Determinants of Hyperrealistic Illustration Competency among Graphic Design Students in Malaysian Universities: The Mediating Role of Deliberate Practice

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ABSTRACT

Hyperrealistic illustration has emerged as one of the most demanding competencies within contemporary graphic design education due to its emphasis on perceptual accuracy, technical precision, visual analysis, and creative interpretation. The development of such competency requires more than artistic talent, as advanced visual skills are typically acquired through continuous learning, structured practice, and reflective improvement (Ericsson et al., 1993; Edwards, 2012). Although previous studies have examined illustration learning, drawing skills, and creative performance. The increasing adoption of artificial intelligence (AI) in creative industries has further transformed illustration practices by introducing new approaches to ideation, visual exploration, and digital production (Dwivedi et al., 2023; Kasneci et al., 2023). However, concerns remain regarding whether AI-supported learning enhances creative development or reduces students' engagement with fundamental manual illustration processes. Therefore, understanding the relationship between technological readiness and traditional skill development has become increasingly important in contemporary graphic design education.

This study proposes a structural model examining the determinants influencing hyperrealistic illustration competency among Malaysian graphic design students, with deliberate practice positioned as a mediating variable. The proposed framework integrates four independent variables: visual observation skills, drawing self-efficacy, teaching quality, and AI readiness. A quantitative cross-sectional survey involving undergraduate graphic design students from Malaysian public and private universities is proposed. Data will be analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) to evaluate direct and indirect relationships among the research constructs (Hair et al., 2022). The study is expected to demonstrate that deliberate practice significantly mediates the relationship between students' cognitive abilities, psychological beliefs, instructional experiences, technological readiness, and hyperrealistic illustration competency. Theoretically, this research extends Deliberate Practice Theory, Social Cognitive Theory, and Experiential Learning Theory into the field of graphic design education. Practically, the findings may assist educators, curriculum developers, and policymakers in designing illustration education strategies that balance manual skill development with responsible AI integration.

Keywords: Hyperrealistic illustration, deliberate practice, graphic design education, illustration competency, visual observation, artificial intelligence, PLS-SEM.

INTRODUCTION

Graphic design education has experienced significant transformation due to rapid advancements in digital technologies, creative software, and artificial intelligence (AI). Contemporary designers increasingly operate within hybrid creative environments where traditional artistic knowledge interacts with digital tools, computational systems, and emerging technologies (Shneiderman, 2022; McCormack et al., 2023). Despite these technological developments, fundamental illustration skills remain essential because drawing continues to

support visual communication, conceptual exploration, problem-solving, and creative thinking within design practice (Lupton & Phillips, 2015; Male, 2017). Among various illustration approaches, hyperrealistic illustration represents one of the most technically demanding forms because it requires artists to achieve exceptional levels of visual accuracy while maintaining artistic interpretation and expressive intention. Unlike simple realistic representation, hyperrealistic illustration involves complex perceptual processes including observation, proportion analysis, tonal control, texture reproduction, colour relationships, spatial understanding, and detailed rendering techniques (Edwards, 2012; Arnheim, 2004). Therefore, competency in hyperrealistic illustration reflects an integration of perceptual, cognitive, technical, and creative capabilities rather than merely the ability to reproduce visual appearances. Within higher education, illustration courses remain an important component of graphic design programmes because they provide students with foundational skills required for visual communication and professional creative practice. Students are commonly trained in observational drawing, composition, perspective, anatomy, rendering techniques, colour application, and visual storytelling before progressing towards advanced illustration projects (Male, 2017; Wigan, 2014).

In Malaysian universities, graphic design programmes emphasise the development of graduates who possess both conceptual creativity and technical competency. Illustration courses within these programmes commonly require students to produce artwork demonstrating control over visual elements, appropriate media application, and effective communication of ideas. However, variations frequently exist among students regarding their ability to achieve advanced illustration competency despite receiving similar curriculum exposure and instructional support. Some students demonstrate exceptional proficiency in hyperrealistic rendering, whereas others experience difficulties in achieving accurate proportions, realistic textures, and convincing visual representation. Previous studies have highlighted that drawing competency contributes significantly to visual literacy, creative thinking, and design problem-solving abilities (Edwards, 2012; Arnheim, 2004). One possible explanation involves the role of deliberate practice. Ericsson et al. (1993) proposed that expert performance develops through structured, purposeful, and goal-oriented practice supported by continuous feedback and refinement. Unlike ordinary repetition, deliberate practice requires individuals to identify weaknesses, engage in targeted improvement activities, and progressively challenge their existing abilities (Ericsson & Pool, 2016).

Hyperrealistic illustration provides an appropriate context for examining deliberate practice because mastery requires extensive repetition, critical evaluation, and continuous adjustment. Artists rarely achieve highly detailed realistic outcomes through spontaneous ability alone; instead, they refine their skills through repeated observation, experimentation, correction, and reflection (Kozbelt, 2001; Ericsson et al., 1993). Therefore, deliberate practice may represent the behavioural mechanism through which students transform basic illustration abilities into advanced competency. Besides deliberate practice, several individual and environmental factors may influence students' development of hyperrealistic illustration skills. Visual observation skills represent one important determinant because accurate representation depends upon the ability to perceive proportions, spatial relationships, tonal variations, and surface characteristics (Edwards, 2012). Students with stronger observational abilities may identify visual differences more effectively and engage in more targeted improvement practices.

In particular, the mediating role of deliberate practice remains underexplored within graphic design education. Most applications of deliberate practice theory have focused on domains such as music, sports, and professional expertise rather than visual communication and illustration learning (Macnamara et al., 2014). Therefore, this study addresses this research gap by proposing a structural model that integrates visual observation skills, drawing self-efficacy, teaching quality, AI readiness, deliberate practice, and hyperrealistic illustration competency among Malaysian graphic design students. The study contributes to the literature in three important ways. First, it extends existing theories of expertise development by applying deliberate practice within the context of graphic design and illustration education. Second, it provides empirical insights into the factors influencing hyperrealistic illustration competency among Malaysian university students. Third, it offers practical implications for educators seeking to develop curriculum approaches that preserve fundamental manual illustration skills while embracing emerging AI technologies.

Accordingly, this study proposes the following research questions:

RQ1: Does visual observation skill significantly influence deliberate practice among graphic design students?

RQ2: Does drawing self-efficacy influence students' deliberate practice?

RQ3: Does teaching quality significantly improve deliberate practice?

RQ4: Does AI readiness influence deliberate practice?

RQ5: Does deliberate practice significantly enhance hyperrealistic illustration competency?

RQ6: Does deliberate practice mediate the relationships between visual observation skills, drawing self-efficacy, teaching quality, AI readiness, and hyperrealistic illustration competency?

The findings are expected to provide valuable insights into how Malaysian universities can cultivate competent illustrators capable of adapting to technological transformation while maintaining strong foundations in traditional artistic skills

LITERATURE REVIEW

Hyperrealistic Illustration Competency in Graphic Design Education

Hyperrealistic illustration represents an advanced form of representational drawing that requires a high level of perceptual accuracy, technical control, and visual interpretation. Unlike conventional realistic illustration, hyperrealistic approaches emphasise the precise reproduction of visual characteristics such as surface texture, material qualities, lighting behaviour, spatial depth, and subtle tonal variations while maintaining artistic intention and communication purposes (Male, 2017; Wigan, 2014). Therefore, competency in hyperrealistic illustration cannot be considered merely as technical drawing ability but rather as a complex integration of perceptual, cognitive, psychomotor, and creative skills. In art and design education, drawing competency functions as a fundamental foundation for visual communication and creative problem-solving. Drawing enables students to externalise ideas, analyse visual structures, understand spatial relationships, and communicate concepts before producing final design outcomes (Lupton & Phillips, 2015). Edwards (2012) further argues that effective drawing development depends significantly on perceptual learning, where students learn to observe relationships between shapes, proportions, spaces, and tonal values rather than relying on symbolic representations of objects.

Deliberate Practice Theory and Illustration Skill Development

The development of expertise has traditionally been associated with the interaction between ability, experience, and sustained learning effort. Among the most influential explanations of expert performance is Deliberate Practice Theory introduced by Ericsson, Krampe, and Tesch-Römer (1993). The theory proposes that exceptional performance does not develop primarily from innate talent but through extensive engagement in structured, purposeful, and feedback-oriented practice activities.Unlike ordinary repetition, deliberate practice involves several essential characteristics: clearly defined goals, concentration, immediate feedback, continuous evaluation, and repeated attempts to improve specific weaknesses (Ericsson et al., 1993; Ericsson & Pool, 2016). Individuals engaged in deliberate practice do not simply repeat familiar activities; instead, they deliberately challenge their current abilities by focusing on aspects requiring improvement.

Visual Observation Skills and Hyperrealistic Illustration Development

Visual observation skill represents one of the most fundamental abilities underlying successful illustration performance. In artistic practice, observation involves more than visual recognition; it requires the ability to analyse relationships among form, proportion, spatial arrangement, colour, texture, lighting, and material characteristics (Edwards, 2012). Therefore, skilled illustrators do not merely reproduce what they see but interpret complex visual information through developed perceptual processes.

The importance of observation in drawing development has been widely discussed within visual arts education. Edwards (2012) argues that many drawing difficulties among learners occur because students rely on symbolic representations rather than accurately perceiving visual relationships. Through systematic observation training, learners gradually improve their ability to recognise shapes, negative spaces, tonal differences, and proportional relationships. These perceptual improvements subsequently influence the accuracy and realism of their visual outputs.

Research in perceptual expertise further suggests that expert artists develop specialised visual processing abilities through extensive exposure and practice. Kozbelt (2001) found that artistic expertise involves enhanced perceptual analysis, allowing experienced artists to detect visual information more effectively compared with less experienced individuals. Similarly, Gombrich (2000) highlighted that artistic representation depends on the interaction between perception, knowledge, and interpretation rather than direct copying alone.

H1: Visual Observation Skills have a positive and significant effect on Deliberate Practice.

Drawing Self-Efficacy and Illustration Competency

Self-efficacy refers to individuals' beliefs regarding their capability to organise and execute actions required to achieve specific performance outcomes (Bandura, 1997). Within educational contexts, self-efficacy influences students' motivation, effort, persistence, learning strategies, and responses to challenges (Zimmerman, 2000). Unlike general confidence, self-efficacy is task-specific and reflects individuals' perceptions of their ability to successfully perform particular activities.

In illustration education, drawing self-efficacy represents students' beliefs regarding their ability to complete drawing-related tasks, overcome technical difficulties, and improve artistic performance through learning. Hyperrealistic illustration often requires considerable patience, concentration, and repeated refinement. Students must invest substantial effort in developing complex technical skills, making psychological factors such as confidence and persistence particularly important.

According to Social Cognitive Theory, individuals with higher self-efficacy are more likely to select challenging tasks, demonstrate greater perseverance, and recover more effectively from failure experiences (Bandura, 1986, 1997). Conversely, students with low self-efficacy may avoid difficult activities because they perceive challenges as threats rather than opportunities for improvement.

Accordingly, this study proposes:

H2: Drawing Self-Efficacy has a positive and significant effect on Deliberate Practice.

Teaching Quality in Illustration Education

Teaching quality represents a critical factor influencing student learning outcomes, particularly within practice-based disciplines such as graphic design and illustration. Unlike theoretical subjects, illustration education requires continuous interaction between instructors and students through demonstrations, critiques, practical exercises, and individual feedback (Biggs & Tang, 2011).

Effective teaching in studio-based education extends beyond delivering technical information. Illustration lecturers function as facilitators who demonstrate professional processes, explain visual decision-making, provide constructive critique, and guide students through problem-solving activities. Through observation of expert demonstrations, students gain insight into professional approaches to analysing references, constructing forms, applying techniques, and refining visual outcomes.

Shulman (1986) emphasised that effective teaching requires both subject knowledge and pedagogical understanding. In creative disciplines, lecturers must not only possess artistic expertise but also understand how to communicate complex visual concepts effectively to learners with different levels of ability.

Thus, the following hypothesis is proposed:

H3: Teaching Quality has a positive and significant effect on Deliberate Practice.

Artificial Intelligence Readiness in Contemporary Illustration Education

The emergence of artificial intelligence has introduced significant changes within creative industries, including graphic design, illustration, advertising, and digital media production. AI-powered systems can generate images, provide visual references, support concept development, and accelerate creative exploration processes (Dwivedi et al., 2023). As these technologies become increasingly accessible, higher education institutions face the challenge of preparing students to utilise AI effectively while maintaining fundamental creative competencies.

AI readiness refers to individuals' knowledge, confidence, willingness, and ability to adopt artificial intelligence technologies appropriately within specific contexts. Unlike simple technology acceptance, AI readiness includes critical understanding of technological capabilities, limitations, ethical considerations, and responsible application (Long & Magerko, 2020).

Within illustration education, AI readiness does not imply replacing manual drawing skills with automated image generation. Instead, AI may function as a complementary learning resource supporting ideation, reference exploration, composition development, and creative experimentation. Students who understand how to use AI critically may access broader visual possibilities while continuing to develop essential observational and technical abilities. In this study, AI Readiness is conceptualised as a multidimensional construct consisting of **technical proficiency, ethical awareness, and creative application**. Technical proficiency refers to students' ability to operate and evaluate AI tools effectively. Ethical awareness concerns responsible and appropriate use of AI technologies, including issues related to originality, copyright, and academic integrity. Creative application reflects students' capability to employ AI as a complementary resource for ideation, reference generation, and creative exploration without replacing foundational manual illustration skills (Long & Magerko, 2020; Ng et al., 2021; Dwivedi et al., 2023). Technical Proficiency is able to operate AI tools, evaluate AI output and integrate AI into workflow. The Ethical Awareness including copyright, academic integrity, responsible AI use and the originality.

H4: AI Readiness has a positive and significant effect on Deliberate Practice.

Relationships Among the Constructs

Although previous studies have examined factors influencing artistic learning and skill development, most investigations have focused on individual variables rather than examining their combined influence within an integrated structural model. The development of hyperrealistic illustration competency is unlikely to result from a single factor alone; instead, it represents the interaction between cognitive abilities, psychological characteristics, instructional experiences, technological adaptation, and sustained learning behaviours. The present study proposes that deliberate practice functions as the central mechanism connecting these determinants with hyperrealistic illustration competency. Based on Ericsson's Deliberate Practice Theory, expert performance develops when individuals repeatedly engage in purposeful activities designed to overcome specific weaknesses through feedback and refinement (Ericsson et al., 1993). Therefore, learner characteristics and educational conditions may influence competency development indirectly by shaping students' engagement in deliberate practice.

CONCEPTUAL FRAMEWORK

Based on the theoretical foundations and literature review, this study proposes a conceptual framework to examine the determinants influencing Hyperrealistic Illustration Competency (HIC) among graphic design students in Malaysian universities. The framework integrates four antecedent variables, namely Visual Observation Skills (VOS), Drawing Self-Efficacy (DSE), Teaching Quality (TQ), and AI Readiness (AIR), with Deliberate Practice (DP) positioned as the mediating variable. The proposed framework assumes that students'

competency in hyperrealistic illustration does not develop solely through exposure to illustration courses or access to digital tools. Instead, competency development is influenced by the interaction between cognitive abilities, psychological characteristics, educational support, technological adaptation, and continuous skill refinement activities.

Based on Deliberate Practice Theory (Ericsson et al., 1993), students develop advanced illustration competency through structured practice involving goal setting, repeated refinement, feedback, and self-evaluation. Therefore, deliberate practice is proposed as the mechanism through which individual and environmental factors influence final illustration competency outcomes. Social Cognitive Theory (Bandura, 1997) supports the inclusion of drawing self-efficacy as an antecedent variable because students' beliefs regarding their own abilities influence motivation, persistence, and willingness to undertake challenging illustration tasks. Similarly, Experiential Learning Theory (Kolb, 1984) supports the role of teaching quality because effective studio instruction provides meaningful experiences, feedback, and reflection opportunities necessary for skill development.

Furthermore, the inclusion of AI readiness reflects the changing landscape of contemporary graphic design education. Rather than considering artificial intelligence as a replacement for manual illustration, this framework conceptualises AI readiness as students' capability to integrate AI technologies strategically and ethically to support creative learning processes.

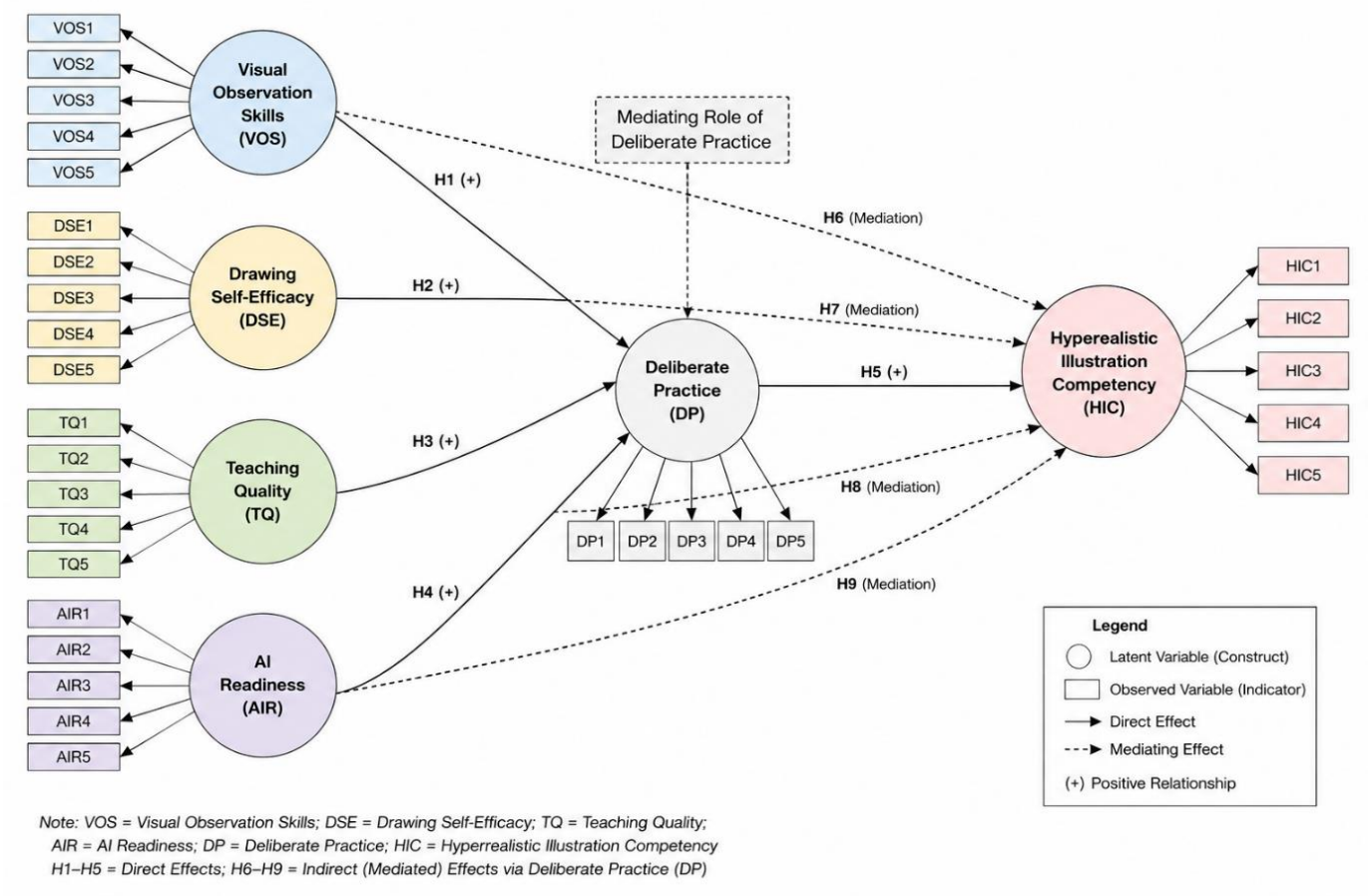

Figure 1. Proposed Structural Model of Hyperrealistic Illustration Competency Development

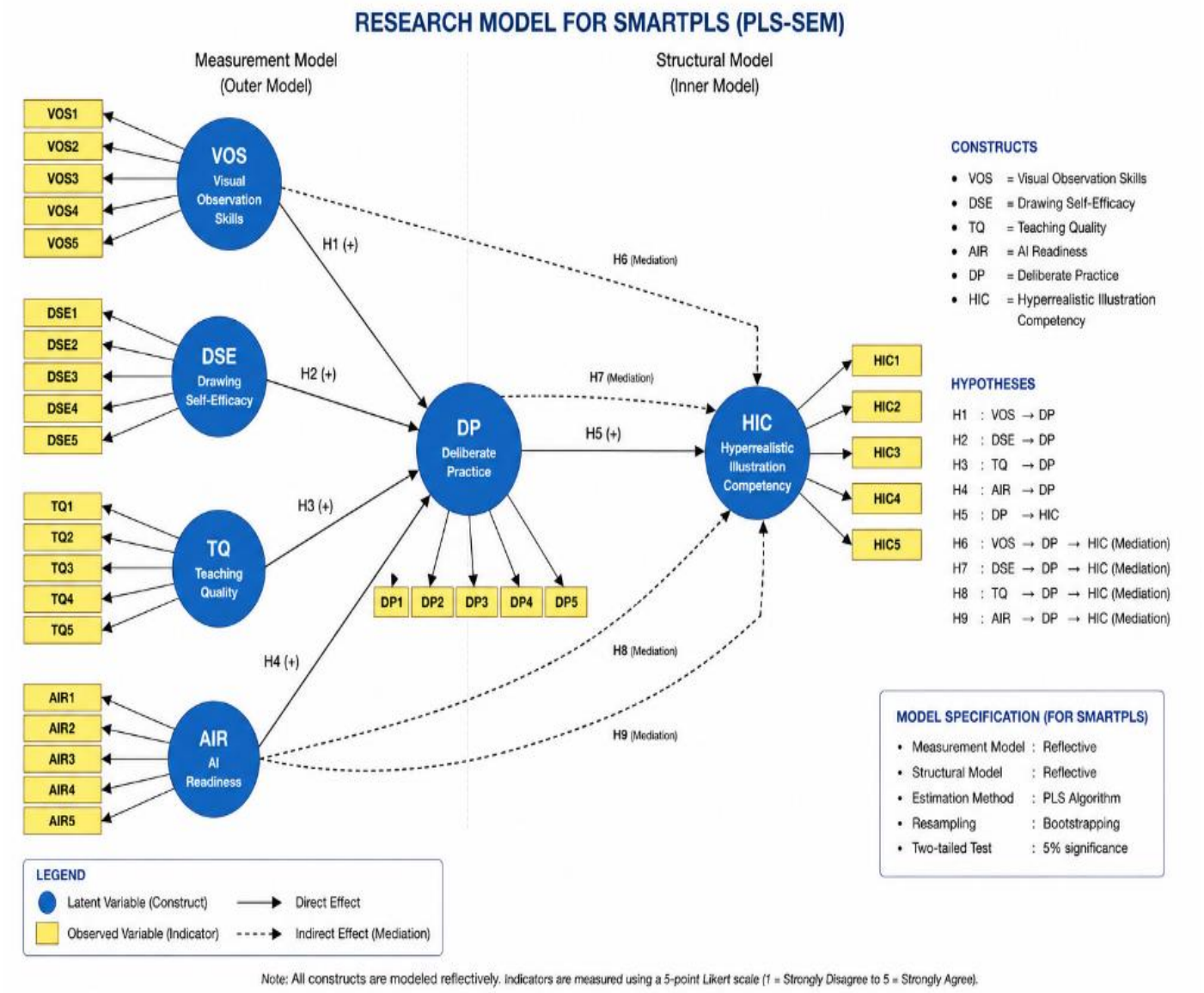

Table 1. Construct Definitions and Theoretical Sources

Relationship	Theoretical Explanation
VOS → DP	Strong observation ability enables students to identify weaknesses and conduct targeted improvement activities.
DSE → DP	Students with higher confidence demonstrate greater persistence and willingness to engage in challenging practice.
TQ → DP	Effective teaching provides feedback, guidance, and learning environments that encourage structured improvement.
AIR → DP	Appropriate AI integration may enhance exploration, reflection, and learning efficiency.
DP → HIC	Continuous structured practice develops advanced technical and perceptual illustration competency.

Table 2. Proposed Relationship Between Constructs

METHODOLOGY

Research Design

This study adopts a **quantitative cross-sectional research design** to examine the determinants influencing hyperrealistic illustration competency among graphic design students in Malaysian universities. A quantitative approach is appropriate because the study aims to measure relationships among latent constructs and statistically test the proposed conceptual model through hypothesis testing (Creswell & Creswell, 2023).

The research employs a survey method because the proposed constructs, including visual observation skills, drawing self-efficacy, teaching quality, AI readiness, deliberate practice, and hyperrealistic illustration competency, represent psychological, behavioural, and educational characteristics that can be measured through structured questionnaire items.

Furthermore, the study applies **Partial Least Squares Structural Equation Modelling (PLS-SEM)** as the primary statistical analysis technique. PLS-SEM is suitable for exploratory and predictive research models involving multiple latent variables, mediation analysis, and complex structural relationships (Hair et al., 2022). Compared with covariance-based SEM, PLS-SEM provides greater flexibility when analysing models with multiple constructs and when data distribution does not fully satisfy normality assumptions (Hair et al., 2019).

The proposed model consists of:

- Four exogenous constructs:
    1. Visual Observation Skills (VOS)
    2. Drawing Self-Efficacy (DSE)
    3. Teaching Quality (TQ)
    4. AI Readiness (AIR)

Research Population

The target population of this study comprises undergraduate students enrolled in graphic design, visual communication, illustration, multimedia design, and related creative arts programmes at Malaysian public and private universities.

These students are considered appropriate respondents because they receive formal education in illustration principles, drawing techniques, visual communication, and studio-based creative practices. Furthermore, undergraduate students represent a critical stage where foundational illustration skills are transformed into advanced competencies through structured academic training.

The study focuses on Malaysian higher education institutions because illustration education is influenced by local curriculum structures, teaching approaches, technological adoption patterns, and creative industry requirements. Investigating students from Malaysian universities provides contextual understanding regarding the development of illustration competency within the national creative education environment.

Sampling Technique and Sample Size

This study proposes the use of **purposive sampling** because respondents must fulfil specific criteria related to illustration education experience.

The inclusion criteria are:

1. Undergraduate students currently enrolled in graphic design or related creative programmes.
2. Students who have completed at least one illustration-related course.

3. Students with experience producing manual or digital illustration projects.

4. Students familiar with contemporary digital creative tools, including AI-assisted technologies.

Purposive sampling is appropriate when researchers require participants possessing specific knowledge or experiences relevant to the research objectives (Etikan et al., 2016).

For PLS-SEM analysis, sample size determination should consider statistical power, model complexity, and minimum requirements for reliable estimation. According to Hair et al. (2022), PLS-SEM studies generally require sample sizes exceeding the "10-times rule" and should ideally be determined through power analysis.

The proposed model contains four predictors affecting the mediator construct and one mediator affecting the dependent construct. Therefore, a minimum sample size of approximately **200–300 respondents** is targeted to ensure adequate statistical power and reliable estimation of structural relationships.

CONCLUSION

Hyperrealistic illustration competency represents a complex capability requiring the integration of perceptual understanding, technical mastery, creative interpretation, and sustained learning engagement. Although illustration education has traditionally emphasised skill acquisition through studio practice, limited empirical research has examined the underlying mechanisms explaining how students develop advanced illustration competency. This study proposes a comprehensive structural model integrating visual observation skills, drawing self-efficacy, teaching quality, and AI readiness as determinants influencing hyperrealistic illustration competency through the mediating role of deliberate practice. By combining Deliberate Practice Theory, Social Cognitive Theory, and Experiential Learning Theory, the proposed framework provides a multidimensional explanation of competency development within contemporary graphic design education.

The study highlights that advanced illustration ability should not be viewed solely as a product of natural artistic talent. Instead, competency emerges through continuous interaction between students' abilities, beliefs, learning environments, technological awareness, and purposeful practice behaviours. The proposed research contributes to the advancement of illustration education by providing an evidence-based framework for understanding skill development among Malaysian graphic design students. The findings may support educators and institutions in designing learning strategies that preserve essential manual illustration foundations while embracing emerging AI technologies. Ultimately, developing competent illustrators in the contemporary creative landscape requires a balanced educational approach that combines human creativity, disciplined practice, effective pedagogy, and responsible technological integration.

Although the present study proposes a theoretically grounded conceptual framework, empirical validation remains necessary. Future studies should collect primary data from undergraduate graphic design students across Malaysian universities to empirically test the proposed structural relationships using Partial Least Squares Structural Equation Modelling (PLS-SEM). Such validation would provide stronger evidence regarding the predictive capability of the proposed framework and enhance its generalisability across different higher education contexts. Future research is encouraged to adopt a longitudinal research design to examine how deliberate practice and AI readiness evolve throughout students' academic progression. Longitudinal evidence would enable researchers to investigate competency development over multiple semesters, providing richer insights into how continuous practice, instructional support, and AI integration influence long-term hyperrealistic illustration competency.

Future investigations may complement quantitative findings through qualitative approaches such as semi-structured interviews, portfolio analysis, classroom observations, and reflective journals. These methods could provide deeper understanding of students' creative processes, learning experiences, artistic decision-making, and the ways in which deliberate practice is developed within studio-based illustration education. A mixed-method approach would therefore strengthen interpretation of quantitative findings while offering richer pedagogical implications.

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