

Students' Response Analysis toward the Use of Infographic-Based Learning Media in Reproductive Biology Course at Indraprasta PGRI University

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ABSTRACT

Objective: The shift to online learning during the COVID-19 pandemic presented significant challenges, particularly in delivering complex material such as Reproductive Biology, which involves abstract and visually rich concepts. Infographic-based learning media, which combines visual and textual data, has emerged as a promising solution to improve student comprehension. This study aims to analyze students' responses toward the use of infographic media in learning organogenesis content. **Method:** A descriptive qualitative method was employed, involving 46 sixth-semester biology education students from Universitas Indraprasta PGRI. Data were collected through a Likert-scale questionnaire and analyzed qualitatively. **Results:** Results indicate that most students provided positive responses, highlighting the media's role in enhancing understanding, supporting task completion, and fostering learning interest. **Novelty:** This media is recommended for broader application in both online and face-to-face learning.

INTRODUCTION

The outbreak of the COVID-19 pandemic has triggered a major transformation in the education sector, including higher education. The immediate shift from face-to-face learning to remote online instruction was implemented globally to curb the spread of the virus. However, this transformation created substantial challenges, particularly in science-related subjects that require hands-on experiences, abstract reasoning, and visualization—such as Reproductive Biology [1]. In this context, educators were prompted to search for innovative teaching strategies and media that could bridge the gap between digital delivery and complex content.

Reproductive Biology, as part of biology education, encompasses intricate processes such as gametogenesis, fertilization, embryonic development, and organogenesis. These concepts are often difficult to comprehend without appropriate visual aids or practical illustrations [2]. Traditional instructional approaches such as lectures and textbooks are insufficient to support meaningful learning in this domain. Therefore, the need for effective media that supports visual and conceptual clarity becomes essential in remote learning environments.

Among the digital tools available, infographic-based media has garnered attention due to its ability to visually simplify abstract content while maintaining informational richness. Infographics are visual representations that integrate text, data, diagrams, and

symbols into an aesthetically pleasing and cognitively digestible format [3], [4]. When designed properly, infographics not only convey information quickly but also enhance engagement and retention. According to Mayer's Cognitive Theory of Multimedia Learning, the simultaneous processing of visual and verbal information supports deeper understanding and long-term memory formation [5].

Several studies in Indonesia have validated the role of infographics in science education. Research by Mochtar and Wahyuni [6] and Saragih [7] showed that visual media like infographics improve learning outcomes and student motivation in biology classrooms. Infographics also promote critical thinking and provide students with scaffolding to organize and synthesize knowledge [8]. In online settings where direct interaction is limited, infographics offer additional support by enabling independent exploration and self-paced review [9].

Moreover, infographic learning materials are aligned with the principles of constructivist learning theory, which emphasizes the active role of learners in constructing their own understanding. The visual and interactive features of infographics can foster engagement and make learning more student-centered [10]. Given these pedagogical advantages, it is imperative to examine the actual reception and response of learners when infographics are applied in real educational settings.

This study aims to investigate students' responses to the use of infographic media in a Reproductive Biology course, particularly focusing on the topic of organogenesis. The research examines how students perceive its usefulness, clarity, motivation enhancement, and support in task completion. The findings are expected to provide practical implications for the integration of visual-based media in biology education and beyond, particularly in contexts requiring abstract and complex knowledge acquisition.

RESEARCH METHOD

This research employed a descriptive qualitative design to explore students' perceptions of infographic-based learning media. The study involved 46 sixth-semester students from the Biology Education Study Program at Universitas Indraprasta PGRI, selected using purposive sampling based on their completion of the Reproductive Biology course.

Data were collected using an online Likert-scale questionnaire consisting of 20 statements divided into five dimensions: understanding, engagement, media accessibility, visual appeal, and task support. Each item offered three response options: agree, somewhat agree, and disagree.

The instrument was validated using the Pearson Product-Moment correlation, with validity coefficients exceeding $r = 0.6$, while reliability was assessed using Cronbach's Alpha, yielding $\alpha = 0.87$, indicating strong internal consistency [8].

Data analysis followed Miles and Huberman's model, including data reduction, narrative data presentation, and conclusion drawing [9]. Responses were categorized thematically to capture the most representative student perspectives.

RESULTS AND DISCUSSION

Students' Perception of Infographic Usefulness

The results of the study demonstrate a strongly positive perception of infographic media among students. Over 91% of the respondents stated that the media helped them better understand abstract topics, particularly organogenesis. They emphasized that complex cellular processes were made more accessible through detailed visuals and structured information flow. This aligns with previous research which highlighted the potential of visual media to clarify complex concepts and improve conceptual retention [6], [11].

Some students mentioned that the visual layout of the infographic allowed them to "see" the progression of organ development, a task difficult to achieve through verbal explanation alone. These findings reinforce the notion that visual information processing complements textual explanation, particularly for spatially and sequentially oriented biological processes [5], [12].

Engagement and Motivation Improvement

One of the most notable outcomes was the improvement in students' engagement and motivation to study. Approximately 88% of students agreed that infographics made them more enthusiastic about attending online classes. The color schemes, illustrations, and succinct content format were mentioned as major factors contributing to their sustained attention during lectures.

This observation is in line with Wulandari and Harjono [13], who reported that interactive visual media heightened students' interest in biology and reduced learning fatigue during online sessions. Students in this study also reported that the infographic format was "refreshing" and "less stressful," particularly when preparing for assessments, compared to lengthy lecture notes.

Furthermore, students indicated that they were more likely to revisit infographic materials for review purposes, suggesting the media's capacity to support long-term retention. These benefits contribute not only to immediate understanding but also to sustainable learning habits.

Task Facilitation and Cognitive Load Reduction

From a cognitive perspective, infographics helped reduce information overload. Students described the media as an efficient summary of lecture content. Around 86% stated that the concise nature of the infographic helped them in completing assignments more quickly. They did not need to reread entire documents to extract key points; instead, they could focus on essential information visually presented in the infographic.

The findings suggest that infographic media support learners with limited attention spans and enhance focus on core learning objectives. According to Handayani and Fadhillah [14], well-structured infographics reduce extraneous cognitive load and provide a scaffold for organizing learning sequences. This is particularly important in complex subjects where students must synthesize multiple layers of information.

Visual Appeal and Device Accessibility

In today's mobile-first digital ecosystem, the accessibility of learning materials plays a vital role in determining their success. Students appreciated that infographics were optimized for use on smartphones and tablets. The compact design enabled them to study during short time intervals, such as while commuting or waiting in queues.

Moreover, students found the combination of illustrations and concise explanations especially useful for identifying and reviewing learning targets. This finding confirms the value of integrating universal design principles into educational media—ensuring materials are not only informative but also portable and easy to use across platforms [15].

Design Challenges and Student Suggestions

Despite the generally positive feedback, some concerns were raised regarding the design of certain infographic elements. Around 9% of students reported difficulty interpreting diagrams that were too dense or had poor contrast between elements. Overuse of icons or text overlays sometimes created confusion rather than clarity. Similar issues have been reported in other studies, emphasizing the need for design simplicity, consistency, and color contrast in infographic development [16], [17].

These findings suggest that while infographics are a valuable tool, careful attention must be paid to visual hierarchy, spacing, and readability. Educators should consider conducting pilot testing or involving students in the design process to ensure that infographics are optimally understood.

Infographics as an Inclusive and Flexible Teaching Tool

Finally, many students suggested that infographic media be incorporated permanently into both online and face-to-face courses. They proposed using infographics not only as lecture materials but also as learning aids during laboratory work or poster presentations. Infographics were perceived as inclusive learning tools that supported different learning styles—visual, reading/writing, and even kinesthetic when combined with interactive assignments [18].

Additionally, students proposed creating their own infographics as a form of project-based assessment. This aligns with contemporary approaches to education that emphasize active learning, creativity, and the development of 21st-century competencies [19]. Thus, infographic media not only supports content understanding but also offers a platform for skill development and learner autonomy.

CONCLUSION

Fundamental Finding : Infographic-based learning media were well-received by students and contributed positively to their understanding, motivation, and academic performance in the Reproductive Biology course. The visual representation of complex biological processes, especially organogenesis, enabled students to grasp difficult concepts more effectively and enjoyably. **Implication :** Therefore, educators are encouraged to adopt and further refine infographic media to support learning in both online and in-person educational settings. **Limitation :** While the majority of students

provided favorable responses, feedback on visual overload highlights the importance of thoughtful media design. **Future Research** : Further studies are needed to explore optimal design principles for infographic-based materials, particularly in balancing visual richness and cognitive load for complex scientific topics.

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