International Conference
The Future of Education

The Use of AI in Higher Education: The Example of the UX Design Course for eHealth

Robert Pucher[1], Robert Mischak[2]

[1]Department of Computer Science, University of Applied Sciences Technikum Wien, Austria
[2]Department of Computer Science, University of Applied Sciences FH JOANNEUM Graz, Austria

Abstract

Artificial intelligence (AI) is rapidly transforming higher education, including fields that combine technology and healthcare. This paper reports on experiences integrating AI-supported learning tools into a UX Design course in an eHealth master's program. Using Google NotebookLM as a structured self-study environment, students prepared independently for practical usability and accessibility evaluations conducted in face-to-face sessions. The course follows a blended learning format with four in-person sessions: the first introduces the course framework and a first display is developed by students; the second focuses on usability testing and individual oral examination; and the third covers accessibility evaluation and oral assessment. A final element, the fourth session, introduces external tools for remote usability testing. Between sessions, students engage in self-directed preparation guided by curated materials and structured question sets within Google NotebookLM. Assessment was conducted exclusively in face-to-face formats to ensure independent understanding. Student performance was strong, with a high pass rate and positive course evaluations. Qualitative feedback highlighted the value of structured AI-supported preparation and the practical relevance of the exercises. The experience suggests that AI tools can effectively scaffold learning in applied technology and health contexts when paired with clearly defined assignments, curated resources, and controlled assessment.

Keywords: *AI in education, UX design, eHealth systems, learning objectives, assessment integrity, workforce transformation*

1. Introduction

Artificial intelligence is rapidly reshaping higher education, opening new possibilities for supporting student learning, structuring self-directed study, and fostering engagement with complex subject matter [1], [2]. These developments are particularly salient in interdisciplinary fields such as eHealth, where students must integrate technical expertise with a nuanced understanding of human-centered design principles [3]. As a result, the meaningful integration of AI tools into teaching - while preserving academic integrity and maintaining rigorous assessment standards - has emerged as a central challenge for educators.

At the same time, AI is transforming entry-level work in software engineering and related domains. Recent analyses indicate that routine tasks traditionally assigned to junior professionals are increasingly being automated, leading to a shift in task profiles and elevated expectations for graduates. Rather than a decline in junior roles, the evidence suggests a reconfiguration of entry-level work, with growing emphasis on analytical, evaluative, and integrative competencies [7] - [9]. This shift disrupts traditional pathways of skill acquisition, as early-career professionals have fewer opportunities to develop expertise through routine tasks.

This paper presents the integration of Google NotebookLM as an AI-supported learning environment within a UX Design course in a master's program in eHealth at the University of Applied Sciences JOANNEUM Graz, Austria. The course focuses on usability and accessibility evaluation of digital health applications, combining structured theoretical preparation with practice-oriented exercises. To ensure the validity of learning outcomes, all assessment is conducted through face-to-face oral examinations, thereby isolating demonstrated competencies from AI-assisted preparation.

The paper details the course design, including the role of AI-supported self-study, the structure of in-person sessions, and the assessment approach. It further analyses the outcomes observed in the most recent cohort and discusses the conditions under which AI tools can effectively support learning in applied, practice-oriented educational settings.

Beyond reporting a course implementation, this work contributes to the emerging discourse on AI-enhanced education by demonstrating how structured AI-supported self-study, combined with curated content, guided tasks, and controlled assessment formats, can systematically foster higher-order competencies while maintaining academic integrity. The findings provide empirical and conceptual insights into how educational designs can respond to the transformation of entry-level roles and increasing competency demands in AI-augmented professional contexts.

2. Educational Context

The course "UX Design in eHealth" is embedded in a master's program that prepares students for professional roles in the development, evaluation and management of digital health technologies. The program draws students from diverse disciplinary backgrounds, including computer science, healthcare informatics, and health professionals. Students typically work part-time in industry or healthcare sector alongside their studies, bringing practical experience that shapes their engagement with course content. Within the curriculum, the UX Design course sits at the intersection of interaction design, usability engineering and health informatics. Students learn to apply established evaluation methods - such as usability testing with think-aloud protocols and accessibility evaluation based on WCAG criteria - to digital health applications and displays. The course emphasizes the practical relevance of these methods for regulatory compliance and patient safety in eHealth contexts.
A central pedagogical challenge in this context is the need to develop both methodological knowledge and applied skills within a limited number of contact hours. The course addresses this challenge through a blended learning format that combines structured self-study supported by AI tools with practice-oriented in-person sessions and controlled individual assessment.
The European Union's Artificial Intelligence Act introduces requirements related to transparency, human oversight, and AI literacy. However, these obligations are not uniformly applied to all educational institutions. Instead, they depend on the role of an organization as a provider or deployer of AI systems. In particular, systems used for high-stakes decisions, such as student assessment or access to education, may fall under the high-risk category, whereas supportive learning tools typically do not [10].

3. Teaching Approach and Course Structure

The course is organized into four in-person sessions, between which students engage in self-directed preparation using Google NotebookLM. This structure reflects a flipped classroom approach: theoretical content and methodological foundations are acquired independently before the in-person sessions, which then focus on practical application and assessment.
The course design explicitly addresses the shift in competency requirements by focusing on higher-order cognitive skills, including problem framing, critical evaluation of AI-generated outputs, and methodological reasoning.
The course is designed for 20 - 30 students and comprises 30 teaching units of 45 minutes each, corresponding to a total of 2,5 ECTS credits. This structure allows for approximately 20 hours of self-directed study in addition to in-class instruction and assessment activities.

Component	**Calculation**	**Hours**
Total workload	2,5 ECTS	62,5
Lectures (in-person sessions)	30 × 0.75 hours	22.5
Exam preparation and assessment	—	20
Self-directed study	approx.	20

Table 1. Workload Breakdown

3.1 First In-Person Session: Course Introduction and Design of a Display

The first session introduces students to the course framework, learning objectives, examination modalities, and the general requirements of UX evaluation. A central element of this session is the assignment of a shared reference object for practical exercises: display systems used in public transportation.
Students work in groups of five and are assigned one of seven variants, ranging from urban tram displays to high-speed train information systems. This diversity of contexts enables comparative analysis while maintaining a consistent methodological approach across groups. An important

advantage of this setting is that students are typically familiar with such systems as everyday users, allowing them to draw on prior knowledge of user needs and expectations.
During the session, students receive a structured introduction to the design rationale of their assigned system, including typical user groups, usage contexts, and relevant usability and accessibility considerations. The selected display systems serve as concrete and professionally relevant artefacts that form the basis for all subsequent evaluation exercises.
Following the first session, students begin their independent preparation for usability testing using Google NotebookLM. The AI-supported environment is based on curated course materials, including relevant sections of the course textbook, structured question sets, and detailed task descriptions for the practical exercises. Students work through approximately one hundred guiding questions, supported by concise answer outlines that help structure their preparation and consolidate their understanding of usability testing principles and methods.

3.2 Second In-Person Session: Usability Testing and Oral Examination

The second session focuses on the practical application of usability testing methods. Students conduct structured usability tests on the eHealth display introduced in the first session, working in small groups. They define test tasks, moderate sessions using the think-aloud method, take on observer roles, and systematically document identified usability issues. The results are compiled into short test reports and presented to the group, including recommendations for interface improvements.
Individual assessment takes place during this session in the form of face-to-face oral examination questions. Each student is assessed individually on their understanding of the usability testing methods applied. This controlled assessment format ensures that the results reflect independent understanding rather than group performance or AI-assisted preparation. The oral questions cover the theoretical foundations of usability testing, the specific methods applied, and the interpretation of findings.
After the second session, students complete a further phase of self-directed preparation, this time focused on accessibility evaluation. Using Google NotebookLM, they work through curated materials on WCAG criteria, automated and manual accessibility testing methods, and the relevance of accessibility in regulated eHealth environments. Structured question sets guide their preparation and help them build a methodologically sound understanding of accessibility evaluation.

3.3 Third In-Person Session: Accessibility Evaluation, Oral Examination

The third session opens with structured accessibility evaluations of selected websites. Students work in groups and choose a website from a predefined list; own proposals are also permitted. They apply WCAG-based criteria, use automated accessibility testing tools, and conduct manual checks, including keyboard navigation and screen reader testing. Identified accessibility barriers are documented and prioritized according to their severity and potential impact on target user groups. Each group presents its findings, answers follow-up questions, and demonstrates its understanding of WCAG principles.
As in the second session, individual oral examination questions are posed during the accessibility evaluation phase. Students are assessed on their understanding of WCAG criteria, the tools used, and the interpretation of their findings. This format maintains the integrity of individual assessment within a group-based practical exercise.

3.4 Fourth In-Person Session: Remote Usability Testing Tools

The fourth session introduces students to external platforms and services for remote usability testing. This segment surveys current commercial and open-source tools for conducting unmoderated and moderated remote usability studies, highlighting their relevance for professional eHealth development contexts. Following this introduction, practical demonstrations and explanations are provided by an additional external specialist who is actively working in this field. Students discuss the methodological trade-offs between in-person and remote evaluation formats and explore how remote testing tools can complement laboratory-based approaches in practice.

4. Results

From the instructor's perspective, the examination results and student presentations were assessed as highly positive. An objective comparison with previous cohorts is not possible, as the course was newly designed in this format and no directly comparable baseline exists. Nevertheless, the instructor's

subjective assessment is that students performed noticeably better than in conventionally delivered courses. While this observation is inherently subjective, it may be considered an indicative signal of the effectiveness of the applied teaching approach.
The official course evaluation was conducted using the evasys system. Of 23 eligible students, 5 participated in the evaluation, corresponding to a response rate of 21.7%. Despite the small sample size, the results were consistently positive across all dimensions. Overall course quality was rated "very good" by 4 out of 5 students, with one student giving the second-best rating. Organisational conditions, including the length of the in-person blocks and room equipment, received similarly high ratings. All five students confirmed that the workload corresponded appropriately to the assigned ECTS credit points.
The evaluation results indicate a consistently structured approach and a high level of methodological correctness. These findings suggest effective learning outcomes; however, they should be interpreted with caution given the limited sample size of the evaluation data.
The course was also enriched by one guest lecturer, which 4 out of 5 evaluating students confirmed as a clear added value for the course. Students noted that the guest contribution provided valuable insight into professional practice and was well integrated into the course flow. Preparation for the English-language guest lecture was highlighted as particularly helpful, enabling students with varying levels of English proficiency to follow and engage with the content effectively.
Ratings for the instructor dimensions were also very positive. The working climate in the course was rated "very good" by all five students. The connection between theory and practice received the highest possible rating from all respondents. Didactic methods and the quality of course materials received strong ratings. Accessibility of the instructor was rated positively by all students. Four out of five students confirmed that the assessment scheme, including grading criteria and examination modalities, was clearly understandable.
Qualitative feedback collected through open-response questions reinforced the quantitative findings. Students particularly valued the open and practice-oriented teaching style, noting that attendance alone provided substantial learning gains. The joint discussion and improvement of real-world examples of good and poor UX implementation was highlighted as especially valuable. Students also appreciated the opportunity to work through examination topics themselves, which they found deepened their understanding and enabled direct application during the in-person sessions. Representative feedback included comments such as: keep everything as it is, and please continue teaching in this open and practice-relevant way.

5. Discussion

The results of the course evaluation provide consistent evidence for the effectiveness of the proposed teaching design. In particular, the strong alignment between theoretical instruction and applied, practice-oriented exercises indicates that the course successfully operationalizes a key requirement of contemporary software engineering education: the integration of methodological rigor with real-world relevance. This is especially significant in a master's program context, where students are typically working professionals and expect immediate applicability of acquired competencies.
The qualitative feedback further supports the contribution of the approach by highlighting the value of example-based, comparative learning using real-world UX cases. Students consistently emphasized that the structured combination of self-study and in-person application enabled deeper engagement with complex problems. This finding suggests that the blended learning design, supported by AI-based preparation, effectively shifts classroom time from content delivery to higher-order cognitive activities, thereby increasing learning efficiency and depth [2].
A central contribution of this work lies in demonstrating how structured AI-supported self-study can enhance active knowledge construction. Students reported that independently working through examination-relevant content significantly improved their understanding and ability to apply methods in practice. This aligns with established principles of retrieval practice and self-explanation and indicates that AI tools, when embedded in a guided and curated framework, can support generative learning processes rather than superficial knowledge acquisition [4].
The integration of external expert input through guest lectures provides additional evidence for the scalability and practical relevance of the approach. The successful preparation of students for an English-language guest lecture across varying levels of language proficiency illustrates how structured scaffolding can make advanced and potentially demanding learning experiences accessible. This highlights the broader applicability of the concept in heterogeneous learning environments and supports its transferability to other domains [6].

While the evaluation results should be interpreted with appropriate methodological caution, it should be noted that the response rate of 21.7% (5 out of 23 students) is within the range commonly reported for voluntary course evaluations in higher education, where response rates between approximately 20% and 40% are frequently observed [11], [12]. This reflects a broader structural challenge rather than a limitation specific to this course. Within this context, the consistently positive pattern across both quantitative and qualitative feedback still provides meaningful indications of the effectiveness of the design.
A particularly relevant contribution concerns the design of the assessment approach. By conducting all individual assessment through face-to-face oral examinations, the course ensures that demonstrated competencies reflect genuine individual understanding, despite extensive use of AI tools during preparation. This explicit separation between AI-supported learning and human-controlled assessment represents a robust design principle for maintaining academic integrity in AI-enhanced educational settings [3]. The results indicate that students are able to translate AI-supported preparation into authentic, independently demonstrated competencies.

6. Conclusion

This paper has reported on the integration of AI-supported learning tools into a UX Design course in an eHealth master's program. The course combines structured self-study using Google NotebookLM with four in-person sessions covering course introduction and eHealth display walkthrough, usability testing, and accessibility evaluation. Assessment is conducted entirely through face-to-face oral examinations to ensure independent understanding.
The official course evaluation, conducted via the institutional evasys system, returned consistently positive ratings across all dimensions, including overall quality, working climate, the connection between theory and practice, and didactic methods. All five responding students confirmed that the workload corresponded to the assigned ECTS credit points. Qualitative feedback emphasized the value of the open and practice-oriented teaching style, the joint analysis of real-world UX examples, and the structured self-directed preparation of examination topics. The guest lecture component was rated as a clear added value by all students who experienced it.
The experience suggests that AI-supported learning environments can effectively scaffold student preparation in applied technology and health contexts, particularly when paired with curated resources, clearly defined assignments, a concrete shared reference object such as a purpose-built eHealth display, and assessment formats that ensure individual accountability. The combination of AI-supported self-study, practice-oriented in-person sessions, and face-to-face oral examination appears to support both learning depth and assessment integrity.
Future development of this teaching approach will focus on increasing student participation in course evaluations to enable more robust conclusions, expanding the range of eHealth interface types used in the practical exercises, and exploring the integration of remote usability testing platforms directly into the course assignments.
The approach also reflects emerging labor market requirements, where graduates must demonstrate the ability to critically evaluate AI-generated outputs and integrate them into complex problem-solving contexts.
In addition to evaluating the effectiveness of the teaching approach, it is important to situate the course design within the broader transformation of software engineering education driven by artificial intelligence. In particular, three questions arise: how such a concept prepares students for changing entry-level roles, how it enables the development of higher competence levels in both foundational knowledge and AI-supported work, and how it contributes to increasing AI literacy among instructors. The following paragraphs address these aspects in relation to the presented course design.

6.1 Preparation for Changing Entry-level Roles

Through the blended learning approach with AI tools, students learn very early on how to increase the productivity and quality of their own products or services. This will help them when entering the job market.

6.2 Achieving Higher Competence Levels (Fundamentals and AI Use)

This paper contributes evidence that higher competence levels can be achieved through the deliberate integration of foundational knowledge and structured AI usage. The combination of curated materials, guided question sets, and clearly defined tasks ensures that AI functions as a cognitive scaffold rather than a substitute for understanding. The results indicate that this design supports deep learning, critical evaluation, and effective transfer to applied contexts, while controlled, AI-free assessment safeguards the validity of demonstrated competencies.

6.3 Increasing AI Literacy Among Instructors

The findings further contribute to the understanding of how AI literacy among instructors can be developed through practice-oriented course design. By actively engaging in the curation of AI-supported learning environments, structuring interactions with AI tools, and maintaining human oversight in assessment, instructors acquire a grounded and reflective understanding of AI capabilities and limitations. This suggests that AI literacy is most effectively developed as an embedded, experiential competence within teaching practice rather than through isolated training measures.

REFERENCES

[1] S. N. Akinwalere and V. T. Ivanov, "Artificial Intelligence in Higher Education: Challenges and Opportunities," Border Crossing, vol. 12, no. 1, pp. 1 - 15, 2022.
[2] Y. Shi, H. Wang, L. Zhao, and J. Chen, "Large language models in education: A systematic review," Computers and Education: Artificial Intelligence, vol. 6, 2025.
[3] K. Bittle and O. El-Gayar, "Generative AI and Academic Integrity in Higher Education: A Systematic Review and Research Agenda," Information, vol. 16, no. 4, p. 296, 2025.
[4] M. Khan, M. A. Akbar, and J. Kasurinen, "Integrating large language models in software engineering education," arXiv preprint arXiv:2509.04877, 2025.
[5] V. Seibert-Giller and R. Pucher, User Experience and Usability: Basics and Methods. Vienna, Austria: UXQCC Publishing, 2023.
[6] P. Eachempati, R. Komattil, and A. Arakala, "Should Oral Examination Be Reimagined in the Era of AI?," Advances in Physiology Education, vol. 49, no. 1, pp. 208 - 209, 2025.
[7] World Economic Forum, The Future of Jobs Report 2023, 2023.
[8] OECD, OECD Employment Outlook 2023, 2023.
[9] McKinsey Global Institute, The Economic Potential of Generative AI, 2023.
[10] European Union, Artificial Intelligence Act, 2024.
[11] J. Porter and R. Umbach, "Student survey response rates across institutions: Why do they vary?," Research in Higher Education, vol. 47, no. 2, pp. 229 - 247, 2006.
[12] A. G. Fosnacht, K. Sarraf, S. Howe, and L. K. Peck, "How important are high response rates for college surveys?," The Review of Higher Education, vol. 40, no. 2, pp. 245 - 265, 2017.