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Exploring the Application of Generative AI Tools in UI Design Teaching at a Higher Vocational College: A Qualitative Study

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Abstract: ***With the increasing integration of generative artificial intelligence (GenAI) into higher education, GenAI tools have provided new opportunities for teaching and learning in art and design education. However, their application in UI design teaching requires further examination, particularly in higher vocational education, where students are expected to develop both design knowledge and practical skills. Based on constructivist learning theory, this study adopted a qualitative research approach to explore the application of GenAI tools in a UI Design course at a higher vocational college. Data were collected through classroom observations, semi-structured interviews, and focus group discussions. The general inductive approach was employed to analyse participants' experiences and perceptions. The findings revealed three main themes: knowledge construction and user-centred design with GenAI, teacher guidance and human–AI collaboration, and critical evaluation and reflective design revision. GenAI tools supported students in understanding UI design knowledge, exploring user needs and design alternatives, and evaluating and revising their work. AI-generated content did not always meet user needs, design standards, or interaction requirements. Teachers played an important role in organising learning activities, guiding human–AI collaboration, and providing feedback on students' design work. Some students also expressed concerns that the convenience of GenAI could reduce their independent thinking during the design process. This study provides qualitative evidence of GenAI-supported UI design teaching in higher vocational education and offers implications for integrating GenAI into design learning activities while maintaining students' active participation and professional judgement.***

Keywords: Generative artificial intelligence, UI design teaching, Higher vocational education, Constructivist learning theory.

1. Introduction

1.1 Research Background

With the increasing use of generative artificial intelligence (GenAI) in higher education, GenAI tools have been applied to support knowledge acquisition, teaching resource development, and practical learning activities. In a systematic review, Belkina et al. (2025) indicated that the educational use of GenAI needs to be integrated with disciplinary content, teaching methods, and specific instructional contexts. In art and design education, GenAI tools have been used in design ideation, visual generation, and the evaluation of student work, providing new forms of support for design teaching (Park, 2025).

User interface (UI) design is a practice-oriented course in digital media art and design and related programmes at higher vocational colleges. Its content covers UI design standards, visual elements and components, page layout, information organisation, and prototyping. Kang et al. (2022) emphasised the importance of practical learning activities in user experience (UX) design education, while Buendía-García (2025) examined the use of GenAI tools in collaborative UX design courses. However, AI-generated designs and feedback do not necessarily meet specific functional requirements or professional standards. Students therefore need to analyse, select, and revise generated content (Li et al., 2025).

Further research is needed to understand how GenAI tools are integrated into teaching activities in UI design courses and what experiences and difficulties teachers and students encounter when using them. Focusing on the use of GenAI tools in a UI Design course at a higher vocational college, this qualitative study draws on constructivist learning theory as an interpretive framework. Through classroom observations, semi-structured interviews, and focus group discussions, it explores teachers' and students' experiences and perceptions of GenAI-supported teaching and learning, with a view to informing the appropriate use of GenAI tools in higher vocational UI design courses.

1.2 Purpose of the Study and Research Questions

The purpose of this study is to explore the use of GenAI tools in a UI Design course at a higher vocational college. Drawing on constructivist learning theory as an interpretive framework, the study adopts a qualitative approach to examine teachers' and students' experiences of GenAI-supported teaching and learning. Specifically, it examines how teachers integrate GenAI into course activities, how teachers and students experience the use of GenAI in learning disciplinary knowledge and undertaking design practice, and what difficulties they encounter and how they respond during tool use, design evaluation, and revision. The following research questions guide the study.

1) How do teachers integrate GenAI tools into teaching activities in a higher vocational UI design course?

2) How do teachers and students experience GenAI-supported teaching and learning in a higher vocational UI design course?

3) What challenges do teachers and students encounter in GenAI-supported teaching and learning, and how do they respond to these challenges?

1.3 Significance of the Study

The significance of this study lies in its theoretical and practical implications. At the theoretical level, the study draws on constructivist learning theory to examine how teachers and students experience GenAI-supported UI design teaching and learning. By considering teachers' organisation of learning activities, students' knowledge construction, and teacher–student interaction, it provides qualitative evidence for understanding the role of GenAI in design learning within a specific higher vocational education context.

At the practical level, the study offers insights into the use of GenAI in learning UI design knowledge, developing design ideas, and creating prototypes. It examines the roles of teachers' professional guidance, students' independent design work, and AI support, providing a basis for considering how GenAI can be integrated into teaching activities while maintaining students' active participation and professional judgement.

1.4 Theoretical Framework

Constructivist learning theory emphasises that learners actively construct knowledge by connecting new information with their existing knowledge and experiences. Vygotsky (1978) argued that cognitive development is closely related to social interaction and guidance from more knowledgeable others. His concept of the zone of proximal development suggests that learners can accomplish tasks with appropriate guidance or collaboration that they cannot yet complete independently. Therefore, learning involves not only individual exploration but also interaction with teachers and peers, who provide support for developing knowledge and problem-solving abilities.

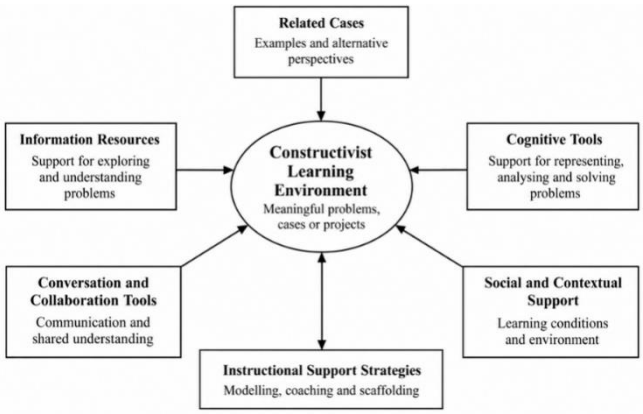


Figure 1: Model for Designing Constructivist Learning Environments (Adapted from Jonassen, 1999).

Jonassen (1999) proposed a model for designing constructivist learning environments, placing meaningful problems, cases, or projects at the centre of learning activities. The model includes five supporting components: (1) the core meaningful problem, case or project, which defines the real-world task students work toward; (2) related cases, which provide examples and alternative perspectives; (3) information resources, which support problem exploration; (4) cognitive tools, which assist learners in analysing and solving problems; (5) conversation and collaboration tools, which facilitate interaction and shared understanding; (6) social and contextual support, which provides the conditions for learning activities.Across the whole model, Jonassen (1999) also identified modelling, coaching, and scaffolding as core instructional strategies used by teachers to support learners throughout the problem-solving process. (Figure 1. shows an example).

These theoretical principles are relevant to UI design teaching, in which students are required to understand design standards, analyse user needs, organise interface information, and develop interactive prototypes. GenAI tools can provide explanations of design concepts, generate alternative design proposals, and offer feedback during design activities. AI-generated content may not always meet user requirements, UI design standards, or interaction logic. Students therefore need to evaluate generated suggestions and revise their designs according to specific tasks. In this process, GenAI may serve as an additional learning resource and cognitive support, while teachers provide guidance to help students develop their understanding and make independent design decisions.

Constructivist learning theory provides a relevant framework for this study because it emphasises active knowledge construction, meaningful learning tasks, social interaction, and instructional guidance (Vygotsky, 1978; Jonassen, 1999). Based on this framework, the present study focuses on how teachers integrate GenAI into UI design teaching, how students engage in knowledge learning and design practice, and how teacher guidance and reflective revision relate to their understanding of design problems.

2. Related Research

2.1 Generative AI in Higher Education

In recent years, research on GenAI in higher education has gradually shifted from tool functions and intentions to use these tools towards actual learning outcomes and the factors that influence them. Through a systematic review and meta-analysis of experimental studies, Han et al. (2025) found that GenAI interventions had an overall positive effect on learning outcomes, although this effect was moderated by factors such as educational level, discipline, instructional duration, and research design. In a synthesis of 57 studies, Chen and Cheung (2025) further found that GenAI had positive effects on university students' academic achievement, learning motivation, and higher-order thinking, whereas its effect on metacognitive ability was not statistically significant. These findings suggest that GenAI does not have the same effects across all learning activities and that its educational effects need to be considered in relation to specific instructional objectives and learning contexts. Existing research provides empirical evidence for understanding the educational use of GenAI. However, studies primarily concerned with measuring learning outcomes cannot fully explain how teachers and students use AI in specific courses or how they understand and respond to the changes associated with its involvement in learning.

2.2 Generative AI in Art and Design Education

Art and design education emphasises creative ideation, visual expression, and design practice. The use of GenAI has further expanded the ways in which students explore and present design proposals. Chen et al. (2025) conducted a quasi-experimental study involving 64 first-year undergraduate

students in a design and art course to examine the effects of GenAI on academic achievement, learning motivation, and self-efficacy. Their study provided empirical evidence for the use of GenAI in art and design teaching. At the same time, the evaluation of AI-generated content in design education cannot rely solely on generation efficiency or the number of outputs. It also needs to consider the professional understanding and creative abilities that students develop during the design process. Drawing on interviews with nine university teachers from different countries, Fleischmann (2026) found that teachers increasingly viewed GenAI as a tool for supporting design thinking, while emphasising the importance of foundational design training, professional judgement, and ethical awareness. These studies suggest that the use of GenAI in art and design education involves not only new approaches to creation but also changes in students' learning processes and teachers' approaches to guidance.

2.3 Generative AI in UI/UX Design Education

UI/UX design education is strongly practice-oriented. Students need to organise information, develop interfaces, and revise designs on the basis of their understanding of user needs and design standards. Research has begun to examine the use of GenAI in related disciplinary courses. In a web development course for UX design students, Buendía-García and Piris-Ruano (2025) explored the use of tools such as GitHub Copilot and progressive prompting strategies to support students in completing web development tasks. Their study suggested that GenAI has potential to support practical work among design students without a programming background. Ma et al. (2026) further analysed 35 student design portfolios from an interaction design course in New Zealand. They found that generation, comparison, and revision were recurring learning activities when GenAI was involved in the design process and that these activities were connected to students' understanding of design problems and reflective judgement. These studies offer insights into GenAI use in UI/UX-related courses through their examination of web development support and design processes. It is important to distinguish between web development and UI design courses in terms of their instructional objectives and professional skill requirements. The former places greater emphasis on coding and technical implementation, whereas the latter focuses more on interface visual standards, component design, information organisation, and interactive prototyping. Experiences of GenAI use in higher vocational UI design courses therefore require further examination in relation to specific instructional tasks and the practices of teachers and students.

2.4 Human–AI Collaboration in Design Education

As GenAI becomes increasingly involved in ideation, content generation, and the evaluation of design work, human–AI collaboration has attracted considerable attention in design education. In a controlled study involving 25 students, Schmitt-Fumian et al. (2025) compared feedback provided by GPT-4 and teachers during design ideation. They found that AI feedback could support students in revising their ideas and had a positive effect on learning motivation. In a study of 10 design teachers, Li et al. (2025) found that teachers recognised the value of structured design feedback from AI but also expected such feedback to be more responsive to specific design contexts and to take students' design intentions fully into account. From the perspective of studio-based design teaching, Park (2025) further examined the implications of GenAI for design collaboration, the evaluation of student work, and students' creative agency, emphasising transparency in the creative process and critical human–AI collaboration. These studies indicate that GenAI can contribute to the generation and revision of design content, while also bringing teachers' guidance, students' independent decision-making, and the evaluation of design work into focus.

In summary, existing studies have examined GenAI use in higher education and design education in terms of learning outcomes, design practice, AI feedback, and human–AI collaboration. Less attention has been given to how teachers and students experience GenAI-supported teaching and learning in higher vocational UI design courses. In particular, questions remain about how teachers integrate GenAI into course tasks and how teachers and students evaluate and revise generated content during design practice. This study therefore adopts a qualitative approach, using constructivist learning theory as an interpretive framework, to explore teachers' and students' experiences and the difficulties encountered in GenAI-supported UI design teaching and learning.

3. Research Method

3.1 General Inductive Approach

This study adopted the general inductive approach (Thomas, 2006), a systematic method for identifying and categorising themes from qualitative data. The general inductive approach enabled the researcher to identify patterns in the data, leading to a deeper understanding of how teachers and students experienced the integration of GenAI tools into UI design teaching and learning at a higher vocational college. By examining participants' perspectives, the researcher sought to understand how teachers integrated GenAI into teaching activities, how teachers and students perceived its role in design learning and practice, and how they responded to challenges encountered during its use. The general inductive approach was considered appropriate for this study because of its flexibility in examining participants' experiences and identifying patterns related to the research questions.

3.2 Participants

Purposive sampling was used to recruit 16 participants, including 4 teachers and 12 students, from a higher vocational college. The UI Design course comprised five credits and 90 class hours delivered over five weeks, with each class hour lasting 40 minutes. All 4 teachers had experience teaching the course and incorporating GenAI tools into their teaching. All 12 students had practical experience of learning UI design with GenAI support.

To protect participants' privacy, interview data were identified using anonymous codes comprising a participant number, role, and gender. For example, 02-S-F identifies student participant 02 as female, while 04-T-F identifies teacher participant 04 as female. S denotes Student, T denotes

Teacher, F denotes Female, and M denotes Male.

3.3 Data Collection

Three methods were employed to collect qualitative data: (1) classroom observations, (2) semi-structured interviews, and (3) focus group discussions. First, classroom observations were conducted over a five-week teaching period of the UI Design course at a higher vocational college. Two observations were conducted each week, with each session lasting approximately two class hours (40 minutes per class hour), resulting in 10 observations covering 20 class hours. The observations focused on teachers' integration of GenAI into teaching activities, students' use of GenAI in design practice, and classroom interactions. Second, individual semi-structured interviews were conducted with 4 teachers and 12 students, resulting in 16 interviews. Teacher interviews explored the integration of GenAI into teaching activities, instructional guidance, and implementation challenges, while student interviews focused on their experiences of using GenAI for knowledge learning, design exploration, interface development, and design revision. Open-ended questions and follow-up questions were used to explore participants' experiences in relation to specific course tasks. Finally, the 12 students were divided into three focus groups of four participants each. Two rounds of discussions were conducted with each group, resulting in six sessions lasting approximately 40 minutes each. The first round, conducted in Week 3, focused on students' experiences of GenAI-supported learning and design practice, while the second round, conducted in Week 5, explored their experiences of evaluating AI-generated content, receiving teacher feedback, and addressing difficulties. Before data collection, participants were informed of the study purpose and procedures, and informed consent was obtained. All data were anonymised to protect participants' identities.

3.4 Data Analysis

After data collection, the interview and focus group recordings were transcribed, and classroom observation records were organised for analysis. First, the researcher repeatedly reviewed the data and identified initial codes related to teachers' and students' experiences of GenAI-supported UI design teaching and learning. Second, related codes were compared and grouped into preliminary categories, focusing on instructional practices, knowledge learning, design activities, human–AI collaboration, and challenges encountered during GenAI use. Third, the researcher reviewed and refined these categories by comparing participants shared experiences and differing perspectives across the data sources. Finally, the analysis identified three main themes and six subthemes: knowledge construction and user-centred design with GenAI, teacher guidance and human–AI collaboration, and critical evaluation and reflective design revision. These themes provided the basis for presenting and interpreting the findings in relation to constructivist learning theory.

4. Findings and Discussion

Drawing on classroom observations, semi-structured interviews, and focus group discussions, this study examined the use of GenAI in a higher vocational UI design course and teachers' and students' experiences and perceptions. The general inductive analysis identified three main themes: knowledge construction and user-centred design with GenAI, teacher guidance and human–AI collaboration, and critical evaluation and reflective design revision. These themes address, respectively, the use of GenAI in learning disciplinary knowledge and exploring designs, teachers' organisation of instruction and students' experiences of human–AI collaboration, and teachers' and students' understandings of the evaluation of generated content and the revision of design work. The findings reveal both the support that GenAI provides for course teaching and learning and problems such as generated content that does not meet professional standards and insufficient independent thinking among students. The themes are summarised in Table 1.

Table 1: Themes.

Themes	
4.1 Knowledge Construction and User-Centred Design with GenAI	4.1.1 Understanding Design Knowledge and Applying UI Standards
	4.1.2 Understanding Users and Exploring Designs in Context
4.2 Teacher Guidance and Human–AI Collaboration	4.2.1 Teaching Task Organisation and Professional Guidance
	4.2.2 Tool Selection and Task-Oriented Prompting
4.3 Critical Evaluation and Reflective Design Revision	4.3.1 Evaluating AI-Generated Designs and Recognising Dependence
	4.3.2 Iterative Revision and Reconstruction of Design Understanding

4.1 Knowledge Construction and User-Centred Design with GenAI

GenAI provided new learning resources that helped students understand UI design knowledge, access reference examples, and explore design proposals. Students could obtain explanations of disciplinary concepts through natural-language questions and generate different design directions for specific tasks. At the same time, acquiring knowledge is not equivalent to applying it. UI design involves knowledge of colour, typography, components, and layout, but also requires students to organise information and interaction flows according to target users and contexts of use. This theme therefore examines two aspects: understanding design knowledge and applying UI standards, and understanding user needs and exploring designs in context.

4.1.1 Understanding Design Knowledge and Applying UI Standards

Student interviews indicated that GenAI had become an important supplementary resource for understanding UI design knowledge. When encountering questions about grid systems, typographic hierarchy, or colour contrast, students could use AI to obtain explanations and examples. One student said,

"...I often use generative artificial intelligence to help me understand concepts that I am not clear about. For example, if I ask Figma AI directly about grid systems in interface layouts, colour contrast standards, or typographic hierarchy, it can give me fairly clear explanations and examples..." (02-S-F, interview)

Some students also tried applying generated suggestions to their work to assess how well these suggestions worked in practice. Another student noted,

"...I try it on a small scale first, such as changing the colours of a button or adjusting one part of the layout, to see whether it works..." (04-S-F, focus group)

These experiences illustrate two ways in which students used GenAI to understand disciplinary knowledge: asking questions to obtain conceptual explanations and testing generated suggestions through small-scale design practice. Instead of simply accepting information provided by AI, trying out suggestions on a limited part of a design allowed students to assess how applicable this knowledge was to their own work.

Teachers' experiences indicated that students' understanding of individual design concepts did not necessarily enable them to integrate this knowledge into a complete interface design task. One teacher explained,

"...AI now makes it easier for students to understand UI design standards, but when they actually design an interface, some focus only on how the page looks and tend to overlook component states, navigation between pages, and interaction logic. I use their prototypes to ask them to explain what each component does and how the different pages should connect..." (02-T-F, interview)

Whereas students focused on explanations of concepts and adjustments to individual design elements, teachers placed greater emphasis on the connections among different areas of disciplinary knowledge. In UI design, the visual appropriateness of a single component does not ensure the usability of the interface as a whole. Students also need to coordinate information hierarchy, component states, relationships between pages, and feedback on user actions. Through prototype analysis and targeted questions, teachers guided students in understanding how to apply design standards within a complete task.

Jonassen (1999) argued that constructivist learning environments should support active exploration and problem-solving rather than the passive reception of information. In this study, GenAI made it easier for students to access disciplinary knowledge. Even so, whether that knowledge could be applied effectively in design practice still depended on students' ability to analyse and make judgements when working on specific design tasks. Teachers' guidance therefore needs to help students understand UI design concepts and integrate separate areas of disciplinary knowledge throughout the design process.

4.1.2 Understanding Users and Exploring Designs in Context

GenAI offered students a range of directions to compare during design ideation. One student stated,

"...Not all of these ideas can necessarily be used, but they do help me think more broadly and give me more options when I am developing ideas..." (07-S-F, interview)

Some students began to incorporate target users and contexts of use into the generation process. In an in-vehicle HMI design task, one student explained,

"...I try to describe the requirements as clearly as possible. For example, I tell Doubao about my project background, the vehicle model, the intended use scenario, and the teacher's requirements together..." (01-S-F, interview)

Another student working on a smart cockpit design for a scenario involving children, noted,

"...When I compare proposals, I mainly consider whether they fit real situations of use and whether the interactions would be complicated. I then choose a suitable direction to develop further..." (11-S-M, focus group)

These experiences suggest that GenAI could help students broaden their design ideas. Some students also began to formulate generation requirements in relation to specific tasks and contexts of use and to compare different proposals.

However, teacher interviews indicated that some students could generate interface proposals with GenAI without adequately completing preliminary user analysis or applying research outputs, such as user personas and flowcharts, to subsequent design work. Whereas students focused on the variety of proposals and their suitability for particular contexts, teachers placed greater emphasis on the connection between user research and design decisions. At the same time, some students were able to evaluate generated proposals in relation to actual use contexts. For example, in designing the home screen of an in-vehicle central display, one student found that an AI-generated proposal crowded the page with too many controls, potentially increasing cognitive load while driving. The student therefore argued that interface design should prioritise driving safety. These differing experiences suggest that incorporating user information into the GenAI generation process does not necessarily mean that students have fully understood user needs. They still need to assess whether generated proposals are appropriate for actual conditions of use.

In a study of GenAI-supported UX design courses, Buendía-García (2025) discussed the use of GenAI in user analysis and design ideation. The present study similarly found that GenAI can support students in exploring different design directions. It is also important to note that feedback from both teachers and students shows that the large number of design proposals generated by GenAI cannot replace real user research or professional design judgement. From a constructivist perspective, context-based design learning requires students to identify user needs within specific task scenarios, and apply this understanding to functional planning and design choices. The educational value of GenAI-supported user-centred design therefore lies in two parts: it provides students with useful design references, and it helps students connect user analysis with real design decisions.

4.2 Teacher Guidance and Human–AI Collaboration

Teachers, students, and AI tools undertake different tasks in

GenAI-supported UI design teaching and learning. Teachers organise learning activities in accordance with course objectives and provide professional guidance during design practice. Students use GenAI to obtain design references, organise materials, and explore proposals, while remaining responsible for independently analysing designs and judging their suitability. Human–AI collaboration therefore involves more than tool use: it is closely related to the organisation of instructional tasks, the application of disciplinary knowledge, and the evaluation of generated content. This theme examines teaching task organisation and professional guidance, followed by tool selection and task-oriented prompting.

4.2.1 Teaching Task Organisation and Professional Guidance

Teacher interviews indicated that GenAI was used at several stages of the UI design course, including preliminary analysis, ideation, and prototype evaluation. Teachers defined the scope of GenAI support according to course tasks and used professional guidance to connect generated content with user needs and design standards.

During preliminary analysis, teachers guided students in using GenAI to organise materials and explore proposals, while emphasising the importance of user research for subsequent design work. Classroom observations showed that, during user analysis tasks, teachers guided students to examine GenAI suggestions in relation to target users and use scenarios and to refine functional structures on the basis of needs analysis. One teacher explained,

"...Some students start asking AI to generate interface mock-ups as soon as they receive a design task, without doing enough user analysis first. Even when they have completed user personas and flowcharts, they do not necessarily use them in their later design work. I ask them first to explain who the users are, what tasks they need to complete, and what problems they might encounter during use. They then determine the functions and page structure on the basis of those needs..." (01-T-M, interview)

Both classroom observations and teacher interviews suggested that teachers emphasised the connection between user research and design practice. Rather than encouraging students to adopt AI-generated solutions directly, teachers guided them to evaluate these suggestions against actual user needs and design requirements.

During the design conceptualisation and prototyping stages, teachers focused on the division of responsibilities between GenAI support and students' independent design work. One teacher said,

"...Students now know about many AI tools, but they do not necessarily understand which tools are suitable for different tasks. AI can help them explore design ideas, but students still need to make their own decisions about information architecture, interaction flows, and the final design..." (03-T-F, interview)

This account indicates that teachers' guidance extended beyond tool selection to clarifying students' responsibilities in different design tasks. Although GenAI could support the exploration of design alternatives, students were still expected to make professional decisions concerning information architecture, interaction flows, and prototype development.

At the design evaluation and revision stage, teachers used prototype reviews and guiding questions to help students identify problems in AI-generated designs. Rather than providing immediate solutions, they encouraged students to examine the intended use context and interaction logic before revising their work. As one teacher explained,

"...Students sometimes bring me an AI-generated interface and ask why they cannot use it directly. I do not immediately tell them how to change it. I first ask them to analyse the use scenario and interaction logic. For example, when designing a splash screen for a mini-program, they need to think carefully about which functions should be restricted and which information should be displayed first. Revising the prototype becomes meaningful once students understand the problem..." (04-T-F, interview)

This experience suggests that teachers placed greater emphasis on students' understanding of design problems than on making immediate changes to AI-generated interfaces. By encouraging students to examine the use context and interaction logic, teachers sought to help them make design revisions based on professional reasoning rather than simply following suggested solutions.

Vygotsky (1978) emphasised the importance of social interaction and guidance from others in supporting learning. The findings of the present study suggest that teachers integrated GenAI-supported activities into UI design practice through task organisation, the clarification of human–AI responsibilities, and professional feedback. Their role therefore extended beyond guiding students in the use of AI tools to helping them understand design requirements and maintain responsibility for their own design decisions.

4.2.2 Tool Selection and Task-Oriented Prompting

Tool selection and prompting are important aspects of students' human–AI collaboration in GenAI-supported UI design teaching and learning. Different design tasks place different demands on tool use. Learning disciplinary knowledge emphasises conceptual explanations and an understanding of standards; ideation requires clarity about target users and visual directions; and prototyping involves component structure, interaction flows, and professional judgement. One student said,

"...I independently create the interface prototypes, judge the details of page interactions, analyse user scenarios, and weigh up design choices. I mainly use Doubao to help organise text, break down the logic, and draft copy..." (01-S-F, interview)

Another student also distinguished the roles of different GenAI tools in design research and visual exploration, using them to organise design knowledge, analyse interaction logic, and obtain references for visual styles and colour schemes. These experiences suggest that some students could select tools according to specific tasks and gradually clarify the

division of work between GenAI support and independent design.

Prompting was also influenced by students' understanding of the design task. One student working on a smart cockpit design explained,

"...When developing ideas, I try to be clear about the scenario, target users, and constraints on style. I do not simply say Make a UI ..." (05-S-F, interview)

This experience suggests that some students could translate design objectives, user characteristics, and conditions of use into requirements for generation. However, teacher interviews indicated that some students were familiar with several GenAI tools but did not necessarily understand which tasks each tool was best suited to. When AI-generated content failed to meet design requirements, some students tended to generate alternative proposals repeatedly rather than analyse the underlying design problems. Teachers also reported that subscription fees, computing resource limitations, and usage-credit restrictions affected students' tool choices and opportunities to explore alternative designs. These findings suggest that students' experiences of human–AI collaboration were shaped not only by their ability to use GenAI tools but also by their disciplinary knowledge, understanding of design tasks, and access to relevant tools and resources.

These findings can be understood in relation to constructivist learning theory. Jonassen (1999) emphasised that constructivist learning environments should support learners in actively exploring and applying knowledge in relation to specific problems. Buendía-García (2025) also discussed the use of GenAI in collaborative UX design courses. The present study further found that, when selecting tools and formulating prompts, students needed to continually align the capabilities of generative tools with the requirements of professional design tasks. The educational value of GenAI-supported design therefore lies not only in obtaining generated outputs but also in students' ability to understand design tasks and judge the suitability of generated content against professional requirements.

4.3 Critical Evaluation and Reflective Design Revision

GenAI can provide students with a range of design proposals, but generated outputs do not necessarily meet user needs, professional standards, or actual conditions of use. Students need to evaluate generated content against design objectives and address its problems through revision. At the same time, some students have begun to reflect on how GenAI influences their own approaches to design thinking. This theme examines the evaluation of generated proposals and awareness of dependence, followed by iterative revision and the reconstruction of design understanding.

4.3.1 Evaluating AI-Generated Designs and Recognising Dependence

Student accounts indicated that the visual appeal of GenAI-generated proposals could differ from their suitability for professional design requirements. One student working on a smart cockpit design task noted,

"...AI generated an image of an in-vehicle interface with a strong atmosphere. It looked good, but it had no component system, and the dimensions and spacing did not follow the standards..." (08-S-M, focus group)

This experience suggests that generated proposals can provide visual references, but students still need to examine component standards, information organisation, and interaction logic to determine whether the proposals meet specific design requirements.

Some students were also able to evaluate generated proposals in relation to contexts of use. In designing the home screen of an in-vehicle central display, one student said,

"...The proposal it gave me crammed a large number of controls onto the page, which could create a cognitive burden for users while driving. The page should prioritise driving safety..." (03-S-M, interview)

The student connected the number of interface controls with the driving context and used this connection to question the suitability of the generated proposal. This suggests that some students could apply disciplinary knowledge to identify problems in AI-generated content, rather than make choices solely on the basis of visual appeal.

At the same time, teacher interviews indicated that some students still had difficulties evaluating proposals,

"...I find that some students see an attractive AI-generated interface and think they can use it straight away. They rarely take the initiative to check whether its functions and interactions make sense. I ask them to explain why they chose the proposal, whether it meets user needs, and whether the functions on the page can work properly. Students need more than the ability to use AI. They also need to identify problems, ask questions, and explain their design judgements..." (04-T-F, interview)

This teacher's experience suggests that some students still tended to evaluate generated proposals on the basis of immediate visual impressions, paying insufficient attention to user needs, functional structure, and interaction logic. Teachers therefore need to use design evaluation and follow-up questions to guide students in explaining the reasons for their choices.

At the same time, some students had become aware that GenAI might influence their own approaches to design thinking. One student said,

"... I am actually more willing to take my time and think things through. Once I use it, I tend to rush to get a result..." (02-S-F, focus group)

This response suggests that the ease of generating content may encourage some students to seek design proposals quickly and spend less time analysing design problems in depth.

In contrast, another student emphasised the importance of independent design judgement,

"...Whether it is a design proposal, a sketch, or a prototype, you need your own ideas. You cannot simply copy the results it gives you..." (10-S-M, interview)

These differing experiences suggest that students' use of GenAI cannot be characterised by a single pattern of dependence. Some students actively checked generated content and made judgements based on professional requirements, while others recognised that ready-made proposals from AI could affect their independent ideation. The evaluation of GenAI-supported learning therefore needs to consider more than the frequency of tool use or the number of proposals generated. It also needs to examine whether students can explain their design choices and independently address the problems involved.

Kasneci et al. (2023) noted that large language models can provide learning support in education, but generated content may contain errors or biases and requires critical evaluation and appropriate verification by learners. Students in the present study similarly found that GenAI-generated proposals could contain inconsistent component specifications, inappropriate information hierarchies, and errors in interaction logic. Building on existing research, this study shows how these problems arise in specific UI design tasks and how students differ in their approaches to evaluating generated content. From a constructivist perspective, learners need to develop knowledge through active analysis and problem-solving rather than directly accepting external information. GenAI-supported UI design teaching should therefore emphasise students' critical evaluation of generated proposals, guiding them to explain their design choices in relation to user needs, design standards, and actual conditions of use, while maintaining independent design judgement.

4.3.2 Iterative Revision and Reconstruction of Design Understanding

Design revision is an important stage at which students put professional judgement into practice in their work. Beyond the initial evaluation of generated proposals, reflective revision involves understanding why problems arise and adjusting an existing design in response to new understanding.

In an in-vehicle HMI design task, one student found that an AI-generated flowchart was overly complicated and failed to distinguish the overall process from specific page transitions. After redefining the generation constraints and making manual adjustments, the student explained,

"...After making these changes, I understood more clearly that flowcharts need to distinguish a high-level overview from detailed page transitions. You cannot just cram every page into a single diagram..." (01-S-F, interview)

This experience involved a structural adjustment to the flowchart and helped the student better understand the roles of different flowcharts in communicating a design. Through revision, the student identified problems in the original proposal and developed a new understanding of how to organise flows.

Another student, working on a music player interface, found that the AI-generated placement of playback controls did not match their understanding of users' interaction habits. Through revision, the student reconsidered the relevant design knowledge,

"...While making changes, I also reconsidered the problems in the original proposal and realised that my understanding of 'touch interaction zones' had been insufficient. I then specifically looked up information about thumb reach..." (12-S-F, focus group)

This response illustrates a learning process that moved from identifying a problem and consulting relevant materials to adjusting a design. While revising generated outputs, the student also recognised gaps in their disciplinary knowledge and strengthened the basis for design decisions through further learning.

Similar experiences arose in other design tasks. When designing the home screen of an exercise check-in app, one student adjusted the visual style and page layout provided by AI and reflected on the relationship between target users and the way the design was presented,

"...as I made changes, I realised that I actually knew clearly why I wanted to design it this way. This gave me a deeper understanding of the principle that design serves users..." (09-S-M, interview)

These experiences suggest that problems in generated proposals can create opportunities for students to reconsider their understanding of design knowledge. Through comparison, revision, and reflection, students can adjust particular pieces of work and further explore the relationship between design requirements and professional principles.

Teacher interviews also indicated that revisions to student work did not necessarily mean that students had understood the original design problems,

"...When students adjust an interface according to feedback, it does not mean they have understood the design problem. Sometimes they simply move a button or generate another mock-up, while the original interaction problem remains. I therefore ask them to keep the versions before and after revision and explain what they changed, why they changed it, and whether the changes resolved the original problem. I am more concerned with whether students can apply these ways of making judgements to later design tasks..." (02-T-F, interview)

Whereas students described gaining new understanding through revision, teachers placed greater emphasis on the reasoning that demonstrated learning during that process. Students needed to adjust their work in response to feedback, explain the reasons for their revisions, and check whether the new proposal addressed the original problem. The educational value of design revision therefore cannot be judged solely by changes in the visual appearance of the final interface.

Student accounts also revealed different learning experiences. One student commented,

"...I have actually had more practice in developing ideas and revising proposals independently, because I have to keep evaluating and correcting the generated results..." (06-S-F, focus group)

In contrast, another student reported that using GenAI encouraged a rush towards design outputs and reduced independent thinking. These two experiences suggest that GenAI plays different roles in design revision. Its educational value is closely related to how students evaluate generated content, whether they actively analyse design problems, and how teachers provide guidance.

Jonassen (1999) emphasised that constructivist learning environments should support learners in actively exploring and applying knowledge in authentic problem contexts. Through an analysis of interaction design students' portfolios, Ma et al. (2026) found that generation, comparison, and revision were important activities in design learning involving GenAI and were connected to students' reflective judgement. In the present study, some students identified problems in flowcharts, interface layouts, and interaction designs, then consulted further materials, compared proposals, and revised their work. Their experiences illustrated a learning process that moved from problem identification to adjustments in design understanding. Although students revised their designs, this does not necessarily indicate that they developed stable professional competence. Such judgements also require consideration of the reasons for their revisions and their subsequent design practice. GenAI-supported UI design teaching should therefore attend to the revision process, guiding students to explain design problems, compare differences between proposals, and deepen their understanding of disciplinary knowledge through specific tasks.

Overall, students focused primarily on the support that GenAI provided for understanding knowledge, developing design ideas, and revising proposals. Teachers placed greater emphasis on discrepancies between generated content and professional requirements and on whether students could make independent judgements based on user needs and design standards. Students also described differing experiences of GenAI use. Some deepened their design understanding through proposal comparison and reflective revision, while others reported that convenient content generation could reduce independent thinking. These findings indicate that GenAI use in UI design courses involves more than operating tools; it is closely connected to the organisation of instructional tasks, teacher guidance, and students' design judgement.

5. Conclusion

This qualitative study explored teachers' and students' experiences of GenAI-supported UI design teaching at a higher vocational college. The findings indicate that GenAI tools supported students in understanding disciplinary knowledge, exploring design alternatives, and revising their work. However, AI-generated content did not always meet user needs, UI design standards, or interaction requirements. Teachers played an important role in organising learning tasks, providing professional guidance, and helping students evaluate generated content in relation to specific design problems. Some students also tended to accept AI-generated proposals without sufficient evaluation, while others expressed concerns that the convenience of GenAI might reduce their independent thinking during the design process.

From the perspective of constructivist learning theory, these findings highlight the importance of active knowledge construction, teacher–student interaction, and reflective practice in GenAI-supported UI design learning. Although GenAI provides additional learning resources and opportunities for design exploration, students still need to apply disciplinary knowledge, examine design problems, and make independent decisions throughout the design process. Higher vocational UI design courses should therefore integrate GenAI into learning activities according to instructional objectives, with particular attention to user research, design standards, and prototyping. Teachers should also guide students to evaluate and revise generated content through professional reasoning rather than relying solely on AI-generated suggestions.

This study contributes to an understanding of GenAI-supported UI design teaching by examining teachers' and students' experiences within a specific higher vocational course. The findings also offer practical insights into the organisation of GenAI-supported UI design teaching, particularly the roles of teacher guidance, AI assistance, and students' independent design practice.

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