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Students' Perceptions of a Canva-Based Web Learning Platform for Real Analysis: A Descriptive Quantitative Study

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ABSTRACT

Real Analysis is often recognized as one of the most difficult subjects in undergraduate mathematics because of its abstract ideas and the requirement for precise proof methods. Despite its importance, the scarcity of interactive learning resources and the low English proficiency of students have impeded effective understanding. This research aims to investigate students' perceptions of Canva as a web-based learning platform to address these challenges in teaching Real Analysis. A descriptive quantitative approach was utilized, involving 34 students from the Mathematics Education program at Universitas Lambung Mangkurat, chosen through purposive sampling. Data were gathered using a Likert-scale questionnaire assessing three dimensions: content quality, speed and performance, and usability. The findings indicated that students responded overwhelmingly positively, with all metrics achieving scores in the "excellent" range, including content clarity, navigation ease, and platform responsiveness. These results suggest that Canva is a user-friendly platform that positively supports students' engagement and perceived understanding of abstract mathematical concepts. The implications of this study underscore Canva's potential as an accessible and innovative educational resource for improving digital learning experiences in advanced mathematics, motivating educators to integrate visually-oriented platforms into the creation of interactive and inclusive learning settings.

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INTRODUCTION

Real Analysis is a core undergraduate mathematics course that serves as a foundation for advanced mathematical studies. The course encompasses fundamental concepts such as limits, continuity, differentiation, and integration, which are essential for understanding higher-level mathematics and its applications in fields such as physics, engineering, and economics. However, the subject is often recognized as one of the most challenging due to its abstract concepts and rigorous proofs. Despite its difficulty, Real Analysis plays a crucial role in developing students' critical thinking, logical reasoning, and proof-writing skills (Mathias, 2024).

Although this course is crucial, most students find the mathematical rigor required in this subject to be intimidating (Sari, et al., 2021). This is exacerbated by the fact that there are not many learning media used to help students understand Real Analysis courses (Helma & Murni, 2023). The majority of students in the Mathematics Department encounter significant challenges in comprehending Real Analysis (Atiqoh & Hafiz, 2022). These difficulties include lack of mastery of proof techniques, inability to understand the use of definitions and theorems, and lack of ability to write logical and mathematical sentences (Nasir, et al., 2023). Furthermore, Adamura (2021) suggests that the lecture method is inappropriate for teaching Real Analysis, as it does not engage students in solving problems. Additionally, preliminary interviews were conducted with two lecturers and ten students from the Mathematics Education program to identify initial challenges in learning Real Analysis. The purpose of these interviews was to gather in-depth information regarding students' difficulties in understanding abstract concepts, their experience with available learning media, and the impact of limited English proficiency on their comprehension of the subject. The interviews revealed that many students have limited English proficiency, even though most Real Analysis textbooks, references, and instructional videos are in English, placing these students at a disadvantage in learning the subject (Cesaria et al., 2024). These findings were further supported by feedback from 36 students from the 2024/2025 academic year obtained through the SIMARI e-learning portal. Moreover, students report finding Real Analysis challenging due to the lack of learning media and the abstract nature of the subject matter.

Several previous studies have explored the use of digital platforms in mathematics education. Hakim & Andayani (2024) developed mathematics websites incorporating videos and interactive worksheets, while Suhendra, et al. (2025) utilized Desmos to enhance students' conceptual understanding of quadratic functions. In the context of Real Analysis, Samosir, et al. (2022) developed electronic learning materials assisted by animated videos to improve critical thinking skills. More broadly, research on Canva in education has primarily focused on its use as a presentation tool or for creating simple learning media at the elementary and secondary levels (Sihombing, et al., 2024; Siregar, et al., 2024), with limited attention to its website creation capability for higher education mathematics instruction. However, these studies share several limitations. First, most existing research on Canva in mathematics education has been conducted at the elementary or secondary level, leaving a gap in understanding its application for university-level advanced mathematics. Second, previous studies on Real Analysis instruction have primarily focused on developing supplementary materials such as videos or electronic learning materials, rather than creating an integrated, self-contained web-based platform. Third, while Canva's website feature has been recognized as having

educational potential, no study to date has systematically developed and evaluated a Canva-based web learning platform specifically for university-level Real Analysis instruction using comprehensive assessment criteria

To address these challenges and gaps, this study proposes using Canva as a web-based learning platform to enhance the teaching and learning of Real Analysis. Web-based learning is an innovative approach that uses technology to deliver content and support interactive learning experiences (Ramya & Suganya, 2023; Zainal, et al., 2024). Recent studies indicate that web-based learning enhances student performance, engagement, and critical thinking in Real Analysis courses (Samosir, et al., 2022). Canva was selected as the primary platform due to several distinct advantages that align with the specific needs of teaching Real Analysis. First, Canva offers an intuitive drag-and-drop interface that allows educators to create visually engaging learning materials without requiring advanced technical skills (Jamaludin & Sedek, 2024). This feature enables the presentation of abstract mathematical concepts such as algebraic properties, order relations, and theorem proofs through clear visual representations, structured layouts, and interactive elements that enhance student comprehension. Second, Canva's website creation capability allows the development of an integrated learning platform (Annisya & Aziz, 2024), where students can access video explanations, practice questions, and theorem proofs in one centralized location, as implemented in the "cangkalanril" website developed for this study. Third, unlike more complex learning management systems that may require significant setup and training, Canva's accessibility and user-friendliness reduce technical barriers, allowing both lecturers and students to focus on the learning content rather than platform navigation (Vlasenko, et al., 2023). These characteristics make Canva particularly suitable for addressing the challenges identified earlier, including the lack of interactive learning media and the need for visually supportive materials to aid understanding of abstract concepts in Real Analysis.

Therefore, this study aims to describe students' perceptions of the Canva-based web learning platform for Real Analysis. Specifically, this research evaluates the platform across three key dimensions: content quality, speed and performance, and usability, providing a holistic assessment of its potential in the context of advanced mathematics education. By examining student responses to the "cangkalanril" website, which integrates videos, explanations, and practice questions to support students in understanding and proving theorems, this study contributes to the limited body of literature on the use of Canva's website creation capability for higher education mathematics instruction.

METHOD

This research study employs a quantitative approach, specifically a descriptive quantitative design, to investigate students' responses to using Canva as a web-based learning platform for Real Analysis (Vargas, et al., 2022). This study focused on the topic of Algebraic and Order Properties and involved 34 Mathematics Education students at Universitas Lambung Mangkurat, selected through purposive sampling based on their enrollment in the Real Analysis course.

The web-based learning platform was developed using Canva for Education's website creation feature. The platform, named "cangkalanril", was specifically designed for Real Analysis instruction and consisted of three main components: learning materials, video explanations, and practice questions. The materials covered two main topics: Algebraic Properties and Order Properties of real numbers, which were identified as foundational topics that students often find challenging. The platform was implemented over four weeks, corresponding to four class meetings, during which students accessed the website independently and engaged with the content at their own pace.

The data collection process involved administering a questionnaire to the participating students. The questionnaire aimed to gather information on the students' perceptions of the web-based learning platform across three dimensions: Content Quality, Speed and Performance, and Usability. The questionnaire employed a Likert scale, with response options ranging from 1 to 5, allowing students to express their level of agreement or disagreement with the statements provided.

The data analysis for this study employed descriptive statistics to examine the quantitative data from the questionnaires. Additionally, the researchers utilized percentage calculations to assess the web-based learning platform developed using Canva for Education. The eligibility criteria were applied, as presented in Table 1 (Hakim & Andayani, 2024).

Table 1. Eligibility Criteria Based on Percentage Scores

Percentage	Criteria
$80\% < x \leq 100\%$	Excellent
$67\% < x \leq 80\%$	Good
$53\% < x \leq 67\%$	Adequate
$40\% < x \leq 52\%$	Inadequate
$20\% - 39\%$	Poor

The criteria in Table 1 were adopted from Hakim & Andayani (2024), which are commonly used in mathematics education research to categorize student response percentages. The unequal intervals reflect the judgment that higher levels of achievement require progressively stricter standards. The findings are categorized into three primary

components, as depicted in content quality, speed and performance, and usability, to provide a comprehensive overview of students' perceptions

It is important to note that this study focuses on evaluating students' perceptions of the platform's quality and usability. Therefore, the findings reflect students' responses to the platform's content quality, speed and performance, and usability, providing insights into its potential as a learning resource for Real Analysis instruction

RESULTS AND DISCUSSION

The research findings, derived from the questionnaire responses, reveal significant insights into the students' perceptions of the web-based learning platform developed using Canva for Education, focusing on content quality, speed and performance, and usability (Priyatna, et al., 2023). The responses were analyzed using descriptive statistics to understand the distribution of student opinions across different aspects of the platform.

To support these findings, the initial interface of the Canva-designed website was structured to be visually appealing and user-friendly, catering to the learning needs of students.

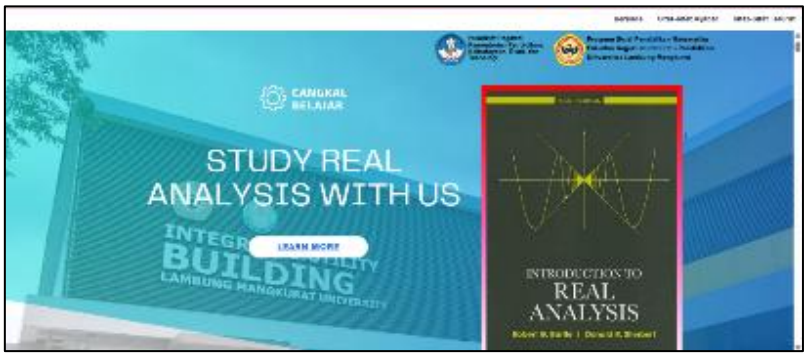

Figure 1. Homepage of the Canva-Based Learning Website

Content Quality

The results show that 44.5% of students strongly agreed with the platform’s content quality, with a detailed distribution of responses across all rating categories presented in the following diagram.

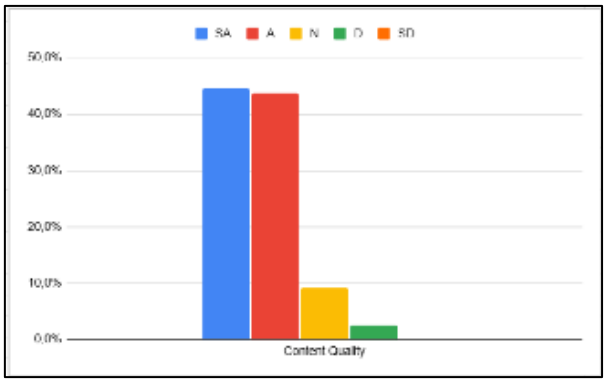

Figure 2. Student Responses on Canva-Based Content Quality

According to the diagram, 44.5% of students "strongly agree," 43.7% "agree," 9.2% are "neutral," 2.5% "disagree," and none "strongly disagree." The majority of students have a positive perception of the content quality of the web-based learning platform that uses Canva, meeting the "excellent" criteria. The analysis of the data reveals that the Average percentage for the content quality of the web-based learning platform is as follows:

Table 2. Average Scores of Student Responses on Content Quality of the Web-Based Learning Platform Developed Using Canva

Questionnaire Statement	Average Score
The text on this website is presented clearly.	88,8%
The combination of text and background colors makes it easy for me to read.	82,4%
The terminology and language used on this website are easy to understand.	84,7%
The content on this website is presented in a structured and logical manner.	89,4%
Visual elements such as images and icons support the readability of this website.	85,3%
The design of this website aligns well with its theme or purpose.	85,9%
I feel comfortable reading the content on this website.	85,9%

Based on Table 2, the indicators for content quality all meet the "excellent" criteria. The average score for content quality is 86.1%, which falls within the "excellent" range. These findings indicate that the web-based learning platform is well-received by students in terms of its content, clarity, and design.

Speed and Performance

One of the primary indicators evaluated was Speed and Performance, which is essential for ensuring a smooth and effective learning experience in a digital environment. The distribution of responses is presented in Figure 3.

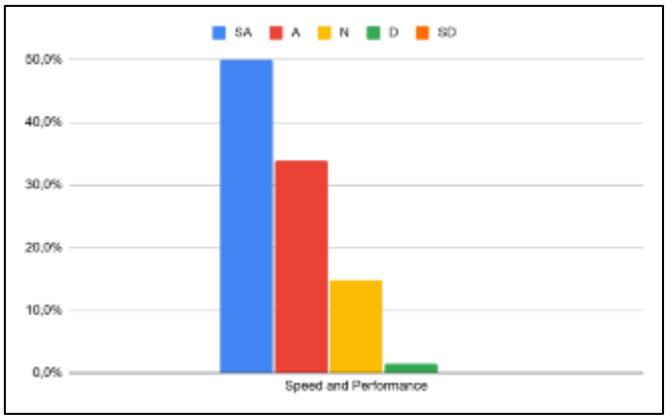

Figure 3. Student Responses on Speed and Performance of the Canva-Based Platform

As shown in the Figure 3, a significant majority of students responded positively regarding Canva's speed and performance. Specifically, 50% of respondents strongly agreed, and 33.8% agreed that Canva operates efficiently and responds quickly during use. These findings suggest that Canva provides a reliable and responsive platform, which is a fundamental prerequisite for supporting meaningful engagement in Real Analysis learning activities. This result provides an important starting point for further exploration of Canva's strengths and limitations in this context.

To further substantiate these perceptions, a more detailed breakdown of the evaluation criteria under Speed and Performance is presented in Table 3.

Table 3. Average Scores on Speed and Performance of the Canva-Based Platform

Questionnaire Statement	Average Score
The pages on this website load quickly.	87,6%
The search feature on this website helps me find information quickly.	85,3%

The table presents student responses on page loading speed and search effectiveness, with high scores confirming Canva's reliable performance and efficient navigation for accessing learning content

Usability

This study evaluated Canva's usability for Real Analysis, with student responses highlighting ease of navigation, interface clarity, and overall user experience.

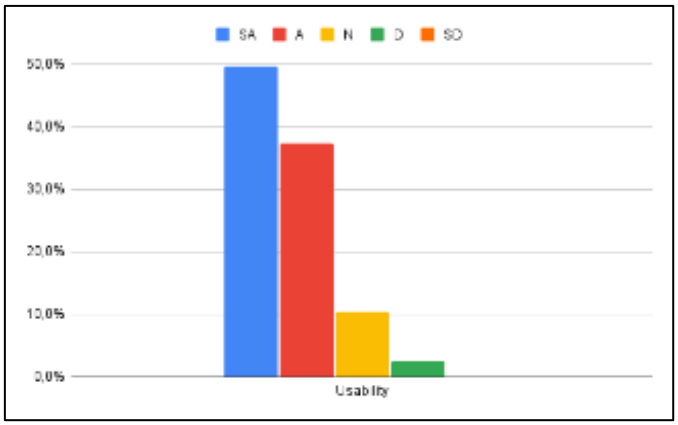

Figure 4. Student Responses on Usability of the Canva-Based Learning Platform

As shown in the Figure 4, most students viewed Canva positively in terms of usability, with 49.6% strongly agreeing and 37.4% agreeing that the platform is easy to use and supports effective navigation. This indicates that Canva is perceived as user-friendly, enabling students to focus on learning complex Real Analysis content without technical difficulties.

To gain a deeper understanding of this aspect, several usability indicators were further examined, as summarized in the following table.

Table 4. Average Scores on Usability of the Canva-Based Learning Platform

Questionnaire Statement	Average Score
The font size on the website is comfortable to read.	84,7%
I can easily find the information I am looking for on this website.	90,6%
The menu structure on this website is well-organized and user-friendly.	85,3%
I can easily navigate from one page to another on this website.	87,1%
The layout of this website is visually appealing and functional.	85,3%
Overall, my experience using this website is positive	87,6%

The usability analysis shows consistently high scores across indicators, including font readability, ease of finding information, menu clarity, navigation, and overall user experience. These results indicate that Canva's interface is well-designed and accessible. Notably, the high score for ease of finding information highlights Canva's intuitive layout and effective navigation, which are essential for supporting independent learning in complex subjects such as Real Analysis.

Discussion

The positive student perceptions of the Canva-based web learning platform reinforce the growing body of evidence supporting the integration of digital tools in mathematics education (Hakim & Andayani, 2024). However, beyond simply confirming

previous findings, this study offers new insights into how a visually oriented web platform can address specific pedagogical challenges in Real Analysis instruction particularly the difficulty students face in grasping abstract concepts such as algebraic and order properties.

Students perceived the platform's content as clear and well-structured. This perception is significant given the abstract nature of Real Analysis, where students often struggle to connect definitions and theorems with meaningful representations (Sari, et al., 2021). The "cangkalanril" website addressed this challenge by presenting materials through a combination of text, visual diagrams, and embedded video explanations. The visual design features enabled by Canva—color-coded sections, structured layouts, and consistent typography appear to have helped students navigate complex content more effectively than traditional text-based materials.

What makes this finding particularly relevant is that the platform was implemented over four weeks, during which students accessed the materials independently. The ability to present abstract concepts through structured visual representations likely contributed to sustained engagement across multiple class meetings. This aligns with Jamaludin & Sedek (2024), who emphasized that Canva's design capabilities can transform how students interact with learning materials.

Interestingly, while overall content quality was rated highly, the aspect of text-background color contrast received relatively lower ratings compared to other indicators. This suggests that even when students perceive content as generally clear, attention to accessibility details such as color contrast and readability remains important for optimizing user experience (Alshammary & Alhalafawy, 2023).

Students responded positively to the platform's speed and performance. In the context of independent learning over four weeks, where students revisited materials multiple times to construct proofs and understand theorems, consistent technical performance was essential. When students can rely on a platform to function smoothly without interruptions, they can maintain cognitive focus on the mathematical content rather than being distracted by technical issues.

The positive perception of the search feature reflects an important aspect of self-directed learning. In a course like Real Analysis, where students often need to revisit specific definitions or theorems while working on proofs, the ability to quickly locate information supports efficient study habits. This finding aligns with Melynk (2022), who argued that technical reliability is a prerequisite for effective digital learning environments, particularly in subjects requiring sustained concentration.

Moreover, the platform's responsiveness across different devices likely supported students' ability to learn flexibly, whether on campus or remotely. This flexibility is

consistent with Esteve-Mon, et al. (2023), who highlighted that effective digital tools empower students to take ownership of their learning.

The strongest positive perceptions were related to usability, particularly the ease of finding information. This finding is noteworthy because Real Analysis imposes a high cognitive load on students due to its emphasis on rigorous proofs and logical reasoning (Panselinas, et al., 2020). When students can navigate a platform intuitively, they can allocate more mental resources to understanding mathematical content rather than figuring out how to use the platform.

The platform's navigation structure, which separated materials, videos, and quizzes into distinct sections, appears to have supported this ease of use. Students could move seamlessly between learning materials and self-assessment activities, allowing them to test their understanding immediately after studying a topic. This integration of content and assessment within a single platform reflects the principles of user-centered design, which Gutierrez Jr. & Doronio (2024) identified as crucial for enhancing student engagement.

The positive perceptions of font readability and menu organization further suggest that Canva's design features effectively supported user comfort. As Vlasenko, et al. (2023) noted, usability is a key factor in educational technology adoption; when students find a platform easy to use, they are more likely to engage with it consistently over time.

Unlike previous studies that focused on Canva as a presentation tool at the elementary and secondary levels (Sihombing, et al., 2024; Siregar, et al., 2024), this study demonstrates that Canva's website creation capability can serve as a comprehensive learning platform for university-level advanced mathematics. The "cangkalanril" website uniquely integrates structured materials, video explanations, and interactive quizzes—combining elements that previous studies often treated separately.

This integration is particularly relevant for Real Analysis, where students need multiple modes of engagement to grasp abstract concepts. Video explanations can demonstrate proof techniques, structured materials provide reference points, and quizzes offer opportunities for self-assessment. The positive student perceptions across all three dimensions suggest that such an integrated approach is both feasible and well-received in the context of advanced mathematics instruction.

The findings must be interpreted within the study's limitations. First, this study captured students' perceptions rather than direct learning outcomes. While positive perceptions are encouraging, they do not necessarily translate into improved understanding or proof-writing skills. Second, the study focused on a specific topic ,algebraic and order properties, over four weeks. Whether similar perceptions would emerge for more abstract topics such as sequences, continuity, or compactness remains

an open question. Third, the absence of a control group means that the observed perceptions cannot be definitively attributed to the platform without comparison to alternative learning approaches.

Despite these limitations, the findings have practical implications for mathematics educators. Canva's website creation capability offers an accessible entry point for developing web-based learning platforms without requiring advanced technical skills. The positive student perceptions across content quality, performance, and usability suggest that such platforms can effectively support student engagement in challenging mathematics courses when designed with attention to visual clarity, technical reliability, and intuitive navigation.

Future research should examine whether these positive perceptions translate into measurable learning gains through experimental designs with pretest-posttest assessments. Studies could also explore the platform's effectiveness across more abstract Real Analysis topics and investigate how additional interactive features, such as collaborative proof-building tools, might further support student learning.

CONCLUSION

The findings demonstrate that the Canva for Education-based web learning platform received excellent perceptions from students regarding its content quality, performance, and usability. Students reported that clear, well-organized, and visually engaging materials supported their comprehension and engagement, while responsive design and intuitive navigation contributed to a smooth learning experience over the four-week implementation period. Although the results are promising, it is important to note that this study focuses on students' perceptions rather than direct learning outcomes. Therefore, further studies are needed to examine the platform's actual effectiveness on learning outcomes using experimental designs with pretest-posttest assessments, as well as to explore its use in more abstract mathematical topics such as sequences, continuity, and compactness. Overall, this study provides a strong foundation for future research on integrating digital tools in higher-level mathematics education, particularly in understanding student perceptions of web-based learning platforms.

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