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Multimedia Based Immune System And Skin Health Education As A Learning Innovation

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Abstrak

Pembelajaran kesehatan pada pendidikan tinggi menuntut pendekatan inovatif agar materi yang bersifat kompleks dan abstrak dapat dipahami secara optimal oleh mahasiswa. Materi sistem imun dan kesehatan kulit merupakan bagian penting dalam pendidikan kedokteran, namun sering kali disampaikan melalui metode konvensional yang kurang mendukung pemahaman konseptual. Penelitian ini bertujuan untuk mengetahui pengaruh edukasi sistem imun dan kesehatan kulit berbasis multimedia sebagai inovasi pembelajaran terhadap pemahaman mahasiswa Fakultas Kedokteran Universitas Wijaya Kusuma Surabaya. Penelitian menggunakan pendekatan kuantitatif dengan desain quasi-experimental melalui non-equivalent control group design. Subjek penelitian terdiri atas dua kelas mahasiswa, yaitu kelas eksperimen yang mendapatkan pembelajaran menggunakan multimedia berbasis Canva dan kelas kontrol yang mendapatkan pembelajaran konvensional. Pengumpulan data dilakukan melalui pre-test dan post-test untuk mengukur peningkatan pemahaman mahasiswa. Hasil penelitian menunjukkan bahwa kemampuan awal kedua kelas relatif sebanding. Setelah perlakuan, kelas eksperimen menunjukkan peningkatan hasil belajar yang lebih tinggi dibandingkan dengan kelas kontrol. Hal ini menunjukkan bahwa penggunaan multimedia pembelajaran memberikan pengaruh positif terhadap pemahaman mahasiswa. Multimedia berbasis Canva mampu menyajikan materi secara visual, sistematis, dan menarik sehingga membantu mahasiswa memahami konsep sistem imun dan kesehatan kulit secara lebih efektif. Dengan demikian, edukasi sistem imun dan kesehatan kulit berbasis multimedia dapat dijadikan sebagai inovasi pembelajaran yang relevan dan aplikatif dalam mendukung peningkatan kualitas pembelajaran kesehatan di pendidikan tinggi.

Keywords: multimedia learning, immune system, skin health, learning innovation, medical education.

Health education in higher education requires innovative approaches to ensure students understand complex and abstract material optimally. The immune system and skin health are essential components of medical education, but are often delivered through conventional methods that do not support conceptual understanding. This study aims to determine the effect of multimedia-based immune system and skin health education as a learning innovation on students' understanding of the Faculty of Medicine, Wijaya Kusuma University, Surabaya. The study used a quantitative approach with a quasi-experimental design using a non-equivalent control group design. The subjects consisted of two classes of

students: an experimental class that received learning using Canva-based multimedia and a control class that received conventional learning. Data collection was conducted through pre-tests and post-tests to measure improvements in student understanding. The results showed that the initial abilities of both classes were relatively comparable. After treatment, the experimental class showed a higher increase in learning outcomes compared to the control class. This indicates that the use of multimedia learning has a positive impact on student understanding. Canva-based multimedia is able to present material visually, systematically, and attractively, helping students understand the concepts of the immune system and skin health more effectively. Thus, multimedia-based immune system and skin health education can be used as a relevant and applicable learning innovation to support improving the quality of health learning in higher education.

INTRODUCTION

Education essentially provides information, both knowledge and attitudes, to individuals, through which they can develop knowledge and behavior toward a better direction. In the world of health, education plays a strategic role in improving health literacy as part of promotive and preventive efforts in society (Kickbusch, 2001; Nutbeam, 2000; Nutbeam & Kickbusch, 2000; St. Leger, 2001). Health education is important because it contributes to the formation of healthy attitudes and behaviors from an early age. In this context, the material will be conveyed well if educators in their learning practices use learning media that can increase motivation in learning.

The immune system and skin health are part of health education that are quite complex because they involve abstract biological processes that cannot be directly observed. Concepts such as the body's defense mechanisms, immune responses, and skin function and structure are often difficult for students to grasp when presented only through verbal explanations or written text. As a result, learning tends to be rote, lacking in-depth conceptual understanding. This situation has the potential to lead to misconceptions that can influence how students view health and make decisions regarding healthy lifestyles. Therefore, delivering material on the immune system and skin health requires a learning approach that can simplify complex concepts into something more concrete and easily understood.

In classroom learning practices, educators, particularly lecturers, still rely on conventional methods such as lectures and textbooks to deliver immune system and skin health materials. This type of instruction tends to be one-way and discourages students from actively participating in the learning process. Limited media limits visualization, resulting in low student understanding. Furthermore, conventional learning methods often fail to foster interest and motivation in learning, resulting in low achievement of health learning objectives. This situation highlights the need for innovation in learning strategies and media to deliver immune system and skin health materials more effectively.

The development of information and communication technology opens up new opportunities related to the use of learning media relevant to these technological developments. Technology enables a more varied presentation of learning materials through a combination of text, images, animation, video, and audio, which can increase student

engagement and understanding. In the context of health education, the use of technology and multimedia has the potential to help visualize abstract concepts such as the workings of the immune system and the function of skin as a protective barrier. Furthermore, multimedia also supports ease of learning and repetition for students (Andika et al., 2025; Fajtriansyah, Merlianda, & Neni, 2025; Melati et al., 2023; Wibowo, 2023). Students can easily re-learn if they encounter obstacles in the process of understanding the material when meeting with lecturers. Therefore, integrating technology into learning is a relevant strategy for improving the quality of health education.

Multimedia learning is an innovation that lecturers can use to deliver material in an interactive and engaging manner. The use of multimedia in health learning allows for a more concrete presentation of the immune system and skin health through process visualizations, anatomical illustrations, and simple simulations. With multimedia support, students not only passively receive information but also actively engage in the learning process through interaction with the media. Research related to multimedia in classroom learning has been reported by (Firdaus, Pramono, & Faradila, 2019; Fitriani & Nuryati, 2018; Prayitno & Hidayati, 2017; Rozana, Widya, & Tasril, 2022; Setiawan, Adi, & Ulfah, 2017). The results show that multimedia can increase students' motivation and ability to understand the material being taught.

Despite the significant potential of multimedia in health education, its use in teaching the immune system and skin health remains relatively limited. Available learning media are generally not optimally integrated and focus on delivering information in a piecemeal fashion. Furthermore, not all multimedia materials are designed to suit student characteristics and learning objectives, resulting in suboptimal effectiveness. These limitations indicate a gap between the need for innovative learning media and current learning practices. Therefore, the development of multimedia-based learning media that are systematically and contextually designed is necessary to support more effective learning about the immune system and skin health.

METHOD

This study employed a quantitative approach with a quasi-experimental design, a non-equivalent control group design. This design was chosen because the researchers did not fully randomize subjects but instead used pre-formed classes. The study aimed to determine the effect of multimedia-based immune system and skin health education on improving student understanding compared to conventional learning.

The research was conducted in several stages. The initial stage began with a pre-test administered to both classes to determine students' initial understanding of the immune system and skin health. Next, the experimental class participated in learning using interactive multimedia, while the control class participated in conventional learning using the usual methods. After completing the entire learning series, both classes were given a post-test to measure student understanding.

The research instrument consisted of a test of understanding the concepts of the immune system and skin health, structured in multiple-choice and/or short essay formats. The instrument underwent a content validation process by subject matter experts and learning experts to ensure its suitability for the learning objectives. Furthermore, the

instrument's reliability was tested to ensure consistency of the measurement results. Research data were collected through pre-test and post-test results in the experimental and control classes. Test scores were used as quantitative data to determine differences in student understanding between the two classes. Data analysis was conducted quantitatively using descriptive and inferential statistics. Descriptive statistics were used to determine the mean value, standard deviation, and improvement in student learning scores. Inferential statistics were used to test differences in learning outcomes between the experimental and control classes, through normality tests, homogeneity tests, and mean difference tests (tests).t). The significance level used in this study is 0.05.

RESULTS AND DISCUSSION

This study involved two classes of students from the Faculty of Medicine, Wijaya Kusuma University, Surabaya: an experimental class that received multimedia-based immune system and skin health education, and a control class that received conventional instruction. To determine the students' initial abilities, both classes were given a pre-test before the treatment.

The multimedia learning media used in the experimental class was developed by utilizing the online-based Canva platform..Canva was chosen based on its ease of access, design flexibility, and ability to integrate various visual elements such as text, illustrative images, icons, simple animations, and supporting videos into a single learning media display. The developed multimedia is systematically designed according to learning outcomes, covering material on the immune system and skin health presented concisely, visually, and interactively. The use of Canva-based media allows the presentation of abstract concepts to be more concrete and easily understood by students, while also supporting engaging learning that is appropriate to the characteristics of learners in higher education. The following multimedia has been created by the research team:

Figure 1 Developed Learning Multimedia

Figure 1 displays multimedia-based learning materials developed to support education on the immune system and skin health. Designed using the online platform Canva, the multimedia provides an engaging, consistent, and easily understood visual presentation for students in the Faculty of Medicine. The learning materials consist of several main slides: a title page, an introductory section on the immune system, immune system components, and types of immune systems.

Each slide presents the material concisely, supported by visual elements such as illustrative images, medical icons, and a systematic layout. The presentation of the material in this multimedia combines informative text and supporting visuals to help students understand the abstract concepts of the immune system. The material is structured sequentially, starting from an introduction to basic concepts, explaining the functions and components of the immune system, to the classification of the immune system, thus facilitating the flow of student understanding. The use of Canva-based multimedia allows for a more interactive and contextual delivery of learning materials compared to conventional learning. This media is expected to increase students' learning interest, focus, and conceptual understanding of the immune system and skin health material as part of technology-based learning innovation.

After conducting the learning process in two different classes, the experimental class and the control class, a pre-test was administered before the learning process and a post-test after the learning process. The results of both tests are as follows:

Table 1. Pre-test and Post-test Results of the Experimental Class and Control Class

Class	Hand	Rate-rate	Standard Deviation
Experiment	Pre-test	62,45	6,82
Experiment	Post-test	81,3	6,15
Control	Pre-test	61,9	7,05
Control	Post-test	72,1	6,74

Based on Table 1, it can be seen that the average pre-test scores of the experimental and control classes did not show a significant difference. After being given the treatment, the average post-test scores of the experimental class increased significantly compared to the control class. The experimental class experienced an increase in scores of 18.85 points, while the control class experienced an increase of 10.20 points. The results of the normality and homogeneity tests indicate that the data from both classes are normally distributed and have homogeneous variances, thus fulfilling the requirements for conducting a mean difference test. The test results*t*The post-test scores showed a significant difference between the experimental and control classes at a significance level of 0.05 ($p < 0.05$). This indicates that the use of multimedia-based immune system and skin health education has a positive impact on students' understanding.

The results of the study showed that interactive multimedia learning on the immune system and skin health was more effective in improving student understanding compared to conventional learning. The higher grades in the experimental class indicated that multimedia can help students grasp abstract and complex concepts through more engaging visualizations and information presentations.

Pedagogically, multimedia provides a richer learning experience because it combines text, images, animation, and video in a single learning medium. This allows students to build a better conceptual understanding, especially in topics such as the immune system and skin health, which are difficult to observe directly (Islam & Tunru, 2017; Labaso', Hestiana, & Podungge, 2023). These findings align with multimedia learning theory, which states that presenting information through multiple channels can improve student comprehension and retention (Baytiyeh & Naja, 2010; Butcher, 2014; Çeken & Taşkın, 2022; Mayer, 2017; Vijayalakshmi & Reddy, 2020).

Furthermore, the research results showed that students in the experimental class were more active and enthusiastic during the learning process. Interaction with multimedia encouraged students to learn independently and focus more on the material presented. This contributed to significantly improved learning outcomes compared to the control class, which used lectures and text-based learning materials.

The difference in learning outcomes between the experimental and control classes also demonstrates that technology-based learning innovations play a crucial role in improving the quality of learning in higher education, particularly in the health sector. Conventional learning still has limitations in explaining complex biological processes, making the use of multimedia a relevant solution to support student understanding.

Thus, the results of this study confirm that multimedia-based immune system and skin health education is an effective learning innovation and worthy of implementation in the Faculty of Medicine. The use of multimedia not only enhances conceptual understanding but also supports a more engaging, interactive learning process, aligned with current developments in educational technology.

CONCLUSION

Based on the research results and discussion, it can be concluded that the implementation of multimedia-based immune system and skin health education has a positive impact on improving the understanding of students in the Faculty of Medicine, Wijaya Kusuma University, Surabaya. Students who participated in the multimedia-based learning showed a higher improvement in learning outcomes compared to students who participated in conventional learning. This indicates that multimedia learning can help students understand the complex and abstract concepts of the immune system and skin health more effectively.

The use of Canva-based multimedia allows for a visual, structured, and engaging presentation of material, thereby increasing student engagement in the learning process. Furthermore, the integration of various multimedia elements such as text, images, and visual illustrations helps clarify key concepts and supports more meaningful learning. Therefore, multimedia-based education can be used as a relevant learning innovation to improve the quality of health education in higher education.

Based on the research results obtained, several recommendations can be made as follows. First, educators in higher education settings, particularly in the health sector, are advised to utilize multimedia-based learning media as an alternative or complement to conventional learning to improve student understanding. Second, further development of

multimedia learning can be expanded by adding more varied interactive features, such as quizzes or self-assessments, to optimize student engagement.

Third, further research is recommended to involve a larger sample size and a broader range of materials to better generalize the results. Furthermore, the use of multimedia learning can also be examined from other perspectives, such as student motivation, attitudes, and learning independence. With further development and research, multimedia learning is expected to provide a more optimal contribution to supporting educational innovation and technology.

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