IMPLEMENTING AI-DRIVEN TOOLS IN UX DESIGN COURSE IN ENGINEERING AND BUSINESS EDUCATION

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ABSTRACT

Pedagogical transformations aim to improve the learning process. These innovations in training/teaching methods are crucial within the evolving economic landscape and technological advancements. Previous work on design thinking for CDIO curriculum development demonstrated that learning experience in a multi-disciplinary environment and human-centric approach help students learn in an innovative process. This article is about UX Design, which is also a user-centered process, but which focuses on optimizing the user experience when using technological products. The aim of our endeavour is to implement AI tools in UX design taught to engineering and business students at Esprit, allowing them to be immersed in the realm of industry 4.0. Incorporating AI tools into user research methods during the UX design process in our curricula not only optimized the acquisition of essential data for students, but also fostered their skills in data analysis. In addition, it allows teachers to level up the complexity of the designed learning outcomes. In this regard, we explore how effective and engaging pedagogical methods using AI-driven tools could be in engineering and business education. Indeed, our programs are aligned with CDIO syllabus, we aim to cultivate a multifaceted skill set, covering knowledge, attitude, and skills development. Moreover, the utilization of AI promotes a positive attitude toward embracing technological advancements, encouraging adaptability and a forward-thinking mindset. In terms of skills, students sharpen their strategic product design abilities, honing a crucial competence in navigating the intersection of AI technology and human-centered design practices. To illustrate this, we present a case study showcasing how the integration of AI tools in our curriculum has enabled students to navigate complex challenges effectively and teachers to update learning outcomes for enriched learning experience. Moreover, we examine the impact of these pedagogical transformations and AI integration, in conjunction within the CDIO context in our programs. We also share our survey findings to reinforce the efficacy of our approach showing that it could be adopted in different fields. We conclude by drawing up a reflective practice process to ensure an insightful integration of innovative tools into curriculum design helping our students to address their needs in a dynamic technological landscape.

KEYWORDS

Human-Centric Design, AI-driven pedagogical approach, Lifelong learning, CDIO standards 3.0, Standards: 1, 2, 5, 8.

INTRODUCTION

The dynamic evolution of the economic landscape and the advances in technology have led companies to rethink their design, production methods and, training of employers and employees (Gajek, et al, 2022). The increasing use of digital interaction is one of the reasons behind the major role assigned to UX Design (Zhong, Z. & Balagué, C. 2021). Digital interfaces are omnipresent in our daily lives, not only in the on-screen world, but also in our free time, social relationships and professional activities. The emergence of artificial intelligence, virtual reality, voice assistants and other uses are new challenges for UX Design. A study by Gomez entitled why web performance matters (2011) reported that 88% of users are not inclined to re-visit a website if their experience was unsatisfactory and 70% of online business fails because of a negative user experience. These statistics alone sum up the importance of UX. The educational landscape is evolving, and we must implement fresh methods in our education systems allowing our students, as a future employee 4.0, to be adapted to a digitalized work environment (Alcacer and Cruz-Machado, 2019).

In this paper, we'll start by defining the UX Design process and integrating it into the CDIO Model as a tool for continuous improvement (Crawley et al, 2014). We'll then proceed with a case study of the UX Design Module in the two schools Esprit Engineering and Esprit Business, to explore the approach and interest of implementing this UX Design process, as well as explaining how we've integrated AI tools to involve students in technological trends. We will show the impact of these AI tools on learning outcomes by comparing the evolution of the module sheets and the evaluation grid reflecting the relevance (Evaluation groups regularly review and revise program learning outcomes, based on changes in stakeholder needs in CDIO standard 2). Finally, we'll discuss the results of our student feedback survey.

UX DESIGN AND EDUCATION ENGINEERING

Design, according to Archer and Layton, is a complex process driven by different needs and values, important in both practical and conceptual aspects. Leonardo da Vinci's constructivist approach, rooted in experimentation and reasoning approach emphasizes the importance of engineering and scientific advancement. This approach highlights the significance of creative thinking, adaptability, and analysis in tackling complicated problems (Capra, 2007, p. 161). Aligning with this philosophy, UX Design combines user experience principles with a problem-solving mindset, pioneered by the Co-Founder of Nielsen Norman Group.

Don Norman and defined by Jean-François Nogier, the President of Usabilis, UX consulting and digital ergonomics company. It goes beyond traditional linear thinking and encourages a holistic, interdisciplinary perspective in creating solutions that meet user needs. In educational settings, UX Design promotes interdisciplinary thinking and iterative problem-solving, motivating students to engage in a continuous dialogue between generating ideas and taking action. By prioritizing human-centred design, students develop empathy and gain a deeper understanding of real-world issues, resulting in more effective and meaningful solutions. Therefore, UX Design serves as a versatile approach that fosters innovation and addresses the complexities of modern challenges across different fields.

UX DESIGN VERSUS CDIO MODEL

The design process follows the Double Diamond model (G. Daniel, 2019), was produced as “a simple graphical way of describing the design process” (Design Council, 2007). Consisting of four phases: Discover, Define, Develop, and Deliver. Although the double-diamond visual is supposed to be common to all projects, the design council suggests modifying (or customizing) it to meet the needs of each project. As mentioned in the visual Figure 1 based on the different stages outlined in the UX Design course, which will be examined in the case study section. The Double Diamond model is not linear, but encourages us to think in a dialectical way, to better define the problem and find more complete solutions.

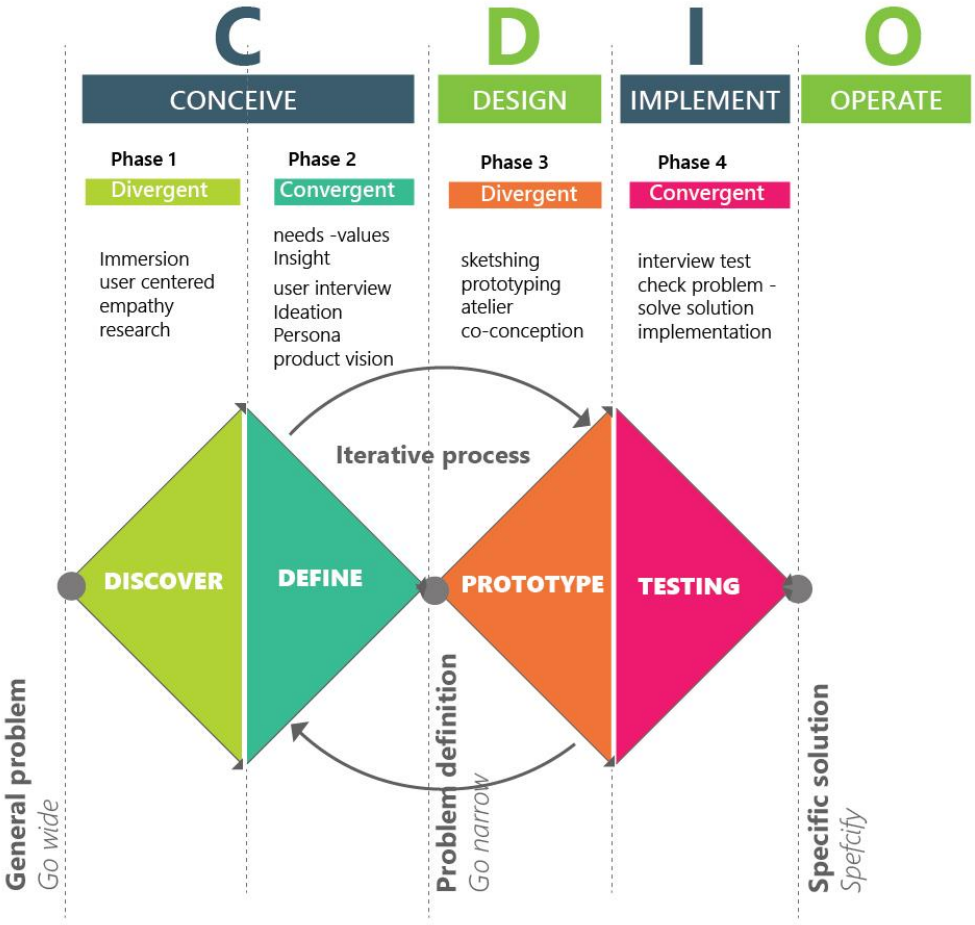

Figure.1 Integrated double diamond on CDIO models

This illustration underlines the importance of embedding the UX Design process as a teaching and active learning method for engineers to address complex human-centered problems by understanding user needs (Discover), reframing and defining the problem, identifying the user (Define), generating ideas, developing a prototype/solution and finally testing and iterating even after the implementation phase, since it's an iterative process that always adapts to socio-economic changes. Users expect continuous progress, improvements, innovations and updates.

We'll start by presenting the different phases of the UX Design process and then explaining how it can be integrated into the CDIO model.

Process UX Design

First Diamond: to explore the problem and identify the real user and his needs. It is structured in two phases:

- A general divergent phase to generate goals and assumptions. By investigating and immersing ourselves in user situations, we can then put forward a real value proposition. In this discover phase, a fundamental study, including an audit of the existing situation and competitive benchmarking, allows to establish design-oriented hypotheses for the project. Qualitative research is crucial, involving interviews with the intended users, where we inquire about their thoughts and reasons to enhance our comprehension of their product vision.
- The second phase, define, focused on research and analysis. It is more specific, because it converges on a synthesis and reframing of the need, which is the result of an analysis of user data to confront the brief, expectations and build a "real" and solid solution.

Second Diamond: design solutions until they are achieved. It is also divided into two phases: once the need is defined, the second Diamond is used to build the user experience:

- A first phase to generate ideas for functionalities, based on the user needs identified in the previous phase. This is followed by the setting up an information architecture through the development of the prototype. The purpose of this phase is to produce a user scenario by prototyping the user's journey through a low-fidelity screen level, while considering ergonomics.
- The second phase converges and becomes increasingly specific, measuring the success of the user journey by testing and iterating. These tests highlight the corrections that need to be made to the prototype.

Integrate Model CDIO

The UX Design process can be integrated with the conceive-design-implement-operate (CDIO) framework standard 1 to develop personal skills together with inter-personal skills shown in Figure1.

Conceive: In the CDIO model, C refers to defining the customer's needs, while taking into account the project context in terms of technological and strategic choices. It corresponds to the first diamond in the process UX Design based on empathy, which mean putting ourselves in the user's shoes, to define real complex problems and reframe the project context.

Design: D of the CDIO initiative is combined with the prototyping phase, enabling the practical design of prototypes from Low Fidelity to High Fidelity. In order to achieve this improved, advanced prototype in the UX Design process, the different prototype test phases are essential.

Implement: is the transformation of design into product, including manufacturing, coding, testing and validation. This is a fundamental phase in the project cycle. In the UX Design, once

the prototyping stage is complete, the next step is to create and test the functionalities and interfaces.
Operate: O of the CDIO initiative focuses on maintaining the product and making it evolve on an ongoing basis. This is part of the UX design process after the testing phase. As we've mentioned, this process is based on iteration and user feedback. But it's also a human-centered process, with users' needs and expectations evolving within the economic and technology environment standard 5. Therefore, we believe that an enduring product, along with its implementation and continuous improvement based on user feedback, plays a crucial role in UX design.

UX DESIGN IN ENGINEERING EDUCATION: STUDY CASE ESPRIT SCHOOL OF ENGINEERING

In the Academic Year of 2019-2020, a course was developed for the 5th year of the TWIN (Web and Internet technology) Option program. The course was designed for 80 students and provided 100% in-class training. It all began when Esprit was partnered with Google and held the first Google MENA Masterclass UX Design Thinking event at Esprit. Afterwards, we participated in the workshop "Design Thinking: a pedagogy at the disposal of the trainer". In the context of pedagogical conferences by CRP (Pedagogical Resource Center). Our conviction stems from the belief that adopting a transdisciplinary approach aligns with the preparation of future engineers. This fact was also confirmed during multiple meetings with startups in the program "Google for startups Accelerator" and the "Design Lab". Indeed, UXD is more and more related to all innovation programs, where the whole of the students, whatever their university course or work experience, join this program to learn or rediscover how to conceive solutions to all sorts of issues. Even more accentuated by the fact that we meet groups of our Esprit students in the UX Design Thinking by Google Masterclasses, who are there to enhance their projects. The course has grown over the last years reaching a total of more than 300 students in AY 23-24, organized into two options: 4 classes of SIM (Mobile Information System) option and 6 classes of TWIN (Web and Internet technology) option. It should also be noted that it has been integrated with the two courses of the SIM option which are the MHA (Mobile Hardware Application) and MVision (Mobile vision) courses.

Embracing the AI era by Implementing AI-driven tools in the UX Design course

The COVID context led us to migrate to online teaching platforms. However, this was not the only change for us. All 5th year level options have moved to 80% online learning.

As we are currently working with a user-centered approach to training, it is appropriate to apply this approach to the development of the course's pedagogical content. Indeed, we asked our 5th year TWIN students to share their feedback on this course. As a result, we refined the teaching material by taking into consideration the feedback of our users. Among the recommendations, the students favor the integration of a digital tool in the User Research section of our course content. In this regard, through the PFE (Final Year Engineering Projects) project of our student, we have benefited from an AI UX Research platform; a tool to facilitate the assessment of user studies and highlight their findings. This allowed us to work online and in a collaborative way but also to improve our learning materials and adapted it to our 5th year students.

AI-driven tools in UX Design: Added Value

The integration of AI tools in engineering and business education for UX Design courses is significant as it bridges the gap between theoretical knowledge and practical application.

The nextapp.co platform (Figure 3) is an AI-powered user discovery tool that reduces research time and effort through automatic audio and video transcription and analysis. Its features enable students to understand how real customer evidence informs design decisions and democratizes UX research. Teaching UX Design with AI-driven tools allows students to learn the essentials of the UX process in a format that mimics real-world scenarios.

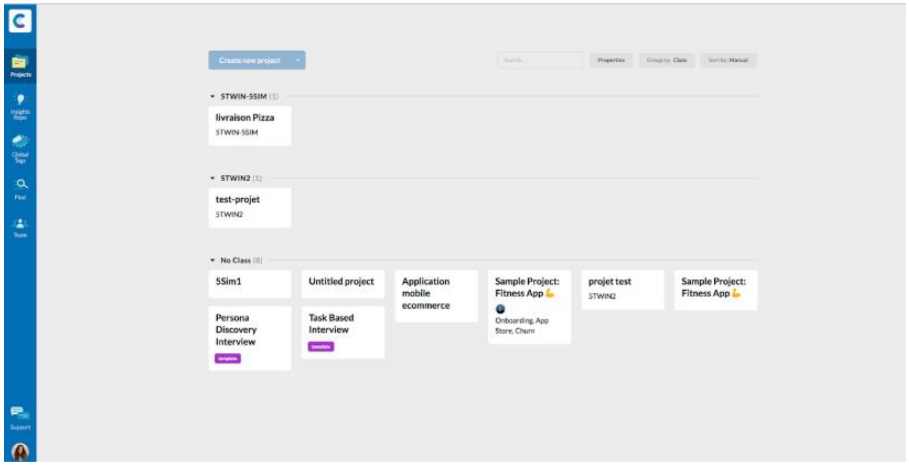

Figure 2. Examples of projects on the Considerly platform.

Considerly (Figure 2) is a Survey Data platform (qualitative and quantitative) that allows us to: Evaluate what, why, how: we collected data to identify our users via interviews in the form of voice recordings and then integrate them into the platform. Classify the needs and problems of users: through the creation of tags (data analysis). Organize the needs and problems in order of importance through the conclusions we drew from the tags.

This digital tool based on AI has allowed us to build a common database of information, to learn new ways of collaborating and to develop our projects according to a process based on UX Research methods. We are carrying on with the experience in the current academic year, AY 22/23, by moving to a new UX platform. This upgrade has allowed us to deepen more in the User research of qualitative studies but also to work on "Esprit university" pro version.

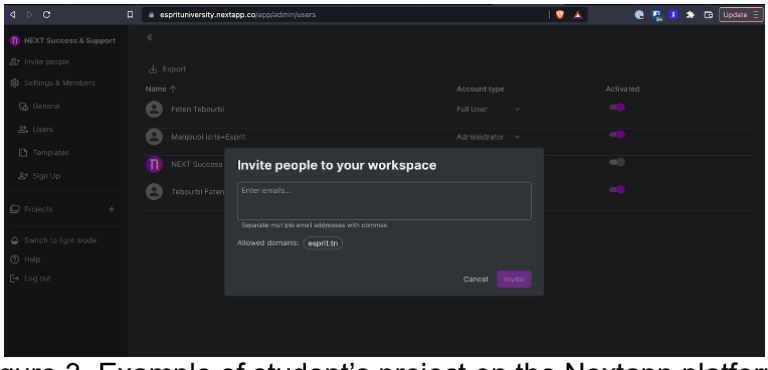

Figure 3. Example of student's project on the Nextapp platform.

For the AY 23-24, we incorporated a new AI platform that supports Timestamp-assisted key meeting moments (Figure 4). The AI Meeting note-taker instantly summarizes key moments,

making us focus on talking rather than note-taking. The platform is also equipped with AI Meeting transcription, which translates the content and records it, enabling us to read the conversation and review key moments. We can also arrange this data by tagging videos and creating a clip of multiple interview sequences to match a specific theme or need.

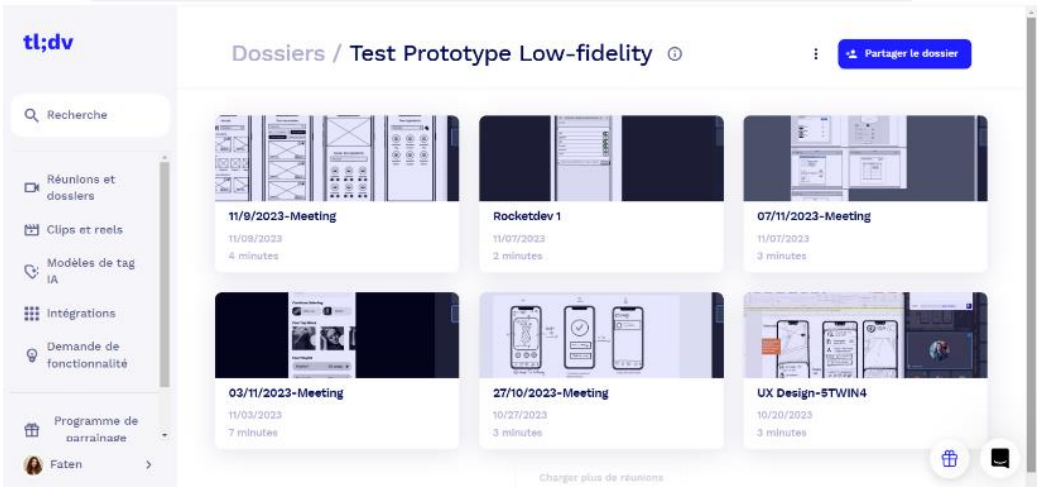

Figure 4. Example of students' project on the tldv platform.

Steps of the UX Design course

The UX Design course lasts for 7 weeks, with 80% of it being online and 20% in person. The final week is dedicated for project presentations and outcomes.

First step: Immersion and exploration

Which involves researching and exploring the project's sociological, economic, technological, and artistic contexts. Methods used include competitive research and qualitative research through user interviews. Students will gather data for their research project and use AI Transcription to automatically transcribe mp4 audio into a file. The first stage involves sorting and organizing the raw data. In the second stage, the students will analyze the data by creating tags, which is referred to as the "Discover" phase in the Considerly platform.

Second step: problem definition and understanding the user's needs:

The students will analyze the platform's generated results based on tag order or interaction to understand and identify the user's needs. They will put themselves in the user's shoes to empathize with their frustrations and constraints. To define the user, the students will create a character that represents a target audience for their projects.

Third step: formalization of the idea:

"Creativity is a fact of life, an indispensable quality for engineers, " says Michel Ferlut, director of economic development at École des Mines d'Alès. "When it is a question of creating value in a company, it is through innovation, starting with ideas".

Engineers must be able to think differently and provide innovative solutions to problems. The ability to generate ideas is essential to creating value in a company. Our engineering students

are challenged to generate ideas in teams by identifying user needs and product goals. The ideation phase involves brainstorming in three steps: generating ideas, exploring and developing each idea, and evaluating and shortlisting opportunities.

Fourth step: prototype and iteration:

During the prototype and iteration phase, students use Balsamiq software to create low-fidelity prototypes (Figure 5). The prototypes are based on a user "flow" to achieve their goal and are regularly tested throughout the process. The prototypes are evaluated through concept testing on the AI tldv platform, where teams interview target users and observe their behavior and interaction with the interfaces. The AI reporter captures important moments and transcribes the interview. Teams use the data on the Considerly platform for analysis and remote collaboration.

The iterative approach involves creating a prototype, testing it, identifying problems, and proposing solutions (CDIO, standard 5). This method allows for rapid testing and adjustments to achieve actual results: A first concept test aims to evaluate the concept's engagement value and the user flow in the low-fidelity prototype. A second test is carried out on a medium version to confirm the hypotheses of the proposed solutions and the ergonomics of the interface. The final test, usability test, is conducted on a high-fidelity prototype to validate tasks and understanding of the screen level. All tests are iterated based on Checklist iteration (Figure 6).

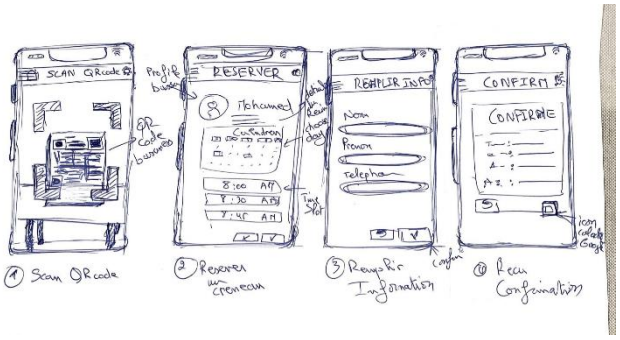

Figure 5. Example of Prototype Low fidelity

Liste de vérification des itérations

Test Concept

Itération 1

1. Faites une liste des 3 à 5 principaux problèmes que votre utilisateur a rencontré lors du test concept : n'oubliez pas à prendre en considération seulement les problèmes rencontrés répétitifs au moins dans deux interviews.

2. Identifiez le type de problème que vous abordez (par exemple, problème d'expérience (usabilité), Problème de concept, nouvelle opportunité).

3. Ecrivez une idée sur la manière de résoudre chaque problème.

Problème #1 ○ problème conceptuelle ○ problème d'usabilité ○ nouvelle opportunité

Rédigez le problème

.....

SOLUTION

Quelles solutions vous proposer à vos utilisateurs

.....

Problème #2 ○ problème conceptuelle ○ problème d'usabilité ○ nouvelle opportunité

Rédigez le problème

.....

SOLUTION

Quelles solutions vous proposer à vos utilisateurs

.....

Problème #3 ○ problème conceptuelle ○ problème d'usabilité ○ nouvelle opportunité

Rédigez le problème

Figure 6. Template Checklist -Iteration

Fifth step: advanced prototype and deployment

After developing a sufficiently advanced prototype using Figma and High Fidelity,students create a deployment plan that aligns with their objectives. They share their project's progress and insights from each stage with a detailed report. With their prototype transformed into a demo, they can explain their project's value proposition and make it desirable to their users. This allows them to reach their target audience with a relevant product or service.

Adaptation of the same process in different fields

To showcase the versatility of the same approach across various domains, we adapted the UX Design process to co-design the evaluation grid for public speaking with the students in an English course at Esprit Business School. This innovative approach aims to enhance student engagement and motivation in language acquisition. The same process was adopted throughout the course, using the NEXTAPP platform Figure 3. In addition, the use of technology facilitated collaboration based on transparent communication, enabling students to interact in real time. But also to practice AI tools to learn about technological environments. A crucial aspect of our project is the integration of interview-based data collection. Firstly, we ensured that the students knew how to formulate questions and had the necessary knowledge to conduct them in order to obtain precise information on the evaluation criteria preferred by the interviewees. This personalized approach ensures that the final grid is tailored to unique learning needs and promotes a more individualized and supportive learning environment.

THE IMPACT OF IMPLEMETING AI-DRIVEN TOOLS IN THE UX DESIGN PROGRAM LEARNING OUTCOMES AND EVALUATION GRIDS

The table 1 presents comparison between the Program Learning Outcomes (PLOs) of the User Experience (UX) module from 2019 to 2022. It revealed a significant evolution of the learning outcomes showcasing a notable shift in the complexity of skills aligned with Bloom's taxonomy. It also highlights the impact of artificial intelligence (AI) at various stages of the process allowing our students to reinforce skills and attitudes helping them to cope with a changing work environment and society.

Raising the level of depth

Overall, an increase in the depth of skills was observed. This increase is noticeable in the shift from simple memorisation to a more in-depth understanding of the fundamentals of the UX process (AA1), indicating an evolution towards higher levels of competence and understanding.

Transition to more advanced skills

The inclusion of 'Testing the prototype with users' (AA5) and 'Iterating and measuring success' (AA7) in the updated 2022 learning outcomes indicates a shift towards higher-level proficiencies. These proficiencies require thorough evaluation and the capacity to iterate and innovate, underscoring the increasing importance placed on advanced skills. (standard 5)

Shift in focus to practical application

The focus of skills is shifting from theoretical understanding to practical application. This is reflected in learning outcomes such as "Analyse user requirements data" (AA3), which has moved from analysis to application. AI is playing a central role in this transformation by automating tasks and freeing up time for learners to focus on advanced skills. The addition of new skills, such as prototype testing with users (AA5) and iteration with success measurement (AA7), suggests a broadening towards more advanced and innovative skills. (Standard 8)

Broadening of skills

Some elements of the 2022 learning outcomes suggest a broadening of the skills expected of learners. For example, "Classify and analyse user requirements data" (AA4) introduces an additional dimension (classify), indicating a diversification of expected skills. (standard 2)

The emphasis is put on the level of understanding of the process rather than presenting the process through one-to-one interviews which explains the absence of 'Produce a presentation of the UX process of your E-commerce project' (AA8) in 2022.This shift highlights how AI is helping to streamline certain tasks, allowing learners to focus their energy on more creative and strategic aspects of UX design. (Standard 8)

In sum, the data suggests that there has been a shift towards more advanced and diverse skills in UX Design learning outcomes from 2019 to 2022. This evolution of learning outcomes, guided by the integration of AI and compliance with CDIO standard 2, prepares IT engineering students to embrace the challenges of a constantly changing industry.

Table 1 : Learning outcomes comparaison

Learning outcomes	**2019**	**2022**	**Note**
AA1: Define the basics of the UX process	Level 1 (Knowledge/ Memorisation)	Level 2 (Comprehension)	Increased level of depth
AA2: Identify a problem and a functionality	Level 2 (Comprehension)	Level 3 (Application)	Change of emphasis to application
AA3: Analyse user requirements data	Level 4 (Analysis)	Level 3 (Application)	Decreasing level of depth
AA4: Classify and analyse user requirements data	Level 4 (Analysis)	Level 4 (Analysis)	Consistent level of depth
AA5: Test the prototype with users (AA4 in 2022)	Not présent	Level 5 (Assessment)	Not mentioned in 2019
AA6: Develop prototypes	Level 5 (Assessment)	Level 4 (Analysis)	Decreasing level of depth
AA7: Iterate and measure success	Level 5 (Assessment)	Level 6 (Creation)	Increased level of depth
AA8 : Produce a presentation of the UX process for your E-commerce project	Level 6 (Creation)	Not present	Not mentioned in 2022

*: (1: Memorise, 2: Understand, 3: Apply, 4: Analyse, 5: Evaluate, 6: Create).

How evaluation gird was transformed

The evaluation parts	***Changes made***
1. Evaluation Criteria	Specific criteria added .
2. Sub-Criteria	The grid becomes more specific and detailed.
3. Rating Scale	The rating scale was changed

Our evaluation approach has undergone a significant refinement through the restructuring of the rating scale distribution between criteria. This reallocation of points places an emphasis on the analytical component during the iteration phase of the evaluation process. Additionally, we have made an augmentation to the rating scale by incorporating points dedicated to the effective utilization of AI tools. This nuanced addition aims to acknowledge and reward the implementation of an efficient approach to leveraging AI technology. Our focus lies in creating meaningful tags, showcasing a commitment to utilizing advanced tools in a way that not only supports project goals but also optimizes the overall UX Design process. In line with the CDIO Standard 11 rubric, we understand the importance of recognizing the need for improvement and benchmarking our current practices. By doing so, we remain committed to maintaining high standards and continuously improving our learning assessment methods.

Crucially, we make sure to pinpoint any deficiencies or inaptitude in our evaluation techniques and make the necessary efforts to rectify these deficiencies.

OUTCOMES OF THE SURVEY: CHALLENGES AND LEARNING POINTS

A survey was conducted with a total of 300 Students from different options of TIC. It was run at the end of the first semester of AY 23 /24, with a focus on the learning experience of students using AI, and its impact on their future career. About 21,66% of the students answered positively to the survey.

The questionnaire designed for the survey aimed to:

1. Analyze the respondents' preferences between integrating the module in the 4th or 5th year of their curriculum.
2. Evaluate the overall interest in the module concerning career development.
3. Summarize the feedback on how to improve the user experience with the module.
4. Investigate the correlation between the perceived helpfulness of AI-user research tools and the desire to use these tools in future projects.
5. Explore any additional comments provided by respondents for qualitative insights.

Some keys findings of the evaluation are as follows: 79% of the respondents believe the module integrates better in the 4th year of engineering programme. In fact, the course in the 5th year is taught 80% online. Throughout their justifications, we noticed that their primary focus lies in enhancing face to face workshops and hands-on sessions, aiming to achieve mastery in all parts of the process. Additionally, there is a strong emphasis on individual tasks, accompanied by straightforward, simple, and constructive instructions. The average interest in the module is approximately 6.56. About 85.48% of respondents are interested in the workshop. This indicates a generally positive reception of the module and a high level of interest in further workshops. The histogram shows the frequency of each score, with the mean

interest score indicated by a dashed red line. This visualization (Figure 7) provides a clearer understanding of how respondents perceive the module's relevance to their careers. Here is a visualization of the distribution of interest scores for career development;

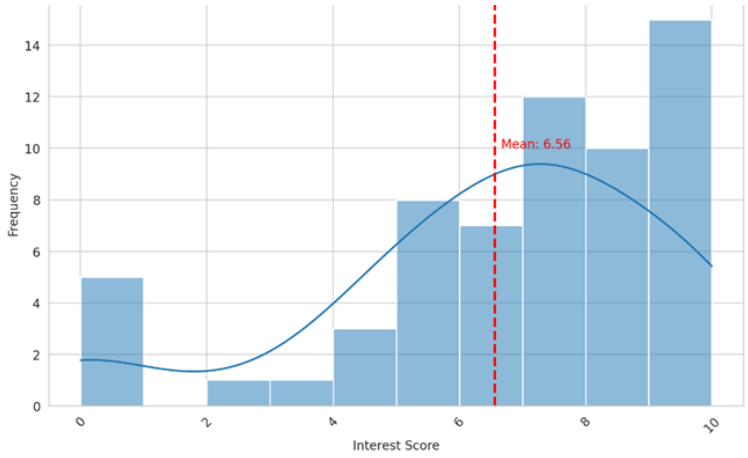

Figure 7. Distribution of interest score for career development

A chi-square test was calculated to examine the correlation between how respondents perceived the module's relevance to their career development and their anticipated use of AI tools in future projects. The results of the test yielded a highly significant p-value of 0.00099, with a calculated chi-square statistic of 27.90 and 9 degrees of freedom. This compelling evidence led to the rejection of the null hypothesis, indicating a significant correlation between the respondents' interest in the career development module and their intention to utilize AI tools in forthcoming projects in fact 90,21% said that they will use AI in their future works. These findings underscore the interconnectedness of perceived educational value and practical application, suggesting that individuals who find a module interesting for their career development are more likely to express a commitment to incorporating the acquired skills into their professional endeavors in the context of the rise artificial intelligence.

CONCLUSION

In this article, we explored how UX design fits into the CDIO model, particularly in the field of educational engineering. By aligning UX design with the CDIO framework, students gain the skills needed to solve complex, human-centered problems. This promotes creativity, agility and analytical thinking. The UX Design encourages students to consider different perspectives and continually refine their solutions. We conducted a case study at the Esprit School of Engineering to demonstrate how AI-driven tools can enhance the UX Design course. These tools, such as Nextapp.co and Considerly and Tldv have facilitated the user research, prototyping, and iteration processes. They allow students to learn essential aspects of UX Design through real-world scenarios to become the future employee and employer 4.0.

Additionally, we highlighted how AI integration and adherence to CDIO standards influenced the evolution of program learning outcomes and assessment rubrics over time. This shift toward more advanced and diverse skills prepares students to adapt to the ever-changing industrial landscape, fostering innovation and excellence.

The results of the student survey (Figure 8) confirmed the positive reception of the module and the link between perceived educational value and practical application.
Respondents expressed a desire to integrate the module earlier in their course, emphasizing the importance of practical workshops and individual work. In the future, the curriculum will focus on integrating AI to automate tasks and improve the analytical aspect of the module. A project has been launched to create an AI platform that includes the different tools presented in this document. The goal is to create a collaborative space for teachers and students.

In summary, UX Design continues to play a crucial role in engineering education, equipping students with vital skills to thrive in a rapidly changing technology landscape. By adopting AI-driven tools and promoting collaboration, educational institutions can effectively prepare students for the challenges and opportunities of the future.

Verbatim : *Improvements :*

Figure 8. Qualitive insights results suvey

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BIOGRAPHICAL INFORMATION

Faten Tebourbi is a senior graphic designer at the Communication Department and designing courses and teaching Multimedia, Web Integration and UX Design with 15+in teaching at Esprit School of Engineering, Tunis, Tunisia. She was regional (MENA) UX Design instructor by Google and mentors at Google for Startups Accelerator. Passionate of Design and technology, she combinate this to way in innovation in web and apps development. She also Co- leads GDG Carthage and WTM Ambassador.

Meriem Chichti is an English language and communication skills teacher and Head of Languages, Culture and Communication department at Esprit School of Business. She believes that pedagogical innovation is the key to successful knowledge transfer. With a Master's degree in English Languages and a Master's degree in Marketing, and certified as a Scrum Product Owner (PSPO), she has played an active role in the launch of several projects that enable her to insert best practices into the student learning process as part of the project-based teaching approach.

Idriss Mahjoubi is a highly skilled full stack developer with a strong background in UX research management. He studied TWIN engineering at ESPRIT University and has four years of industry experience. Idriss has worked at Consider.ly in Germany and nextapp.co in the Netherlands, where he played a pivotal role in developing software tools for efficient UX research. Additionally, he worked extensively with AI, taking responsibility for researching and developing AI modules, allowing for advanced and innovative features. With his exceptional problem-solving skills and attention to detail, Idriss consistently delivers user-friendly and cutting-edge solutions.

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