

Visual Literacy Ability of Design Students in Virtual Class Settings

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Abstract

The condition of design education in Indonesia today has changed with the presence of ICT in the learning process and the popularity of implementing online learning. With the government's policy to implement Hybrid Learning successfully, studio based-learning in design students, which usually uses face-to-face learning processes, has partially moved into a virtual space. Visual literacy is everything about understanding, using, thinking, and expressing through images. Visual literacy is vital in understanding basic design in the Visual Communication Design study program. This research seeks to examine visual literacy in virtual learning spaces, in the phenomenon of online learning in higher education in the field of visual communication design, which primarily uses studio-based learning, namely methods that prioritize design stages with direct experience, lecturer directions, and collaboration between individuals in a studio room. By conducting qualitative research using survey methods, interviews, and discussions with students participating in studio classes and reviewing the latest visual literacy theories, the conditions in the virtual studio room changed visual understanding, which was limited to computer screens. This preliminary research can contribute to the design of instructional media, understanding the concept of virtuality in the studio space, and applying hybrid learning to design education in the future.

Keywords: Higher Education, Studio Based Learning, Virtual Classroom, Visual Communication Design, Visual Language, Visual Thinking

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Introduction

Since 2016, through the Creative Economy Ministry, the Indonesian government has launched a creative economy policy as the backbone of the country's economy. The Ministry is encouraging all its creative sub-sectors to accelerate. With 16 sub-sectors, Visual Communication Design (VCD) is one of the fields designated by the government (Kemenparekraf, 2016). With government instruction, the education sector also continues to strive to develop higher education, provide an intake of workers in creative fields (Kemenparekraf, 2020), and to produce tens of thousands of graduates every year; the government is also encouraging progress in education sector based on technological advances.

There are around one hundred VCD study programs spread across all universities in Indonesia; the field of visual communication design is growing at the university level, with an average of 14,000 graduates per year (PDDikti, 2024). But the development of learning models, such as online and hybrid, driven by the integration of information and technology is often a challenge for higher education, both before and after the COVID-19 phenomenon (Rahmawati, 2018). These issues include the field of visual communication design courses; unlike general theory courses, art and design courses employ many studio practice-based learning strategies. Studio-based learning is a technique that emphasizes hands-on learning in studio sessions where teachers must supervise students directly in person or amongst classmates. The field of creative studies has long used this technique and many have also utilized the latest technology over the last ten years even though conditions are not yet ideal. Naturally, advancements in learning technologies impact the process from a physical to a virtual studio (Agrawal, 2009).

Despite challenges, such as the need for updated resources and infrastructure, design education in Indonesia is adapting to meet the demands of the modern creative industry. The connection between changes in digital culture and visual literacy is profound and multifaceted. In a digital culture where the consumption and creation of visual content are ubiquitous, the importance of visual literacy becomes paramount. Visual literacy, or the ability to interpret, create, and communicate through visual means, is a critical skill set that allows individuals to effectively navigate the digital landscape. This shift necessitates an enhancement of visual literacy skills so individuals can discern the credibility, context, and implications of visual messages.

The ability to decipher, negotiate, and assign meaning to information that is presented visually is known as visual literacy (Duchak, 2014). Visual literacy enables designers to create meaningful and powerful visual communications that can inform, persuade, and educate users, bridging the gap between the message and the audience. With the shift to learning methods through technological means, everything that appears on the screen or technological media used for learning is now very crucial. So it is important for the VCD field to understand aspects of visual literacy skills in the dynamics of today's visual culture. The primary objective of this research is to examine visual literacy in virtual spaces within the context of online learning in higher education, specifically focusing on studio-based learning in VCD.

The problem statement is that visual literacy is vital in learning practices. An individual's level of understanding can increase with good visual literacy. Visual literacy encompasses visual perception, visual language, and visual thinking. The problem is that in modern learning practices, instructions and materials have transitioned into visual displays in virtual spaces, not in physical form. Thus, it is necessary to understand how these concepts of visual literacy apply. The research question is: How is visual literacy, which encompasses visual perception,

visual language, and visual thinking, understood by students and lecturers in learning within virtual studio spaces?

Literature Review

Visual Literacy Theories

Visual Literacy was introduced by John Debes in 1969, which is defined as the ability to understand an image. According to Debes, visual literacy refers to a group of skills that people can develop by seeing, and having and integrating other sensory experiences. When developed, it enables a person with intuitive knowledge to distinguish and interpret visible actions, objects and symbols, whether natural or man-made, that he encounters in his environment. Through the creative use of these skills, he is able to communicate with others. Through good use of these skills, they can understand and appreciate visual communication (Kelly et al., 2020).

A more modern definition was presented by Avgerinou (2011) that visual literacy means an ability obtained by understanding and utilizing images, as well as thinking and studying images (Avgerinou & Pettersson, 2011). From the development of this modern definition, it can be seen that the understanding of visual literacy places more emphasis on the same competencies or abilities as reading and writing. In addition to the pillars expressed by Avgerinou, Seels (1994) presented visual communication, visual learning, and visual thinking as contributing equally to the concept of visual literacy. However, a distinction between the three constructs can be drawn based on their capacity to focus internally or externally. More specifically, visual thinking is considered an internal mental process; visual learning is related to internal cognitive processes and external factors that influence its performance; and visual communication is external, concentrating on the creation and transmission of visual messages directed to the individual's environment (Seels, 1994).

Another understanding of this comes from Messaris (1994) which he challenges the assumption that interpreting images is a straightforward process akin to reading text, arguing that visual comprehension is less about a set of learned skills (as traditional literacy might imply) and more about innate human capabilities for recognizing and making sense of visual cues. He delves into the psychological aspects of visual perception and cognition, considering how individuals mentally process images and the extent to which this processing is culturally dependent. Messaris also investigates the role of visual communication in media, the persuasive power of images in advertising, and the construction of reality through visual means. His work critically discusses how images influence our perception of the world and our mental representations of reality, thus contributing to the broader understanding of visual literacy's impact on individual and societal levels (Messaris, 1994). From the review of several theories put forward by the experts above, the following explains each of the pillars which are sliced and also divided based on internal and external mental processes. These pillars are visual perception, visual language and visual thinking.

Evolution of Design Study Education

The historical development of design study education has been marked by a continuous interplay between pedagogical philosophies and technological advancements. In its early stages, design education was largely apprenticeship-based, with learners working closely under the tutelage of master craftsmen. This method of learning by doing and observing allowed for the transmission of practical skills and tacit knowledge, crucial for the trades of the time. The

Industrial Revolution introduced the need for formal design education to address the challenges of mass production, leading to the establishment of specialized institutions such as the Bauhaus in Germany, which emphasized the unity of arts, crafts, and technology. The Bauhaus and similar institutions became pivotal in setting the foundation for modern design education by fostering an interdisciplinary approach and advocating for the combination of aesthetics with function (Green & Bonollo, 2003; Marshalsey, 2021). This strategy has not altogether changed from its verifiable roots in models such as the Ecole Des Beaux Arts and the Bauhaus in 18th century (Broadfoot & Bennett, 2003). It is considered comparative to studio-based Learning instructional method (SBL) is an educational method with a particular student-centered approach. Within the 21st century, the studio space is still at the center of educating and learning in art and design programs (Boling et al., 2016). Teachers regularly utilize studio-based learning in creative fields such as architecture, design, and performing arts. A studio is more often than not a committed classroom or space (Agrawal, 2009). While other suggest that SBL centers on learning through activity and "Studio" is as a rule a devoted classroom or execution space, but it can moreover be a social setting inside a community (Park, 2011). The studio may be a space for student and instructors to associated based on each other's conventional standards of supervision and discussion.

The advent of the digital age brought about a seismic shift in design education. The proliferation of personal computers in the late 20th century and the emergence of the internet revolutionized the way design was taught and practiced. Computer Software allowing for more rapid prototyping and experimentation. Online resources and digital libraries made design history and theory more accessible, expanding the scope of self-education. The late 20th and early 21st centuries have seen a democratization of design tools and knowledge, with open-source software and online tutorials lowering the barriers to entry. Design education today is not just about teaching the use of tools or techniques; it's also about cultivating a design-thinking mindset that embraces collaboration, innovation, and adaptability to prepare students for a rapidly evolving technological landscape (Broadfoot & Bennett, 2003).

Donald Schön's "Educating the Reflective Practitioner" offers profound insights into the evolution of design education through the lens of reflective practice. Schön challenged the traditional technical rationality that dominated professional education, advocating instead for a model of learning that embraces the complexity of real-world practice. According to Schön, design education should not merely focus on imparting technical knowledge and skills but should also foster the ability to reflect-in-action. This means that students are encouraged to think critically and reflectively during the design process, allowing them to adapt to unique problems and situations dynamically. Schön's philosophy emphasizes the importance of context and the unpredictable nature of design challenges, suggesting that the ability to reflect on one's work while engaged in it is a hallmark of expertise in design professions (Schon, 2003).

Building on these ideas, Schön proposed that design education should be structured around studio-based learning, where students engage in the continuous creation and recreation of their work while reflecting on their design processes and decisions. This studio model simulates the iterative nature of professional design work, where learning is an active, hands-on process. Schön's approach underlines the idea that knowledge is not only applied but also generated through practice. In the design studio, students learn to negotiate between the often-conflicting demands of aesthetics, functionality, and client needs, honing their skills in a setting that mirrors professional practice. Schön's work has had a lasting impact on design education, emphasizing the importance of preparing students not just as technicians but as agile thinkers

capable of reflective and responsive practice in the face of the ever-changing demands of the design profession (Schon, 2003).

Concept of Virtuality in Studio Space

There is previous research whose focus is on restructuring design studio education in an online paradigm. This study explores the integration of online educational tools and practices into an undergraduate design studio course. It investigates how digital technology can be used to replicate the collaborative, hands-on learning experiences traditionally associated with live design studios. This research examines the challenges and opportunities of transitioning to an online format and identifies effective strategies for engaging students, developing creativity, and supporting the design process remotely. By introducing online educational tools and practices to design studio education, Ioannou's research contributes to ongoing efforts to adapt design pedagogy to the digital landscape and provides insights for educators navigating the online paradigm (Ioannou, 2017).

Meanwhile, another study proposes a shift in traditional approaches to designing studio pedagogy by embracing innovative strategies and technologies. It explores how emerging technologies, such as virtual reality, augmented reality, and digital simulation, can be integrated into the design studio to enhance the learning experience and expand creative possibilities. This research emphasizes the importance of interdisciplinary collaboration, critical thinking, and experiential learning in the context of design studio education. By advocating a new paradigm, Wang's research encourages educators to embrace technological advances and explore alternative methods for teaching design, ultimately fostering a dynamic and future-oriented design education environment (Wang, 2010).

Overall, these two research studies collectively highlight the transformative potential of online educational tools and practices in design studio education. They explore the integration of digital technology, collaboration, and experiential learning in an online paradigm. Ioannou's research focuses on specific applications of online tools and practices in undergraduate design studio courses, while Wang's research supports a broader shift in the paradigm of design studio education, embracing new technologies and interdisciplinary collaboration. Together, these studies contribute to ongoing discussions about adapting design education to the digital age and reimagining the pedagogical possibilities of design studios. These studies illustrate how the virtuality of studio spaces can revolutionize design education by providing a flexible, accessible, and technologically enriched environment that prepares students for the future of design practice.

Method

In the current landscape of higher education, particularly within the field of Visual Communication Design (VCD), there has been a significant shift toward virtual platforms. A detailed qualitative study was conducted to investigate the dynamics of VCD studio classes that are being held online at a private university's faculty of arts and design at city of Bandung, Indonesia. This study was designed as a case study that methodically examined the transition from physical to digital learning environments, capturing the experiences and challenges faced by both students and lecturers.

Utilizing a descriptive qualitative approach, the research utilized a combination of surveys, virtual ethnographic methods, and direct observation within virtual classroom settings.

Ethnographic methods, traditionally employed in physical settings to gain in-depth insights into cultural practices and experiences, were adapted to the virtual context (Hine, 2015). This involved real-time participation and observation in online classes, along with conducting interviews and focus group discussions. The virtual ethnographic approach embraced modern communication tools to engage with participants, collecting qualitative data that revealed the nuances of student-lecturer interactions and pedagogical effectiveness in the virtual studio space.

Moreover, the study sought to understand the transformation of teaching methods and learning experiences in the transition from a tangible to a virtual learning environment. It examined how the digital tools and platforms facilitated or hindered the processes inherent in VCD practices. The insights gained from this research are instrumental for educators and academic institutions as they refine their strategies to enhance the effectiveness of design education in a virtual landscape. By documenting the intricate details of these online interactions and learning experiences, the study contributes to the broader discourse on the potential and limitations of virtual learning spaces in nurturing the next generation of visual communication designers.

A comprehensive survey has been launched to examine the intricate aspects of visual literacy within the online studio classes of a Visual Communication Design (VCD) program. The survey deployed a Likert scale questionnaire to 57 student participants, probing into three primary components of visual literacy—namely, visual perception, visual language, and visual thinking—as well as their sub-components. This methodology enabled the evaluation of student responses on a gradient, from strong agreement to strong disagreement, thereby generating a nuanced profile of students' alignment with the facets of visual literacy.

To complement the data from the survey, extensive online observations were conducted across four studio classes involving the same cohort of 57 students, spanning a full semester of 14 sessions. The purpose of these observations was to glean insights into the actual conditions and dynamics of the learning environment as students engaged with the material (Uzun & Aydin, 2012). Parallel to the observations, in-depth interviews were conducted with a diverse group of 10 students—equally representing male and female perspectives—and two lecturers responsible for delivering the studio classes. These conversations aimed to triangulate and deepen the understanding of the survey findings, bringing a qualitative depth to the research.

Further elucidating the collected data, an online Focus Group Discussion (FGD) was organized, dividing the students into four distinct groups based on their respective studio classes and project topics. Each group comprised seven individuals, engaging in a structured dialogue designed to delve deeper into the practical implications of the survey outcomes. This discursive process not only provided a platform for collective reflection but also facilitated peer learning and the exchange of ideas. Lastly, the virtual ethnographic method employed by the researchers provided a window into the authentic contexts in which participants interact with digital media, reflecting the actual conditions and ambiance encountered during media engagement.

Discussion

The three primary components of visual literacy that will be analyzed, the first is visual perception (VP). VP refers to the process by which we interpret and understand visual information from the surrounding environment. It involves the brain's ability to receive and process visual stimuli such as shape, color, texture, and motion, and form meaningful representations of the visual world. From these primary components, researchers sorted them

into several sub-components related to learning in virtual classrooms, such as attention and focus, understanding, memory and recall, organization & structure, and instructional media.

The second component is Visual Language (VL). VL refers to the use of visual elements, such as images, symbols, colors, shapes, and typography, to communicate ideas, concepts, and messages. It is a form of nonverbal communication that relies on visual cues to convey meaning. then from this understanding, the researcher relates the non-verbal forms that appear in the class or studio, such as icons and symbols, infographics & charts, visual timeline, diagram, visual mnemonics, colors & typography.

The third is Visual Thinking (VT). VT is cognitive processes use visual representations, mental imagery, and spatial reasoning to understand and solve problems, generate ideas, and communicate information. It involves mental manipulation and manipulation of visual elements to organize thoughts, make connections, and express concepts. From this explanation, the researcher created sub-components related to the learning process and also the tasks given, such as dual coding theory, spatial reasoning, visual-spatial working memory, visual metaphors and analogies, mind mapping, visual problem solving.

From the three primary components and their sub-components, a statement is designed in the form of a Likert survey from which the score will then be calculated. From the score, it shows that the three derivatives in the component with the highest scores are things that become obstacles in the learning process. These three results were then confirmed through interviews with students and lecturers, then explored more deeply with FGD sessions.

VP		VL		VT	
Variable	Score	Variable	Score	Variable	Score
LMS Organization & Structure	19,21%	Diagram	19,28%	Spatial Working Memory	16,99%
Understanding	18,23%	Visual Timeline	16,99%	Dual Coding	12,90%
Memory Recall	17,73%	Icon & Symbol	16,99%	Visual Problem Solving	12,47%
Attention and Focus	17,24%	Visual Mnemonik	16,67%	Mind Mapping	11,83%
Instructional Media	14,29%	Infographics and Charts	15,36%	Visual Metaphors & Analogies	11,61%
General Application Organization & Structure	13,30%	Colors and Typography	14,71%	Visual-Digital Working Memory	11,61%
				Visual-Graphic Memory	11,40%
				Graphical Reasoning	11,18%

Table 1. Score result on primary component

From the VP score results, it was found that the largest score of 19.21% was found in the organizational and LMS structure variables provided by the campus. This means that using the campus LMS in the organization and structure of the application is very difficult to find topics, materials and links in the application. Respondents were then given statements related to visual language skills. In the survey language is divided into 6 related variables which refer to the use of visual elements, such as images, symbols, colors, shapes and typography, to communicate ideas, concepts and messages. It is a form of nonverbal communication that relies on visual cues to convey meaning.

From the results of the VL scores, it was found that the largest score of 19.28% was found in the diagram variable. This means that depicting information in diagram form is considered less

helpful for understanding concepts in online studio learning. Meanwhile, the color & typography variables in the material displayed on the screen are very helpful for communicating ideas, concepts and messages.

From the results of the VT scores, it was found that the largest score of 16.99% was found in the spatial working memory variable. This means that students have difficulty understanding things such as digital and real/physical size comparisons (for example the comparison of the size on the screen and the original size) in online studio learning. Meanwhile, the graphic reasoning variable, namely visual representations, such as infographics or sketch images, which appear on screen material is considered very helpful for communicating ideas, concepts and messages.

From the results of data collection and the first stage of analysis, there are several things that are important points in the research notes. the first thing is from the three components studied (Visual Perception, Visual language, & Visual Thinking) have the same role in literacy abilities. These three things can influence the visual process for understanding the purpose of the task given in lectures. The second is because virtual learning conditions are more screen-based, everything displayed on the screen is very important for these three components. Non-verbal material is the key to effectiveness in this type. The third is in online learning conditions, communication in the form of conversations and discussions tends to be less. Discussions cannot be held simultaneously. There is a tendency for some students to play a more passive role, this can be seen in observations, many of the students actually cover the camera and not speaking from the beginning to the end of the lecture. This is not good if the goal of studio-based VCD practice is collaboration, discussion and peer criticism. And lastly, one crucial thing is the spatial memory ability. Many outputs from design in the VCD field are finished products that are printed or physically produced. If this reduces the student's ability to estimate finished sizes, then this condition is not ideal for such a task.

Findings

In the VCD studio practice class which was conducted online and linked to visual literacy theory, it was found that using the campus LMS in the organization and structure of the application makes it very difficult to find topics, materials and links in the application. This makes it difficult for students to understand the assignments given and for lecturers to develop teaching. They prefer learning supplements in the form of videos and animations obtained from YouTube or other websites.

The second is depicting information in diagram form is considered less helpful for understanding concepts in online studio learning. even though we know that diagrams are a form of infographics. Meanwhile, the color & typography variables in the material displayed on the screen are very helpful for communicating ideas, concepts and messages.

And lastly, students have difficulty understanding things such as digital and real/physical size comparisons (for example, comparisons of the size on the screen and the original size). Meanwhile, visual representations, such as infographics or sketches, which appear on screen material are considered to be very helpful in communicating ideas, concepts and messages.

This study has several limitations, namely this research only uses a small sample with case studies at universities in big cities, so samples with other social status backgrounds & technical capabilities are not covered. The visual literacy theory used is a component that is internal to a

person, does not include external ones such as communication between student & learning experience. Each component described is not analyzed as variables that influence each other, so that this could be the next research step. And, this study did not analyze the differences produced by samples based on gender, so this can be input for further research.

Conclusion

In the evolving landscape of design education, the Visual Communication Design (VCD) practice studio class has traditionally thrived on the tangible and interpersonal interactions intrinsic to studio-based learning. However, with the necessity to pivot to fully online formats, there is a growing recognition that such an approach may not align seamlessly with the development of students' visual literacy skills and the objectives central to studio-based learning. Consequently, a hybrid model of education is increasingly being advocated, one which strategically combines online learning with opportunities for direct interaction amongst students, lecturers, and their tangible work, hence preserving the essence of the studio environment.

The transition to a hybrid model in design education addresses the evolving needs of Visual Communication Design (VCD) practice studio classes, which have historically relied on direct, tactile, and interpersonal interactions. As online formats become increasingly necessary, a careful blend of digital and traditional learning experiences is advocated to maintain the integrity of studio-based learning outcomes. The successful implementation of this model is contingent upon integrating engaging visual content and robust technological infrastructures that support collaborative learning while fostering independent and autonomous learning, critical for a designer's growth. This ensures that virtual studios replicate the interactive dynamics of their physical counterparts, enabling a learning environment where students can actively participate, create, and refine their design skills.

This study's exploration of visual literacy in the virtual studio space reveals that while essential components like visual perception, visual language, and visual thinking are crucial for navigating the online VCD studio environment, adapting these elements to a virtual context poses significant challenges. The research points to issues with the functionality of learning management systems and the effectiveness of visual aids such as diagrams, underscoring the importance of design education platforms that cater to the digital medium's unique demands. The findings emphasize the significance of color and typography in engaging students online, reinforcing theories of visual literacy that recognize the natural human capacity for visual interpretation. These insights advocate for an educational paradigm that promotes a reflective, practice-based approach, as suggested by Schön, blending advanced digital tools with the core principles of studio-based learning to prepare students for the contemporary demands of the creative sector. Furthermore, the data suggest that are sub-components influential in online engagement, aligning with Messaris's (1994) understanding of visual literacy as an innate human capability that extends beyond learned skills. By adapting the educational paradigms proposed by Schön (2003), which emphasize reflective practice and hands-on engagement, the research suggests a move towards hybrid models that blend digital technology with the essential elements of traditional studio-based learning. This approach seeks to retain the essence of the studio's collaborative spirit while leveraging the digital tools that have become integral to the design profession, thereby preparing students for the evolving demands of the creative industry.

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