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# THE IMPACT OF INFOGRAPHICS ON LEARNING OUTCOMES IN DESIGN EDUCATION

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**Abstract:**

Recently, the exclusive focus on student engagement in education has been undeniable, at least following the disruption around people doing things differently because of the Covid-19 pandemic. Various visualization tools, especially infographics, have been widely used to increase student engagement due to their ability to convey information in an accessible and visual format. This research highlights the impact of infographics on students' engagement and interest as a part of learning experience through graphic design education and has been conducted accordingly. Using a systematic literature review, the research takes a look at both the advantages and difficulties of including infographics within design programs. This paper reviews evidence from a variety of academic studies to evaluate the effectiveness of infographics on student engagement and educational achievement. Furthermore, a meta-analysis of the chosen publications summarizes the statistics regarding their efficiency in terms of engaging the participants within the design programme. Findings of the study provide important implications for educators, instructional designers, and curriculum developers regarding the implementation of infographics in teaching practice as strategies to improve student learning. The paper will conclude with recommendations to integrate infographics in curriculum design in design education.

**Keywords:**

Infographics, Design Education, Higher Education, and Student Engagement

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## Introduction

Student engagement has garnered much attention in recent years, especially following the disruption of education by the Covid-19 pandemic. Motivated out of market pressures of the higher education context, institutions now prioritize student engagement (Krause, 2005; Lomer & Palmer, 2021). In simple terms, it means how much do the students get interested in, are participated in, and involve in learning experiences. In order to solve this problem and ensure a higher level of engagement, a number of visualization tools have been created, where infographics appear as a particularly successful solution (Figure 1). Combining text, visuals and data, infographics often use a rich mix of media to convey information in an engaging and easy-to-understand way and to reduce complexity. This is why infographics are a vital part of teaching, specifically regarding things in design.


**Figure 1: Visualization Tool**

(Source: VENNGAGE)

The unique contribution of this research lies in its systematic analysis of how infographics influence learning outcomes, engagement levels, and pedagogical effectiveness within design education. By examining perspectives from students, educators, and curriculum developers, the study offers actionable insights that can inform evidence-based teaching practices and curriculum innovations. The findings will also provide broader implications for higher education institutions and industry stakeholders seeking graduates equipped with visual literacy, creativity, and communication skills:

1. **Educators and Instructional Designers**: Lecturers, particularly those in design and other visually focused fields, stand to gain significantly from understanding how infographics can boost student engagement. By investigating the impact of infographics, educators can better design and implement teaching strategies that actively engage students and address various learning preferences. This study will offer valuable guidance on best practices, helping educators fine-tune their teaching methods to promote more meaningful learning.

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2. **Students**: At the core of this study are the students, whose engagement is critical to their academic success. By demonstrating how infographics can make learning more interactive and accessible, the research aims to improve the overall educational experience. Engaged students are more likely to develop a deeper interest in the subject, retain information more effectively, and acquire the skills necessary for success in their future careers.
3. **Curriculum Developers**: The results of this study will be useful for those involved in curriculum development, particularly in design education. By gaining a better understanding of how infographics influence student engagement and learning outcomes, curriculum developers can make more informed decisions about integrating multimedia tools and visual aids into course structures. This will help ensure that educational content aligns with contemporary pedagogical trends and meets the needs of today's learners.
4. **Higher Education Institutions**: As student engagement becomes an increasingly important priority in higher education, the findings from this study can assist institutions in meeting the expectations of both students and the wider job market. By adopting effective engagement strategies like infographics, institutions can enrich the learning experience and enhance their reputation for innovation and student-centered education.
5. **Industry Professionals and Employers**: Design education is closely tied to industry requirements, where employers are increasingly looking for graduates with critical thinking skills, effective communication abilities, and problem-solving capabilities. Understanding how tools like infographics can enhance student learning is crucial. This research will highlight how such pedagogical methods can nurture the skills that employers value, such as creativity, problem-solving, and the capacity to communicate complex ideas clearly and persuasively.

## Research Background

Visualization is recognized today as an important and integral part of the modern-day teaching methodologies. This trend has also increased in the use of visual presentation tools, such as concept maps, graphic organizers, flow charts, and pictograms Despite not being able to fully replace verbal communication, visuals have clear benefits in terms of grabbing students' attention, as well as supporting their understanding. As per the observations made by Hariharan (2014) tag lines like "seeing is believing" and "a picture is worth a thousand words" highlight the role of visual aids in improving the learning experience. Studies have shown that infographics enhance student engagement as learning becomes interactive and participatory as compared to conventional methods (Smiciklas, 2021; Parveen & Husain, 2021). To this end, the present explorative study investigates the whereabout of infographics in design education, enquired at their capacity to mainly improve participation and support a deeper learning. A systematic literature review and meta-analysis will be used to assess the influence of infographics on student engagement and learning outcomes, as well as challenges or limitations to their use in educational environments. This study is expected to give an insight to an educator and curriculum developers on how to implement infographics in the teaching field, so that they can have a better learning experience in the study.

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## Methodology

This study employed a mixed-method design comprising a meta-analysis and a quantitative survey. The first phase involved a meta-analysis aimed at synthesizing existing empirical evidence on the effectiveness of infographics in enhancing student engagement in design education. Studies were systematically retrieved from databases including Scopus, Web of Science, and Google Scholar, using keywords such as "infographics," "design education," and "student engagement." Inclusion criteria required peer-reviewed articles published between 2010 and 2024 that reported quantitative outcomes related to infographic use in educational settings. A total of [insert number] studies were included after screening for relevance and methodological quality. Statistical analysis followed the approach suggested by Mikolajewicz and Komarova (2019), enabling a cumulative evaluation of effect sizes across studies.

In the second phase, a quantitative survey was conducted to assess design students' perceptions of infographics. A structured questionnaire was distributed to 50 undergraduate design students selected through convenience sampling from institutions in Johor Bahru, Malaysia. The sample size was considered adequate for exploratory analysis, given the study's focus and logistical constraints. Participation was voluntary, and informed consent was obtained from all respondents. The study received ethical clearance from [insert ethics board name or institution], ensuring that all procedures complied with research ethics standards.

## Literature Review

This study is grounded in Axelson and Flick's (2010) framework of student engagement, which defines engagement through cognitive, emotional, and behavioral dimensions. Infographics, as visually rich and data-driven instructional tools, are theorized to influence all three. Cognitively, they support information processing and reduce overload (Sweller, 1988; Mayer, 2005); emotionally, they foster interest through appealing design and storytelling formats (Brigham, 2018); and behaviourally, they promote active learning and discussion. Anchored in the principles of multimedia learning and constructivist pedagogy, this study explores how infographics can serve not just as teaching aids but as engagement-enhancing mechanisms within design education.

### *Enhancing Student Engagement Through Visualization Tools*

As student engagement has become a central focus in education, the use of visualization tools has surged to aid learning. Visualization methods—such as maps and illustrations—have been around for centuries (Klerk et al., 2013), but today's digital tools provide students with powerful ways to understand complex concepts visually. Teachers now have a broad array of visualization tools at their disposal, including images, slideshows, GIFs, graphics, photos, charts, diagrams, maps, and videos. In recent years, video content and graphic interfaces have gradually taken the place of traditional text-based materials (Gutierrez, 2014), fostering more interactive and dynamic learning environments. This transition is important because research shows that people process visual information much faster than text (Dineva, 2019), making visual aids crucial for capturing attention and promoting deeper understanding. Studies also suggest that about 40% of students engage more effectively with visual content than with written text, emphasizing the value of visual tools in enhancing student participation (Dineva, 2019).

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### *The Transformative Role of Infographics in Education*

Among various visualization tools, infographics have emerged as a particularly effective way to engage students. Initially designed for the media to present information, infographics have since transformed into influential educational tools that combine data visualization, text, images, and graphics to convey a narrative (Krum, 2014). As Elaldi and Çifçi (2021) explain, creating an infographic typically involves three key steps: (1) visualizing the information or data, (2) designing the infographic with a mix of visuals, text, and images, and (3) combining these elements to form a unified narrative. Infographics are especially valued for their ability to simplify complex information, capture attention, and engage audiences (Abilock & William, 2014; Bradshaw & Porter, 2017; Brigham, 2018; Falik, 2016; Haverkamp & Vogt, 2015; Kline & Kellgre, 2018; Martin, 2018; Otten et al., 2015; Wright, 2016).

In educational settings, infographics are not just tools for presenting information—they also promote active learning. By strategically using visual elements and layouts, infographics help capture students' interest and stimulate engagement with the material. For example, studies have shown that infographics are frequently used to communicate complex health and risk information, underscoring their ability to make intricate data more comprehensible (Damman et al., 2018; Lazard & Atkinson, 2015; Upshaw, 2021). The increasing popularity of infographics can be attributed to their capacity to present content in a clear, visually appealing format, which helps make abstract or complex concepts more accessible and encourages greater student interaction.

### *A Comprehensive Overview of Student Engagement in Education*

According to Axelson and Flick (2010), Student engagement is defined as: The type of engagement or interest that students can show is the level which students engage with their own learning. The framework, including three primary dimensions, considers cognitive engagement (the extent and quality of students' mental effort put into learning), emotional engagement (students' feelings and attitudes toward the learning experience), and behavioral engagement (observable actions, including attendance, participation, and prosocial behavior toward academic success). These types of engagement are related and important to facilitating a rich and effective learning environment.

## Findings and Discussion

### *Student Engagement with Infographics*

The study’s findings revealed that roughly 80% of design students regarded infographics as a highly beneficial instructional resource for increasing engagement with course material. This finding strongly supports the growing recognition of visual learning tools in education. Students consistently reported that the visual appeal of infographics, their ability to simplify complex ideas, and their clarity in presenting information were key factors contributing to their positive perception.

Among these factors, visual appeal was often emphasized, suggesting that students were particularly attracted to the vibrant and dynamic nature of infographics. The integration of graphics, text, and design elements likely made the material more engaging, as students are naturally more inclined to engage with visually stimulating content. The clarity with which infographics present information was another important aspect: students valued how infographics break down complex and abstract design principles into clear, digestible visual

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forms. This ability to simplify difficult concepts was especially noted, indicating that infographics helped students better understand complex design topics that might otherwise be challenging in traditional text-heavy formats.

These findings support existing research on the effectiveness of visual learning tools, which have been shown to improve engagement and comprehension by making complex information more accessible through visual means (Dineva, 2019; Krum, 2014). The positive feedback from students reflects a growing preference for resources that not only convey information but also present it in an engaging and easily understandable way. However, variations in individual learning styles, prior exposure to visual media, and the small, localized sample may introduce potential biases or limitations in generalizing students' preferences across broader educational contexts.

***Impact on Learning Outcomes***

The quantitative data analysis further revealed that the integration of infographics had a significant impact on student learning outcomes. Specifically, students who encountered infographics as part of their learning materials exhibited greater comprehension and retention of design principles and concepts. This finding is consistent with the broader educational literature, which suggests that infographics, as a visualization tool, can foster deeper cognitive engagement by simplifying and organizing complex information (Abilock & William, 2014; Bradshaw & Porter, 2017).

Of note was the large effect size observed when infographics were embedded within both lectures and written assignments. This suggests that their impact is not confined to a single learning format, but rather that their versatility across different teaching methods—whether in visual, textual, or interactive contexts—can significantly improve student comprehension and retention. The use of infographics in lectures likely helped to capture students' attention and reinforce key design concepts in a way that traditional lecture methods might not have been able to do as effectively. Additionally, incorporating infographics into written assignments appears to have reinforced understanding by enabling students to synthesize complex material in a structured, visually stimulating way, which encourages active learning.

These results are consistent with the concept of dual-coding theory, which posits that learning is enhanced when information is presented both visually and verbally (Paivio, 1986). The integration of infographics in various learning environments provides students with opportunities to process information in multiple formats, reinforcing comprehension and retention.

***Infographics as a Bridge to Visual Thinking in Design Education***

Inherently, design education is heavily based on visual communication. This study finds that using infographics can be a powerful connector between text-based, knowledge-based learning and the visual thinking that we are expected to do in design practice. In this manner, infographics become more than just an add-on; they become influential in teaching students the basics of design in a visual vernacular, which is relevant to their future practice.

Findings from this study support that visual thinking is the pivotal skill in design education, which is in agreement with findings from other research in the field. Infographics allow students to synthesize and visualize revealing information using text and imagery and provide

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an opportunity for students to consider flow, structure, composition, balance, contrast, and hierarchy. This not only keeps students engaged but also plays a crucial role in developing the visual literacy skills they will need to effectively understand and create visual communications in their future careers.

Additionally, infographics allow students to be active participants in the learning process instead of passive receivers of information. Infographics invite students to dig deeply through various layers of information, encouraging them to scroll to discover more and learn at their own pace and depth in a manner that can enable self-education in effective, complex design they can appreciate later. However, individual differences in learning preferences, prior exposure to visual learning, and the limited sample scope may affect the generalizability of these findings, suggesting that interpretations of student preference should be approached with caution.

***Implications for Design Education***

The study's findings have important implications for the integration of visual learning tools in design education. The widespread use of infographics has shown promise in improving student engagement, understanding, and retention, making them a valuable tool in design curricula. The positive response from students suggests that educators in design fields should consider incorporating infographics more frequently into their teaching strategies, not just as supplementary materials, but as central components of their instructional approach.

Future curriculum development in design education could benefit from further exploration of how to best integrate infographics into both in-person and online learning environments. Given their proven effectiveness in enhancing comprehension and engagement, infographics can be employed in a variety of settings, including live lectures, self-paced assignments, and collaborative group activities. Their flexibility in adapting to different learning environments makes them a versatile tool for engaging students and enhancing learning outcomes.

Furthermore, the study underscores the potential of interactive infographics, those that allow students to explore and manipulate the visual content themselves to further enrich student engagement. Future research could investigate how interactive features in infographics, such as clickable elements or dynamic content, might increase interactivity and foster even greater engagement in design education.

## Conclusion

In design education, this study revealed the great potential of infographics as teaching tools that improve students' activities and learning outcomes (Figure 1). Furthermore, a lot of the decision making regarding how to successfully integrate infographics into the curriculum is pragmatic in nature. Critical factors for successful integration include faculty training, resources for building high-quality infographics, and assessment strategies for determining their impact on student learning.

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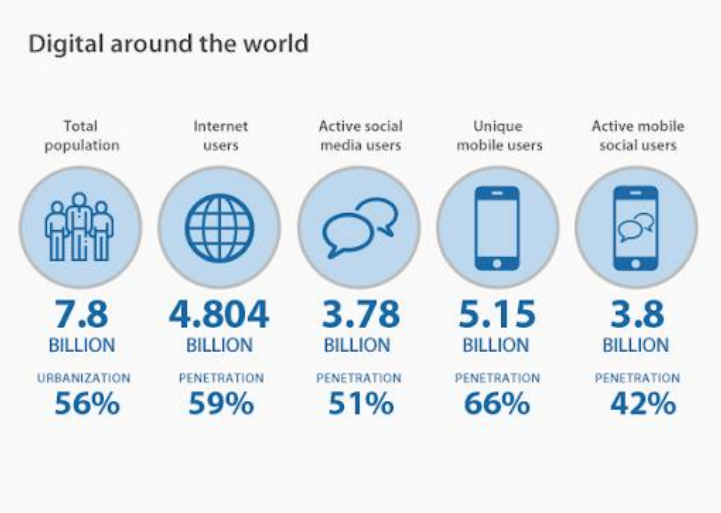


**Figure 2: Infographic**

(Source: VPN Mentor)

The results also provided directions for future work. Future investigations may focus on the long-term impact of infographics on students' careers and professional practices in graphic design. In addition, while this study provides promising insights, it is important to note the limitations, such as the relatively short-term scope of the research and the limited diversity of educational settings examined. Future investigations should explore the long-term effects of using infographics on students' careers and professional practices in graphic design, as well as comparative studies examining the effectiveness of different types of infographics across various educational contexts. By addressing these areas, future research can refine our understanding of the factors that contribute to the successful integration of infographics in design education, offering more tailored strategies for educators and institutions. In conclusion, as the field of design education evolves, strategically incorporating infographics offers a promising path toward more engaging, interactive, and effective learning experiences, provided that the challenges identified in this study are carefully considered and addressed.

In conclusion, this study highlights the importance of infographics in design education. They not only boost student engagement but also improve learning outcomes, making them a perfect fit for the visual-oriented nature of design. As design education evolves, integrating infographics strategically can be key to creating more engaging and effective learning experiences. With an expanding body of research backing their transformative potential, infographics prove to be a valuable tool for encouraging active learning, simplifying complex concepts, and enriching students' educational experiences. As educational institutions navigate new challenges and opportunities, infographics offer an innovative way to foster interactive and meaningful learning for students.

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