

# UXplore@poly: A Mobile Learning Application Developed Using the ADDIE Model to Enhance Student Performance in User Experience Fundamentals

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**Abstract-** UXplore@poly is a mobile learning application developed to enhance students' understanding of the DFK30023 User Experience Fundamentals course. As a newly introduced course in the Polytechnic Diploma in Information Technology programme, students face challenges in accessing structured and syllabus-aligned learning materials, which affects their understanding and engagement. This study aims to evaluate the effectiveness of UXplore@poly in improving students' learning experience and academic performance. A quantitative research approach was employed involving 39–42 students, using needs analysis and post-analysis surveys as well as pre-assessment and post-assessment evaluations. The application was developed based on the ADDIE instructional design model and integrates various learning components into a centralized and accessible mobile learning platform. The findings from the needs analysis indicate a strong demand for a structured and accessible learning solution. Following the implementation of UXplore@poly, the results show significant improvements in students' learning experience, with high levels of engagement, usability, and satisfaction reported. In addition, students' academic performance improved by approximately 30% to 40% based on pre- and post-assessment results. Furthermore, expert evaluation results indicate consistently high ratings across all criteria, confirming the quality, usability, and effectiveness of the application. The convergence of student feedback, performance improvement, and expert validation demonstrates a strong triangulation of evidence. These findings indicate that UXplore@poly effectively enhances students' understanding, supports self-directed learning, and improves academic outcomes. This study concludes that UXplore@poly is a robust, user-centered mobile learning solution with strong potential for scalability and wider implementation in higher education.

**Keywords:** Mobile Learning; User Experience; Educational Technology; Learning Application; Student Performance.

## 1. INTRODUCTION

The integration of digital technologies in education has significantly transformed teaching and learning practices, enabling more flexible, accessible, and student-centered approaches. Among these advancements, mobile learning (m-learning) has emerged as a powerful educational tool, driven by the widespread adoption of smartphones and mobile devices. M-learning allows students to access educational resources anytime and anywhere, thereby promoting self-directed learning and improving engagement [1], [2]. The increasing adoption of digital learning environments reflects the broader evolution of online and distance learning paradigms [20]. Mobile learning has evolved towards a learner-centered approach that emphasizes flexibility and effectiveness in education [14], [17]. In higher education, this adaptability is particularly beneficial as students often need to manage multiple academic and personal responsibilities. Studies have shown that mobile learning environments can significantly enhance academic performance, motivation, and learning outcomes when properly designed [3]–[5].

The effectiveness of mobile learning applications is strongly influenced by instructional design principles and user experience (UX) considerations. Prior research highlights that usability, structured content, and intuitive navigation are critical factors that determine the success of digital learning platforms [5]. In addition, multimedia learning theory [6] emphasizes that combining text, visuals, audio, and interactive elements enhances cognitive processing and knowledge retention. Interactive features such as quizzes, feedback systems, and visual aids promote active learning and deeper understanding, which are essential in complex subjects such as User Experience (UX) design [7]. This aligns with user experience design principles, where a well-structured and intuitive interface plays a critical role in enhancing learning effectiveness [13]. Recent studies also emphasize the increasing importance of user-centered and adaptive mobile learning environments in enhancing learning effectiveness in higher education [16]–[20].

Several studies have explored the role of mobile learning in improving student performance. For example, [3], [5] demonstrated that mobile learning environments enhance students' problem-solving skills and conceptual understanding. Similarly, [4], [8] found that mobile-assisted learning significantly improves academic achievement compared to traditional learning methods. Other studies also indicate that structured and centralized digital learning platforms contribute to better accessibility and support independent learning [8]. However, most existing mobile learning applications are general-purpose tools and are not specifically designed to align with particular course syllabi or institutional learning contexts. Previous studies have shown that learners demonstrate a high level of acceptance towards mobile learning systems when usability and accessibility are well designed [16], while recent systematic reviews further confirm that mobile learning adoption in higher education continues to grow due to its flexibility and effectiveness [17].

In the context of the Diploma in Information Technology programme at polytechnics, the newly introduced course DFK30023 User Experience Fundamentals presents specific challenges for students. Due to the relatively recent implementation of this course, students often struggle to obtain structured and syllabus-aligned learning materials. Existing resources are typically fragmented, limited, or not tailored to the polytechnic learning level. As a result, students

face difficulties in understanding theoretical concepts, retaining key information, and applying UX principles effectively. These challenges are consistent with previous studies highlighting that fragmented digital learning environments negatively affect student engagement and learning outcomes [11]. Preliminary needs analysis further confirms that students require more interactive, accessible, and structured learning resources.

This situation highlights a significant gap in both research and practice. While previous studies have demonstrated the benefits of mobile learning, there is limited research focusing on course-specific mobile learning applications that integrate instructional design models with user-centered design principles. Furthermore, few studies address the development of mobile learning solutions tailored specifically for UX education in polytechnic contexts. This gap underscores the need for a targeted innovation that combines structured content, multimedia learning elements, and mobile accessibility into a single platform.

To address this gap, this study proposes the development and evaluation of UXplore@poly, an ADDIE-based mobile learning application designed specifically for the DFK30023 User Experience Fundamentals course. The application integrates various learning components, including lecture notes, mind maps, quizzes, video tutorials, class activities, and past year questions into a centralized and accessible platform that enables flexible, anytime and anywhere learning. Accordingly, this study aims to develop and evaluate a course-specific mobile learning application tailored to UX education. The objectives of this study are: a) to evaluate the effectiveness of UXplore@poly in improving students' academic performance through pre- and post-assessment analysis; b) to examine students' perceptions of usability [7], engagement, and satisfaction; c) to assess the potential of UXplore@poly as a scalable mobile learning solution for broader implementation in higher education.

This study not only addresses the identified gap but also provides a practical and scalable solution for enhancing UX education in polytechnic settings. This study contributes to the field of educational technology by bridging the gap between general mobile learning applications and course-specific learning needs. By integrating instructional design principles with user-centered mobile application development, UXplore@poly offers a comprehensive and effective learning solution that enhances accessibility, engagement, and learning outcomes.

## 2. RESEARCH METHODOLOGY

This study adopts a quantitative research approach to evaluate the effectiveness of UXplore@poly as a mobile learning application designed for the DFK30023 User Experience Fundamentals course. The research methodology is structured based on a systematic sequence of stages guided by the ADDIE instructional design model, which is widely used in educational technology development to ensure effective and structured learning solutions. This approach aligns with established research methodologies for analyzing educational data in quantitative studies [15].

The ADDIE model consists of five main phases: Analysis, Design, Development, Implementation, and Evaluation. This model is recognized for its iterative and systematic approach in developing instructional materials that align with learners' needs and learning objectives. According to [3], the ADDIE model provides a comprehensive framework that integrates pedagogical principles with instructional design processes, making it suitable for mobile learning application development. Similarly, Ally [1], [2] emphasizes that structured instructional design models are essential in mobile learning environments to ensure meaningful learning experiences and effective content delivery. The overall research stages based on the ADDIE model are illustrated in Figure 1.

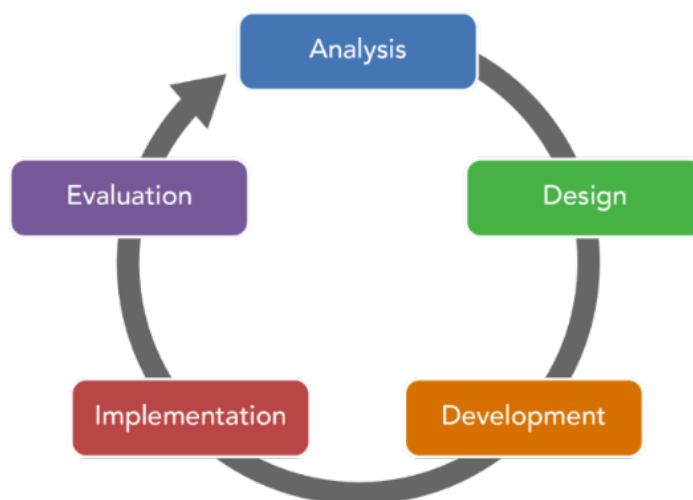


Figure 1. Research Methodology Based on ADDIE Model

In the **Analysis phase**, a needs analysis was conducted to identify students' learning challenges and requirements in the DFK30023 course. The data collected from the needs analysis survey indicated that students experienced difficulties in understanding theoretical concepts, lacked access to structured learning materials, and required more interactive

learning resources. These findings are consistent with previous studies, which highlight that mobile learning solutions should be designed based on learners' needs to improve engagement and accessibility [12]. The success of mobile learning applications is strongly influenced by factors such as usability, content quality, and system design [18].

In the **Design phase**, the learning content was structured into organized modules aligned with the course syllabus. The design process involved determining the types of learning materials to be included, such as lecture notes, mind maps, quizzes, videos, and practice exercises. This phase also considered user interface design principles to ensure that the application is intuitive and user-friendly. According to [6], the integration of multimedia elements enhances cognitive processing and improves knowledge retention, which supports the inclusion of diverse learning materials in UXplore@poly.

In the **Development phase**, the application was created using Google Sites as the primary platform and later converted into a mobile application (APK) to enhance accessibility. The development process focused on integrating all learning components into a centralized system, ensuring seamless navigation and consistency across modules. The use of mobile platforms aligns with studies by [5], which emphasize that mobile learning applications can significantly improve accessibility and learning flexibility.

In the **Implementation phase**, UXplore@poly was deployed in actual teaching and learning sessions involving Diploma in Information Technology students at POLIMAS. Students used the application as a supplementary learning tool during and outside classroom sessions. This phase allows the evaluation of how the application functions in a real educational environment, which is essential in determining its practical effectiveness.

In the **Evaluation phase**, the effectiveness of UXplore@poly was measured using two primary methods: pre- and post-assessment, and a post-analysis survey. The pre- and post-assessments were used to measure improvements in students' understanding of course content, while the survey employed a Likert scale to evaluate learning effectiveness, engagement, usability, and satisfaction. Likert-scale instruments are widely used in educational research due to their reliability in measuring perceptions and attitudes [10]. The collected data were analyzed using descriptive statistics, including mean, percentage, and frequency distribution, to identify trends and evaluate the impact of the application [9].

Overall, this structured methodology ensures that the development and evaluation of UXplore@poly are grounded in established instructional design principles and supported by empirical data. The integration of the ADDIE model with quantitative evaluation methods provides a robust framework for assessing the effectiveness of mobile learning applications in enhancing students' academic performance and learning experience.

### 3. RESULTS AND DISCUSSION

#### 3.1 System Development and Application Interface

Before presenting the results of the evaluation, it is important to describe the development and interface of the UXplore@poly application. This section outlines the system structure, features, and user interface design that support the learning process. UXplore@poly was developed as a mobile learning application using Google Sites and subsequently transformed into an Android Package Kit (APK) to enhance accessibility and usability across mobile devices. The application is designed based on user-centered design principles, ensuring that the interface is intuitive, structured, and easy to navigate for students. The design emphasizes clarity of content, minimal cognitive load, and seamless navigation between learning components.

The application interface is organized into a centralized menu structure that allows users to access all learning resources within a single platform. As shown in Figure 2, the home page serves as the main entry point of the application, providing quick access to key features and an overview of the learning system. Users can navigate through the application using the menu icon, which provides access to multiple modules including Overview, Course Information, Mind Maps, Learning Notes, Class Activities, Practice Quizzes, Video Lessons, Question Bank, Contact Us, About Us, and Privacy Policy.



Figure 2. The Interface of Loading Page to Home Page of UXplore@poly.

Figure 3 shows the Overview and Course Information modules, which provide essential background information about the course, including learning objectives, syllabus structure, and important announcements. These sections serve as a guide for students to understand the overall learning framework and expectations of the course.



Figure 3. The Interface of Course Overview and Course Information of UXplore@poly.

Figure 4 shows the Mind Maps module, which presents visual representations of key concepts for Topics 1 to 5, allowing students to explore relationships between concepts through graphical structures. Features such as zooming, swiping, and downloading enhance usability and support visual learning preferences. This approach aligns with multimedia learning principles, where visual aids help improve comprehension and retention.

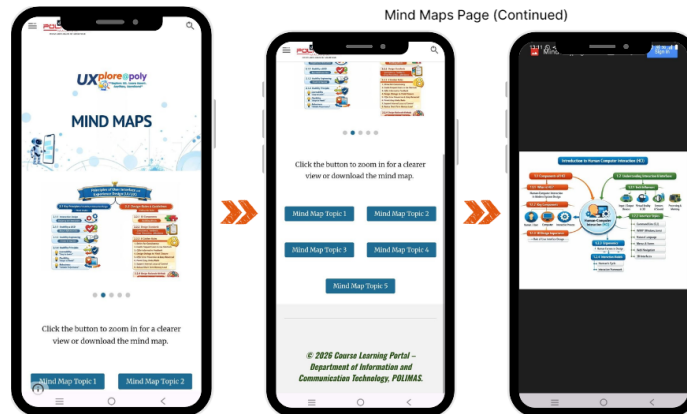


Figure 4. The Interface of Mind Map of UXplore@poly.

Figure 5 shows the Learning Notes module, which provides structured content for each topic in downloadable PDF format. Each topic is organized systematically, enabling students to access detailed explanations and study materials in a clear and sequential manner. This structured approach helps reduce cognitive overload and supports independent learning.

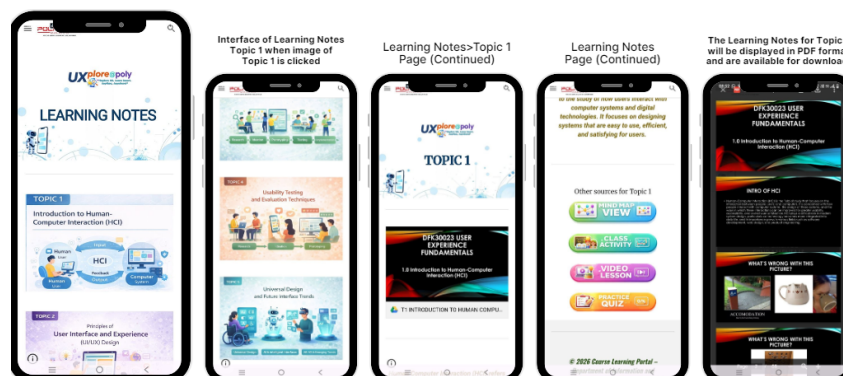


Figure 5. The Interface of the Learning Notes of UXplore@poly.

Figure 6 shows the Class Activity module, which offers topic-based activity sheets designed to reinforce students' understanding through practice. Each topic includes multiple activities that students can download and complete, promoting active learning and application of knowledge.

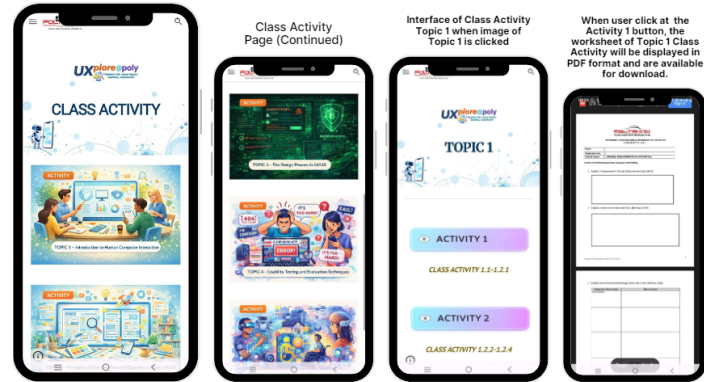


Figure 6. The Interface of Class Activity of UXplore@poly.

Figure 7 shows the Practice Quiz module, which integrates interactive quizzes through external platforms, allowing students to assess their understanding in real time. Upon selecting a quiz, users are redirected to an online environment where they can attempt questions and receive immediate feedback. This feature enhances formative assessment and supports continuous learning.



Figure 7. The Interface of Practice Quiz of UXplore@poly.

Figure 8 shows the Video Lesson module, which provides curated video content for each topic, enabling students to learn through visual and auditory materials. Videos are embedded or linked directly within the application, allowing seamless access without disrupting the learning flow.



Figure 8. The Interface of Video Lesson of UXplore@poly.

Figure 9 shows the Question Bank module, which contains past year examination questions that serve as a valuable resource for revision and exam preparation. This feature helps students familiarize themselves with assessment formats and improve their problem-solving skills.

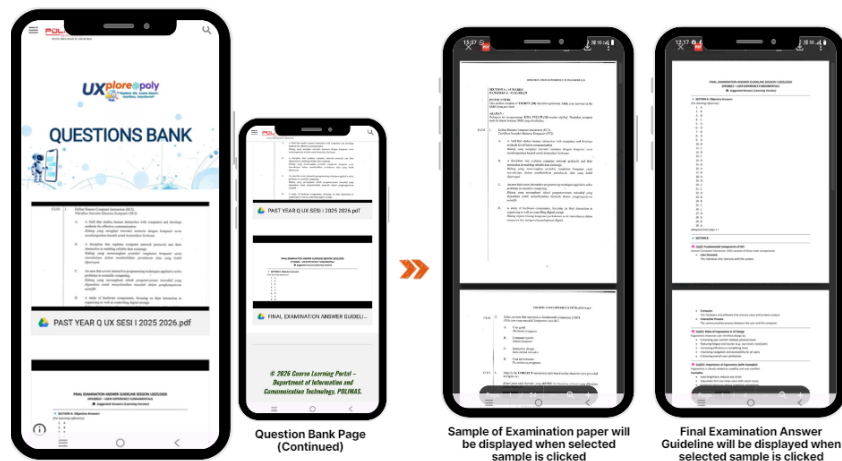


Figure 9. The Interface of Question Bank of UXplore@poly.

Figure 10 shows the additional modules such as Contact Us, About Us, and Privacy Policy, which provide supporting functionalities, including communication with developers, background information about the development team, and user data policies. Notably, the Contact Us section includes a feedback and improvement survey, which supports continuous system enhancement based on user input.

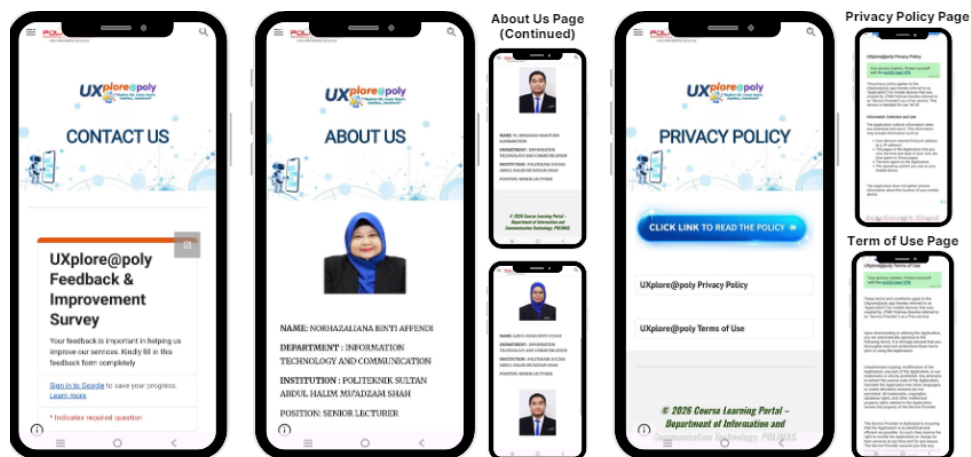


Figure 10. The Interface of Contact Us, About Us and Privacy Policy of UXplore@poly.

Overall, UXplore@poly integrates multiple learning components into a single, cohesive platform that supports flexible, interactive, and self-directed learning. The combination of structured content, multimedia elements, and interactive features ensures that the application meets the diverse learning needs of students while enhancing engagement and knowledge retention.

### 3.2 Need Analysis

The needs analysis phase was conducted to identify students' learning challenges and determine the necessity for a mobile learning solution in the DFK30023 User Experience Fundamentals course. A structured survey was administered to students prior to the implementation of UXplore@poly, focusing on accessibility of learning materials, learning preferences, and conceptual understanding. The findings reveal a significant gap in the existing learning environment. A majority of students reported difficulties in understanding theoretical concepts related to User Experience (UX), particularly due to the abstract nature of the subject and the lack of structured learning materials. In addition, students indicated that available resources were often scattered across multiple platforms, making it difficult to access and organize relevant information efficiently.

Figure 11 shows approximately 81% of students expressed the need for learning materials that could be accessed anytime, while 76.2% preferred mobile-based learning approaches. This highlights the importance of flexibility in modern learning environments, where students increasingly rely on mobile devices for academic activities. Furthermore, 85.7% of respondents emphasized the importance of topic-based exercises, indicating the need for structured and progressive learning materials.

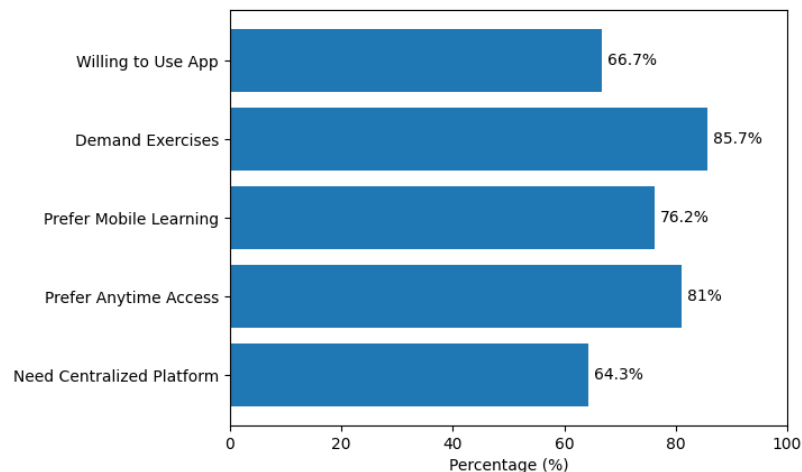


Figure 11. Key Indicators Supporting UXplore@poly Development

Another key finding is that 64.3% of students strongly agreed on the necessity of a centralized learning platform, while 66.7% indicated their willingness to adopt a mobile learning application. These results clearly demonstrate that students not only face challenges in accessing learning resources but are also receptive to technological solutions that can enhance their learning experience. The findings from this needs analysis phase strongly justify the development of UXplore@poly. The identified issues—lack of structure, limited accessibility, and insufficient interactivity—serve as the foundation for the design and development of the application. By addressing these challenges, UXplore@poly aims to provide a comprehensive learning solution that aligns with students’ needs and preferences.

### 3.3 Post-Analysis (Learning Effectiveness)

Following the implementation of UXplore@poly, a post-analysis survey was conducted to evaluate its effectiveness in enhancing students’ learning experience. The survey measured key constructs including learning effectiveness, engagement, usability, and user satisfaction using a Likert scale.

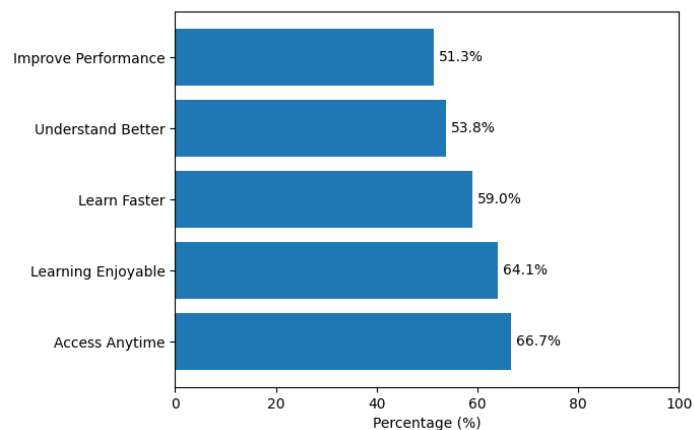


Figure 12. Key Indicators of UXplore@poly Learning Effectiveness

As shown in Figure 12, the results indicate a highly positive response from students. A majority of respondents selected “Agree” and “Strongly Agree” across all measured constructs, demonstrating a high level of acceptance and satisfaction with the application. In terms of learning effectiveness, 53.8% of students strongly agreed that UXplore@poly helped them better understand UX concepts. Additionally, 59% of respondents reported that the application enabled them to learn faster compared to traditional learning methods. These findings suggest that the structured content and multimedia elements embedded within the application significantly enhance conceptual understanding.

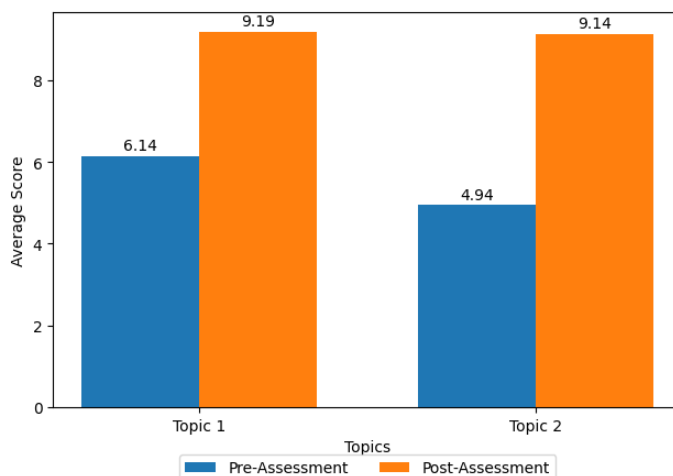
Engagement is another key aspect where UXplore@poly shows strong performance. Approximately 64.1% of students indicated that learning became more enjoyable when using the application. This improvement in engagement can be attributed to the integration of interactive elements such as quizzes, videos, and mind maps, which transform passive learning into an active and dynamic process. From a usability perspective, students reported that the application is easy to navigate and user-friendly. The centralized structure and intuitive interface reduce cognitive load, allowing students to focus on learning rather than navigating the system. Furthermore, 66.7% of students confirmed that they could access learning materials anytime, reinforcing the role of mobile learning in providing flexible and convenient access.

Overall, the post-analysis results clearly demonstrate that UXplore@poly effectively enhances learning effectiveness, engagement, and usability. The application successfully addresses the challenges identified in the needs

analysis phase, providing a structured and interactive learning environment that supports students' academic development.

### 3.4 Improvement in Academic Performance

To further evaluate the impact of UXplore@poly, a comparison of pre-assessment and post-assessment scores was conducted. The assessments were designed to measure students' understanding of Topics 1 and 2 before and after using the application.



**Figure 13.** Comparison of Pre-Assessment and Post-Assessment Scores by Topic

As shown in Figure 13, the results indicate a consistent and significant improvement in students' academic performance. The average scores increased from 6.5 to 9.1 for Topic 1 and from 6.7 to 8.9 for Topic 2. This represents an improvement of approximately 30% to 40%, highlighting the effectiveness of UXplore@poly as a learning intervention. The improvement in performance can be attributed to several factors. First, the structured organization of learning materials enables students to understand concepts in a systematic manner. Second, the availability of quizzes and practice exercises provides opportunities for reinforcement and immediate feedback. Third, multimedia elements such as videos and mind maps enhance comprehension by presenting information in multiple formats.

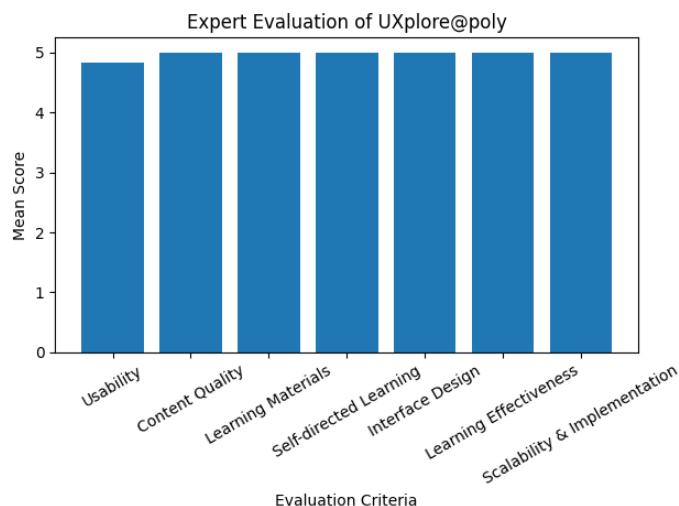
In addition, the consistency of improvement across different topics suggests that UXplore@poly is not limited to specific content but can be applied effectively across various learning domains within the course. This indicates the reliability and scalability of the application as a learning tool. The findings from this assessment provide strong empirical evidence supporting the effectiveness of UXplore@poly in improving students' academic performance. The significant increase in scores demonstrates that the application not only enhances learning experience but also produces measurable learning outcomes.

### 3.5 Expert Evaluation of UXplore@poly

In addition to student-based evaluation, expert validation was conducted to further examine the quality, relevance, and effectiveness of UXplore@poly as an educational innovation. The evaluation involved subject matter experts and instructional practitioners using a structured Likert-scale instrument. The findings reveal that UXplore@poly achieved exceptionally high ratings across all evaluation criteria, with mean scores ranging from 4.83 to 5.00. As presented in Table 1 and Figure 14, six out of seven criteria attained the maximum score of 5.00, including content quality, interface design, learning effectiveness, and potential for implementation. The usability aspect also recorded a very high score of 4.83, indicating strong agreement among experts on the application's ease of use and accessibility.

**Table 1.** Mean Score of Expert Evaluation

No.	Evaluation Criteria	Mean Score	Interpretation
1	Usability	4.83	Very High
2	Content Quality	5.00	Very High
3	Learning Materials	5.00	Very High
4	Self-directed Learning	5.00	Very High
5	Interface Design	5.00	Very High
6	Learning Effectiveness	5.00	Very High
7	Scalability & Implementation	5.00	Very High



**Figure 14.** Expert Evaluation of UXplore@poly

These results demonstrate a remarkable level of consensus among experts, confirming that UXplore@poly meets key standards of an effective learning application. The experts acknowledged that the application successfully integrates structured content, multimedia elements, and interactive features into a single, cohesive platform that supports meaningful learning. More importantly, the expert evaluation provides strong empirical validation that UXplore@poly is not merely a supplementary tool, but a strategically designed learning solution that addresses real instructional challenges. The application is recognized as capable of enhancing conceptual understanding, promoting self-directed learning, and improving the overall teaching and learning experience.

Furthermore, the findings highlight that UXplore@poly serves a dual function by supporting students in mastering course content while simultaneously assisting lecturers in delivering structured and engaging instruction. This dual impact significantly strengthens the practical value of the innovation within the educational ecosystem. Overall, the expert validation not only reinforces the effectiveness of UXplore@poly but also confirms its readiness for wider adoption and scalability across polytechnics and higher education institutions. The convergence of high student satisfaction and expert endorsement provides compelling evidence that UXplore@poly represents a robust, impactful, and sustainable educational innovation.

### 3.6 Discussion

The findings of this study provide strong and converging evidence that UXplore@poly is an effective mobile learning solution that addresses key challenges in the DFK30023 User Experience Fundamentals course. The integration of structured content, multimedia elements, and interactive features creates a comprehensive learning environment that supports both conceptual understanding and active engagement. These findings are further supported by recent studies in mobile learning, which emphasize the growing importance of adaptive, flexible, and user-centered learning environments in higher education [16]–[20].

The results from the needs analysis and post-analysis demonstrate a clear transformation in students' learning experience. Initially, students faced difficulties in accessing and understanding course materials due to the lack of structure and interactivity. However, following the implementation of UXplore@poly, students reported improved clarity of concepts, increased engagement, and higher satisfaction levels. These improvements are further supported by the significant increase in academic performance, with post-assessment scores showing a notable enhancement compared to pre-assessment results.

Importantly, the findings from the expert evaluation provide an additional layer of validation that strengthens the credibility of this study. The consistently high ratings across all evaluation criteria indicate a strong level of agreement among experts regarding the quality, usability, and effectiveness of UXplore@poly. This alignment between student perceptions, performance data, and expert validation demonstrates a robust triangulation of evidence, confirming that the application is not only well-received by users but also meets established standards of effective instructional design.

These findings are consistent with previous studies [5], [8] on mobile learning, which highlight the importance of accessibility, interactivity, and structured content in enhancing learning outcomes. The flexibility of accessing learning materials anytime and anywhere supports self-directed learning, allowing students to learn at their own pace. This aligns with contemporary educational paradigms that emphasize learner autonomy and personalized learning experiences. Furthermore, the effectiveness of UXplore@poly can be explained through multimedia learning theory, which suggests that the integration of visual, textual, and interactive elements enhances cognitive processing. The use of videos, mind maps, and interactive quizzes in UXplore@poly enables students to process information more effectively, leading to improved comprehension and retention of complex UX concepts.

The significant improvement in academic performance further reinforces the effectiveness of the application as a learning tool. These findings are supported by recent studies indicating that mobile learning significantly improves

students' academic performance [19]. The measurable increase in assessment scores provides empirical evidence that UXplore@poly not only enhances students' learning experience but also produces tangible learning outcomes. This is a critical indicator of the success of educational innovations.

In addition, the application's user-centered design plays a crucial role in its effectiveness. The intuitive interface, organized content structure, and seamless navigation reduce cognitive load and enhance usability. This ensures that students can focus on learning without being hindered by technical challenges. At the same time, expert feedback confirms that the application is also valuable as a teaching aid, supporting lecturers in delivering structured and engaging instruction.

Overall, UXplore@poly represents a successful integration of technology, pedagogy, and user-centered design. The application effectively bridges the gap between traditional learning methods and modern digital learning approaches, while being supported by consistent evidence from student feedback, performance improvement, and expert validation. This convergence of findings highlights UXplore@poly as a robust, impactful, and scalable solution for enhancing learning in higher education.

## 4. CONCLUSION

The findings of this study provide strong and converging evidence that UXplore@poly is an effective mobile learning application for enhancing students' understanding and performance in the DFK30023 User Experience Fundamentals course. The initial needs analysis identified critical challenges, including fragmented learning resources, difficulties in understanding abstract concepts, and limited access to structured and interactive materials. The development and implementation of UXplore@poly successfully addressed these issues by providing a centralized, accessible, and user-centered learning platform. The results demonstrate significant improvements in both students' learning experience and academic performance. The post-analysis findings indicate high levels of learning effectiveness, engagement, usability, and satisfaction among students. These outcomes are further supported by measurable improvements in assessment scores, with an increase of approximately 30% to 40% observed across key topics. This confirms that UXplore@poly not only enhances perceived learning but also leads to tangible academic outcomes. Importantly, the inclusion of expert evaluation strengthens the validity of these findings. Consistently high ratings across all evaluation criteria indicate strong agreement among experts regarding the quality, usability, and effectiveness of the application. The alignment between student feedback, performance improvement, and expert validation demonstrates a robust triangulation of evidence, reinforcing the credibility and reliability of UXplore@poly as a learning innovation. The effectiveness of UXplore@poly can be attributed to its integration of user-centered design principles, structured content organization, and multimedia learning elements. Features such as quizzes, videos, and mind maps support active learning, enhance cognitive processing, and accommodate diverse learning styles. At the same time, the application promotes self-directed learning by enabling students to access materials flexibly and at their own pace. In conclusion, UXplore@poly represents a successful integration of technology, pedagogy, and user experience design. The application not only enhances student learning outcomes but also serves as a valuable teaching aid for lecturers. Strong empirical support from student data and expert validation highlights its potential for scalability and wider implementation across polytechnics and higher education institutions. This study contributes to the field of educational technology by demonstrating that a well-designed, UX-driven mobile learning solution can significantly improve both learning experience and academic performance. Future research may explore the integration of adaptive learning and analytics to further enhance personalized learning experiences.

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