

# User Experience Design Module: Focusing on Student-Centred Approach

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**Abstract**— User Experience (UX) Design, while not a new term, has become significantly importance in recent years. It includes how users interact with software, focusing not only on completing specific tasks efficiently and error-free, but also on the overall experience. This contains the emotional impact, user satisfaction, and whether the experience was enjoyable and worth recommending to others. However, teaching these concepts within a module in an academic setting presents complications. Students often lack real-world experience that making it harder for them to appreciate how deeply these factors influence user behaviours and product success. In our case study, students registering in this module often come from different cohorts, such as Business Information Technology (BIT) and Computing and Information Technology (CIT). While BIT and CIT pathways both integrate aspects of technology, they serve different educational and career purposes. Teaching UX to these students can be challenging, potentially impacting their performance in the final project-based assignment. These issues can be categorised into theoretical and practical aspects that can be addressed by considering students different learning styles and create a more inclusive and effective learning environment. This paper explores the student-centred approach particularly within the framework of a User Experience Design module. The study was carried out over two academic years of the same module. In the first cohort, only slight modifications were introduced, while the second cohort fully embraced the proposed techniques. The results revealed a significant improvement in the students' final project performance after the full implementation of this approach.

**Keywords**— *Student performance, User Experience Design, Student-centred approach, Higher education.*

## I. INTRODUCTION & MOTIVATION

User Experience (UX) Design is an interdisciplinary field that focuses on creating products that provide meaningful and relevant experiences to users [1]. This involves the design of the entire process of integrating the product, including branding, design, usability, and prototyping. In the context of education, teaching UX design to students comes with its own challenges, that requires a careful balance between theory and practice, keeping up with industry trends, developing personal skills, ensuring access to resources, and providing effective assessment and feedback.

For instance, UX design contains a wide range of theories from psychology, human-computer interaction, design principles, and usability engineering [2]. Making these theories accessible and engaging to students can be difficult. On the other hand, ensuring that students can apply theoretical

knowledge to real-world scenarios is not easy. Balancing lecture-based learning with hands-on projects and case studies is important but not easy to achieve.

The UX field is continuously evolving with new tools and techniques. Keeping the curriculum up-to-date and relevant is important. Teaching students about the latest technologies such as Artificial Intelligence (AI), Virtual Reality (VR) and their implications for UX design requires constant updating of course materials [3]. Another key aspect of UX is understanding and empathising with users. Students often find it difficult to grasp the importance of emotional impact and user satisfaction because these concepts are subjective. Unlike technical skills that have clear, measurable outcomes, emotional impact and user satisfaction rely on personal perceptions and feelings, which can vary widely among individuals. Translating human emotions into design requires empathy and effective user research skills, which need both theoretical knowledge and practical experience [4]. In addition, UX design often involves working in multidisciplinary teams. Teaching students' effective communication, collaboration, and teamwork skills is essential but can be challenging to simulate in a classroom environment [5].

Furthermore, providing students with access to specific software can be costly. Ensuring all students have equal access to these resources is necessary for effective learning. Setting up proper usability testing labs and providing opportunities for students to conduct real user testing can be resource intensive [6]. Finally, creating fair and objective assessment criteria that take into account student's creativity and innovation is important. But before that, offering detailed, actionable feedback that helps students improve their skills without discouraging them is crucial [7].

Despite these challenges, a well-structured UX curriculum that incorporates real-world projects, up-to-date content, and a focus on critical thinking can effectively prepare students for careers in this dynamic and rewarding field.

## II. METHODOLOGY AND RESEARCH APPROACH

UX design can be a convoluted concept to teach. Unlike other modules in computer science that follow specific mathematical and algorithmic frameworks, this module emphasises psychology and the interaction between humans and computers. These topics can be challenging for those in the engineering field, who are more accustomed to applying a rational and structured mindset. This focus can initially seem confusing to students as they need to employ a design

thinking process to given problem, which requires fostering a mindset of innovation and iteration. Generally, students have diverse learning preferences and motivations. Engaging all of them and keeping them motivated throughout the course requires various teaching methods and personalised support [8]. This module can be intensive, with students needing to balance various project aspects, knowing their user personas, research, and theoretical study. Therefore, ensuring students manage their workload effectively without becoming overwhelmed needs to be considered.

This study identifies and implements effective strategies to overcome these challenging aspects, enabling students to succeed in their final project regardless of their academic pathways or subject backgrounds. To achieve this, two distinct cohorts of the same module were selected: Stage 2 full-time undergraduate (UG) students from two different pathways, Business Information Technology (BIT) and Computing and Information Technology (CIT) during the 2021/22 and 2022/23 academic year, with a total of 125 and 102 students, respectively. Fig.1 illustrates the number of students registered in the UX design module based on their UG pathways.

The UX is a 12-week module comprising 3 hours of lectures and 2 hours of practical sessions each week. It delivered in a blended learning format during the spring semester of each year for the students from the 2<sup>nd</sup>-year CIT and BIT cohorts. While BIT and CIT pathways both integrate aspects of technology, they serve different educational and career purposes. BIT focuses on the intersection of business and IT, preparing students for roles that require understanding of both domains. CIT, on the other hand, is more technically oriented, preparing students for specialised IT and computing roles.

During each practical session, students had the opportunity to work as a team on PowerPoint presentations created for them based on a given case study, allowing them to learn how to develop each part of the project similar to their final assignment. After each session, students could upload their practical PowerPoint in the designated assignment section (Fig.2) and receive general feedback during lectures or individual feedback upon request.

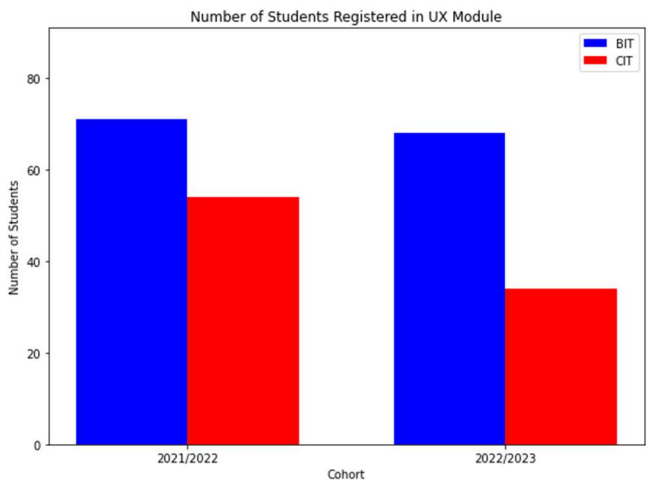


Fig.1: Number of students registered in the UX design module for BIT and CIT pathways during the 2021-2023 cohorts.



Fig.2: Illustrates the assignment created for each practical session.

### III. THE SUGGESTIONS AND ANALYSIS

To improve the student performance in this module, we adopted a student-centred approach, placing students at the core of the module curriculum. This approach represents a shift from traditional, teacher-led methods to one that prioritises the learner's role in their own education [8,9]. We prioritise understanding individual needs, interests, inclusive learning environment and learning styles of students [10,11] outlined as follows:

- In a student-centred classroom, active learning is a core principle. This involves engaging students in activities that require them to apply, analyse, and evaluate information rather than just receiving it. Techniques such as group discussions and hands-on projects are often employed to promote active engagement. During our study, we implemented these methods by having students collaborate with their nearby classmates. We provided them with posted notes and case studies, asking them to create mind maps. Additionally, we introduced a few scenarios during class, encouraging students to discuss these with their friends and share their solutions. We also organised a town hall meeting to encourage students to ask questions and explore topics in depth. This method increases curiosity and allows students to take an active role in their learning journey while discuss various problem-solving strategies.
- Personalisation is key to addressing the diverse needs and preferences of students. This can involve differentiating instruction to varying learning styles, interests, and abilities. For instance, some students may benefit from visual and multimedia resources, while others might prefer written materials or interactive simulations. This insight can be gathered through a brief survey conducted before the module begins or through informal discussions during the first week of class. In our research, we enhanced engagement by creating interactive slides, incorporating videos, using images, and highlighting key concepts with clear bullet points. We provided online lecture notes and recorded videos with subtitles, along with conducting labs accessible through Canvas. Different book and online resources also were introduced for students as core and recommended reading. Furthermore, we provided support and

guidance via MS Teams channels for lecture and practical sessions.

- Giving students control over their learning and create sense of collaboration is another essential component. This might include allowing them to choose topics for projects, set personal learning goals, or decide on methods for demonstrating their understanding. Empowering students to make these choices creates a sense of ownership and responsibility for their learning. Also, students like to work in groups to solve problems, share ideas, and learn from one another. This will help them to develop essential social and communication skills. Initially, we planned to create a list of project topics and allow students choose their own and work in groups. However, recognising the potential challenges for 2<sup>nd</sup>-year students and the fact they are coming from different cohorts, we decided to select a single project for students to complete individually. To enhance their communication skills, we encouraged them to collaborate in teams during practical sessions. Also, we provided them with the opportunity to create their own mood boards and decide how to present their application to potential customers.
- Continuous feedback is a crucial component of this approach. Regular formative assessments and constructive feedback enable students to track their progress and identify areas for improvement. We incorporated weekly formative feedback on students' submitted practical work, complemented by town hall discussions, to support this process.
- Creating a flexible learning environment that can adapted various activities and student needs is essential. This involves providing space for group work, individual study, and hands-on activities. Our school has designated "Project Rooms," which students can book online through the school's booking system. These rooms offer a convenient space for students to collaborate with their classmates or group members on final projects and assignments, without the need to visit the library.
- Connecting classroom content to real-world issues and practical applications makes learning more relevant and engaging. This can be achieved through case studies and guest speakers, which help bridge the gap between theoretical knowledge and practical experience. We implemented this approach by inviting guest speakers, providing them guidance on how they can leverage AI for brainstorming ideas and assigning a real-world project for students to develop a prototype application.

The implementation of the outlined methods led to significant enhancements in student satisfaction and achievement. Fig.3 illustrates the outcome of our suggested method. The data shows that the majority of students in the 2022 cohort achieved scores within the 50-60 range, whereas most students in the 2023 cohort were concentrated in the 60-70 range.

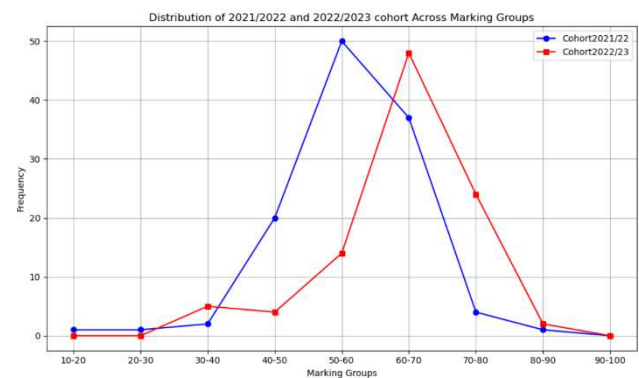


Fig.3: Comparison of the number of students achieving different marking groups in UG cohorts during 2021/22 with slight modifications and 2022/23 with full adoption of these techniques.

Figures 4 and 5 are created to illustrate a clearer understanding of student performance by highlighting the distribution of students across specific grade categories according to student's pathways. Both pathways exhibit a similar trend in overall performance, with a high concentration of students falling within a particular grade range, as illustrated by the overall cohort figure.

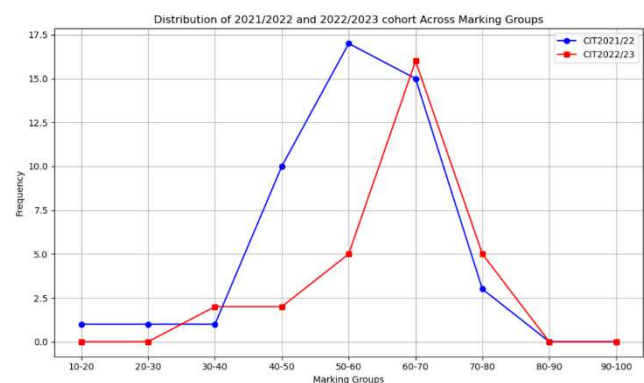


Fig.4: Comparison of the number of CIT students achieving different marking groups in UG cohorts during 2021/22 and 2022/23.

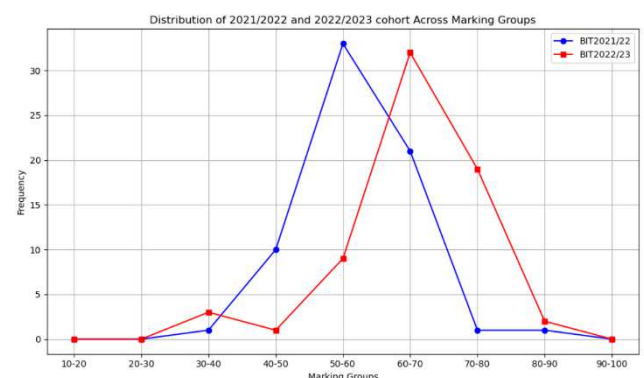


Fig.5: Comparison of the number of BIT students achieving different marking groups in UG cohorts during 2021/22 and 2022/23.

### A. Student Feedback on Module Structure

Student feedback consistently highlighted the effectiveness of our teaching approach, emphasising how it enhanced their learning experience. Many students praised the use of clear, practical examples and the diverse range of tasks that kept them engaged. They also appreciated the lecturer support and accessibility, noting that these elements made complex concepts easier to understand. Overall, the positive feedback of 89% of both 2022 and 2023 UG cohorts reflected strong student satisfaction with the teaching methods and materials provided as shown in Fig 6. The following are selected comments from 2023 student's cohort.

- "I appreciated the fact that my lectures were recorded and streamed as well as in person".
- "Use of 'Town Hall' was great to determine any queries students may need addressed".
- "Lab sessions are very helpful and lecturer is always happy to help with any queries and 'Town Hall' is an excellent way of doing this at the start of each lab. "
- "Very detailed explanation and good examples for explain what we have to do."

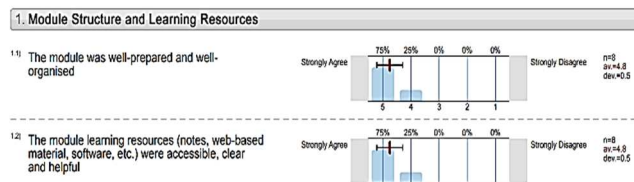


Fig.6. Student feedback results for the "Module Structure" when fully using the framework.

Student feedback included a request for a stronger method to ensure everyone forms a group and participates in the lab. We considered this feedback for our next session. We also observed that some students were less engaged than others. We believe that the lack of mandatory attendance for lectures and practical sessions has led to varying levels of participation. This issue becomes particularly problematic when students are required to conduct usability testing for their prototypes and refine their final designs based on the feedback collected. Although strategies such as Continuous Progress Monitoring have been proposed in [9, 12], ensuring consistent student engagement remains difficult without formal regulations.

### IV. CONCLUSION

This paper highlights the importance of adopting a student-centred approach to enhance academic performance. By focusing on student needs and promoting active engagement and collaboration, this method fosters a more

dynamic and impactful learning environment. It is not only strengthening students' grasp of the subject matter but also prepares them for real world challenges. By considering students' varying learning styles and needs and implementing instruction described in this work, we can improve their performance in a user experience design module. For future work, we plan to investigate the impact of replacing individual projects with group projects, where teams of 3-4 students select a project from a list of proposed options. This strategy will enhance students' sense of control over their learning, fostering collaboration, and creating a greater sense of ownership and responsibility for their educational experience.

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### REFERENCES

- [1] Norman, D. and Nielsen, J. (2017), "The Definition of User Experience (UX)", Nielsen Norman Group, available at: <https://www.nngroup.com/articles/definition-user-experience/> (accessed 14 October 2020)
- [2] Garrett, J. J. (2010). The Elements of User Experience: User-Centered Design for the Web and Beyond.
- [3] Law, E. L.-C., & Hvannberg, E. T. (2004). "Analysis of strategies for improving and estimating the reliability of a usability inspection technique." *Interacting with Computers*, 16(3), 507-529.
- [4] Rogers, Y., Sharp, H., & Preece, J. (2011). *Interaction Design: Beyond Human-Computer Interaction*.
- [5] Nielsen, J. (1993). "Usability engineering." Morgan Kaufmann.
- [6] Wilson, C. (2013). *Brainstorming and Beyond: A User-Centered Design Method*.
- [7] Sauer, J., Sonderegger, A., & Schmutz, S. (2020). "Practical guidelines for usability testing in the wild." *International Journal of Human-Computer Studies*, 136, 102383.
- [8] Goodwin, K. (2009). *Designing for the Digital Age: How to Create Human-Centered Products and Services*
- [9] B. Ahmaderaghi, E. Barlasakar, O. Pishchukhina, D. Cutting and D. Stewart, "Enhancing Students' Performance in Computer Science Through Tailored Instruction Based on their Programming Background," 2024 IEEE Global Engineering Education Conference (EDUCON), Kos Island, Greece, 2024, pp.
- [10] Emaliana, "Teacher-centered or student-centered learning approach to promote learning?" *Jurnal Sosial Humaniora (JSH)*, vol. 10, no. 2, pp. 59-70, 2017.
- [11] N. Anderson, A. McGowan, L. Galway, P. Hanna and M. Collins, "Exploring Expectations and Prior Experience in Student-Centered Software Engineering Education," 2024 IEEE Global Engineering Education Conference (EDUCON), Kos Island, Greece, 2024, pp. 1-8,
- [12] Barlasakar, E., Cutting, D., McDowell, A., Anderson, N., Ahmaderaghi, B. and Collins, M., "Early intervention for improving student performance by detecting non-engagement". In *End Education and New Developments Conference 2023* (pp. 149-153). inScience Press, 2023.