this approach, students at Taruna Bakti Kertosono Vocational School will be encouraged to develop critical, creative and systematic thinking skills in facing the challenges of the dynamic business world. This strategy also facilitates learning experiences oriented towards hands-on practice, simulation, and collaboration, providing opportunities for students to apply technology knowledge in real business contexts. Thus, it is expected that the development of the Technopreneur learning module and the implementation of transformative learning strategies in vocational schools can trigger and enhance students' interest in the world of technology-based entrepreneurship.

Method

The research method in developing the Technopreneur learning module at Taruna Bakti Kertosono Vocational School through a transformative learning strategy will carry a holistic and participatory approach. This research was started with an in-depth literature study to understand the theoretical basis technopreneurship and various relevant transformative learning strategies (Fadli, 2021). Furthermore, qualitative approaches, such as in-depth interviews with relevant stakeholders, teachers, students, and professionals industry were carried out to obtain in-depth views and input regarding needs and expectations for learning modules as well as effective learning strategies. Module development will involve collaboration between technopreneurship experts, educators, and curriculum developers to ensure that the material presented is appropriate to student needs and relevant to current technological and market developments. This research concerns to ongoing evaluation during the module development process to ensure suitability, understandability, and the desired impact on students' entrepreneurial interests.

Results and Discussion

Implications of Technopreneur Module Development for Changes in Students' Entrepreneurial Interests

Entrepreneurial interest is one of the important factors that determines a person's success in running a business. Vocational school students are an age group that has great potential to become entrepreneurs because they have high enthusiasm and creativity. However, vocational school students' interest in entrepreneurship still needs to be increased. One effort to increase vocational school students' interest in entrepreneurship is to develop a technopreneur learning module that applies transformative learning strategies. This is one of the learning strategies that focus on developing students' potential holistically, both cognitively, affectively, and psychomotorically (Kuo et al., 2024; Suminar et al., 2022). Transformative learning strategies can influence vocational school students' interest in entrepreneurship in several ways, namely increase students' understanding of entrepreneurship. Transformative learning strategies can help students understand entrepreneurial concepts in depth. This can be done through learning activities that actively involve students, such as discussions, presentations, and practice (Almulla, 2020; Zhao, 2021);.

Generating student motivation for entrepreneurship. Transformative learning strategies can help students determine the importance of entrepreneurship in life. This can be done through learning activities that involve students in real experiences, such as industrial visits and entrepreneurship practices. Developing students' skills in entrepreneurship transformative learning strategies can help students to develop the skills needed for entrepreneurship, such as communication skills, critical thinking skills, and problem solving skills (Dias-Oliveira et al., 2024; Thornhill-Miller et al., 2023). Research data shows that developing technopreneur learning modules with transformative learning strategies can increase vocational school students' interest in entrepreneurship. Research conducted by Avsec et al. (2022); Ripollés & Blesa (2024) shows that students who take technopreneur learning with transformative learning strategies have a higher interest in entrepreneurship than students who take technopreneur learning with conventional learning strategies. Based on these data, it can be concluded that developing technopreneur learning modules with transformative learning strategies can be an effective way to increase vocational school students' interest in entrepreneurship. The following are several examples of learning activities that can be carried out in the technopreneur learning module through transformative learning strategies.

This is the process of learning entrepreneurship concepts in depth. Students can be divided into groups to discuss certain topics, such as business opportunities, marketing strategies, and financial management. Presentation is represents entrepreneurial ideas or insights. Students may be asked to make a presentation about their business idea. Practicum can be used to develop students' skills in entrepreneurship (Portuguez Castro & Gómez Zermeño, 2021; Wardoyo et al., 2023). They can be asked to practice making products, marketing products, or managing business finances. Industrial visits can be used to provide students with real experience about the business world. Students can visit companies or industries to see how the business is run directly. Entrepreneurial practice can be used to provide opportunities for students to apply the entrepreneurial skills they have learned. Students may be asked to start small businesses, such as selling products or services. Developing a technopreneur learning module with a transformative learning strategy requires critical planning and proper implementation. However, this effort can have a positive impact on increasing vocational school students' interest in entrepreneurship.

Technopreneur Learning Module Development

Transformative learning strategies at Taruna Bakti Kertosono Vocational School can be the key to stimulating students' interest in entrepreneurship. This can happen through a series of steps that integrate aspects of technopreneurship with transformative learning that is focused and relevant to future needs. First of all, module development must align the material taught with the latest technological trends and the needs of the current business world (Al-Ansi et al., 2023; Alenezi, 2023). The module must be able to bridge the gap between theory and practice, providing an in-depth understanding of how technology can be a foundation for innovation and the creation of business opportunities. Transformative learning strategies are important to stimulate students' interest in entrepreneurship. This approach does not only focus on the transfer of knowledge, but rather on the formation of students' skills, critical thinking, and creativity in dealing with real problems.

Student-centered learning models, such as case studies, projects, or business simulations, can be an effective means of encouraging innovative thinking and a deep understanding of technology in a business context (Hsu & Wu, 2023; Ionescu-Feleagă et al., 2025). In the learning process, the module must combine theory with practical application. Students need to be provided the opportunity to apply the knowledge gained in an environment that is similar to the real world. This could be through collaborative projects,

industry visits, or internship programs that allow students to be directly involved in technology-relevant business processes. On the other side, transformative learning also emphasizes the development of soft skills, such as communication, leadership and collaboration skills, which are important in the modern business context. Integrating these aspects in learning modules will shape students into individuals who are not only technologically creative, but also able to adapt and innovate in a dynamic business environment (Garrido-Moreno et al., 2024; Rumanti et al., 2023).

Finally, continuous and comprehensive evaluation of module development and its impact on students' entrepreneurial interest is crucial. With a good evaluation, successes, challenges and improvements needed to optimize the impact of the module on students' interest and readiness in entering the world of technology-based entrepreneurship can be identified (Borghi, 2024; Listyaningsih et al., 2024). By combining the development of modules that focus on technopreneurship and the implementation of transformative learning strategies that emphasize practical application and skills development, it is expected that it can increase students' interest in entrepreneurship at Taruna Bakti Kertosono Vocational School.

Conclusion

Transformative learning strategies at Taruna Bakti Kertosono Vocational School shows great potential in stimulating students' interest in entrepreneurship. Through the integration of technopreneurship concepts and a learning approach that focuses on practical application, skill development and student creativity, a solid foundation can be created for future generations to enter a technology-driven business world. Adoption of learning strategies that enable students to not only be consumers of technology, but also creators of innovative solutions, is the key in preparing them to face the challenges and opportunities of the future. Continuous evaluation of the influence of this module on students' entrepreneurial interest and readiness is important to ensure that this approach not only provides understanding, but also changes the paradigm and encourages real action in developing an entrepreneurial spirit among students at Taruna Bakti Kertosono Vocational School.

Conflicts of Interest
We certify that there is no conflict of interest with any financial, personal and other relationships with other peoples or organization related to the material discussed in the manuscript.

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