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DIGITAL OPTIMIZATION OF USER EXPERIENCE IN EDUCATIONAL APPLICATIONS

Abstract. Digitalization of higher education is a global trend that is developing in parallel with the increasing demand for online learning and the use of digital resources. This paper analyzes strategies for improving user experience in the development of educational applications.

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ОПТИМИЗАЦИЯ ПОЛЬЗОВАТЕЛЬСКОГО ОПЫТА В ОБРАЗОВАТЕЛЬНЫХ ПРИЛОЖЕНИЯХ

Аннотация. *Цифровизация высшего образования является глобальной тенденцией, которая развивается параллельно с увеличением спроса на онлайн-обучение и использование цифровых ресурсов. В данной статье анализируются стратегии улучшения пользовательского опыта при разработке образовательных приложений.*

Digitalisation of the educational process transforms traditional teaching methods, online and mobile learning is actively used [1]. In the conditions of digitalisation, when educational online platforms and applications compete for the attention and loyalty of users, the key success factor is the quality of User Experience (UX). UX is an important factor that determines how convenient and effective an app is to use. Educational User Experience EUX is the process of designing and delivering educational products and services that meet the needs, expectations and preferences of learners and teachers. EUX is important because it can have a significant impact on the quality and effectiveness of education, as well as user satisfaction and retention [2].

Application of advanced technologies and improvement of EUX makes educational resources more attractive and accessible to users. The following key directions influencing UX in education are highlighted [3]:

1. Individualisation of learning. It is important to cater to different levels of knowledge and needs of students. Reactive applications allow content to be dynamically adapted to each user, resulting in a more personalised approach;

2. **Convenience and accessibility.** With the mass use of mobile devices, it is desirable to create adaptive and accessible apps suitable for different screens. This is especially important for users in resource-limited regions, where having only a mobile device and a stable internet connection may be the only prerequisite for accessing educational resources;

3. **interactivity and gamification elements.** Modern educational apps offer a more lively and engaging learning experience. This not only increases engagement, but also promotes better learning;

4. **Performance and fast loading of content.** Performance is a key element in the UX of educational apps. It is especially useful for apps with

large audiences and complex functionality, where it is important to avoid slowdowns and provide a smooth interface.

Consider the benefits of optimising UX in educational applications:

- Increased learning effectiveness and user engagement. Positive EUX can make learning more enjoyable, meaningful and rewarding for users, which can increase their engagement and motivation to continue using a product or service. For example, a gamified learning app that provides feedback, rewards and tasks can make learning more engaging and interactive, and a personalised learning platform that adapts to the user's level, pace and goals can make learning more relevant and satisfying;

- Improved learning outcomes and **performance.** Positive EUX can also facilitate the acquisition and retention of knowledge and skills, as well as the transfer and application of learning to real-world settings. For example, a multimedia learning tool that utilises images, audio and video can improve a user's sensory and cognitive processing, and a collaborative learning platform that provides feedback and discussion from users can enhance a user's social and communication skills;

-reducing frustration. A negative EUX can cause frustration, confusion and dissatisfaction among users, which can lead to lower usage, completion and retention rates. For example, a poorly designed learning interface that is cluttered, confusing or inconsistent can hinder user navigation and interaction;

- accessibility of content, use of responsive design, and provision of tutorials such as video tutorials and interactive tips greatly enhances the overall user experience. Regular content updates and feedback from users allow the app to adapt to the changing needs and preferences of the audience.

Therefore, the importance of improving and optimising EUX must be considered when developing and promoting an educational app in the education market.

One of the most important aspects of creating a successful educational product is understanding user needs, preferences and behaviour. This can be achieved by conducting user research, testing and evaluation throughout the product development cycle. These methods can help identify problem areas, user motivations and goals, and evaluate the usability, effectiveness, and satisfaction of the product [4].

Various tools and techniques can be used for user experience research in the development of educational applications, but the most important is the preliminary identification of target users, studying their experiences, needs and expectations, finding out the situations and tasks of the planned use of the developed application. In this case, you can use various methods of

researching your target audience, such as surveys, interviews, focus groups, user testing, analytics, etc.

The next method is to study and analyse existing developments of potential competitors. This will help to determine the unique advantages of the educational resource being developed, which will make this application stand out.

After preliminary research, the user interface of the application is designed and developed to be intuitive, attractive, consistent and accessible. It is also necessary to design an interaction with the potential learner that is engaging, interactive, personalised and rich in feedback. This can involve the use of templates, mockups, prototypes, user flows and scenarios, etc. To enhance interactivity and user engagement in educational applications, the use of animations and microinteractions is recommended. Such effects make the interface more lively and help users better understand how to interact with the application. For example, smooth transitions when switching between pages or animations when hovering over buttons can significantly improve the interface experience. Additionally, implementing gamification such as reward systems, points or leaderboards can encourage users to actively learn and engage. Interactive elements such as quizzes, mini-games and hands-on exercises not only make learning more interesting, but also contribute to a better learning experience.

It is also worth considering the use of personalised recommendations based on user behaviour to help suggest appropriate materials and tasks that match their interests and level of training [5].

Feedback from users is also important to keep them engaged. Regular surveys and mechanisms for collecting feedback allow the application to be adapted to the users' needs, improving its functionality and content. Introducing elements such as forums or chat rooms for discussion can create a community around the app, which helps to improve interaction between users and deepen their learning experience.

In addition to surveys and feedback mechanisms, integrating channels for open communication fosters a sense of belonging and shared purpose among learners. Community features like forums, discussion boards, or chat rooms encourage collaborative learning, allowing users to exchange ideas, solve problems together, and share resources. This type of peer interaction enriches the learning environment by providing diverse perspectives and collective problem-solving. Furthermore, implementing progress tracking and achievement badges can motivate learners to stay active within the app, setting goals and celebrating milestones along the way. To maintain an adaptive learning platform, it's essential to periodically analyze user engagement data, update content based on popular topics, and provide timely

responses to feedback. By creating an engaging, interactive, and responsive learning community, the educational application not only meets users' needs but also cultivates a loyal user base that feels invested in their ongoing educational journey.

Throughout the educational app development process, you need to test the user experience to ensure that it meets the needs and expectations of your potential learners. To do this, you need to collect and analyse user feedback and data to measure the effectiveness and satisfaction of your product or service. It is recommended to use various strategies like usability testing, A/B testing, user feedback surveys, analytics, etc. To further improve the effectiveness of an educational app, it's important to continually iterate based on user feedback. By analysing data from usability testing, A/B testing and surveys, developers can identify and address specific pain points, ensuring that the learning experience remains engaging and intuitive. Additionally, using analytics to track metrics such as user retention, session length, and completion rates helps assess areas that need refinement. Regularly updating content to keep it relevant, optimising performance to minimise load times and improving navigation for seamless interaction also contribute to user satisfaction. Integrating features such as interactive quizzes, personalised learning paths and multimedia content can further increase engagement by making learning more dynamic and engaging. This iterative approach to improving user experience not only increases satisfaction, but also contributes to improved learning outcomes, which overall contributes to the success of the app.

Thus, user experience plays a crucial role in the success of an educational application. EUX should be improved and optimised holistically, paying attention to design, content, loading speed and visitor interaction.

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АНАЛИЗ ПОТОКА ДАННЫХ

Аннотация. *В связи с распространенным использованием датчиков и сетей инструменты мониторинга, «большие данные» сегодня перемещаться по конвейерам обработки данных предприятия в потоковом режиме мода. Хотя некоторые компании предпочитают размещать свои данные инфраструктура обработки и услуги в виде частных облаков, другие полностью передают эти услуги публичным облакам.*

Ключевые слова: потоки данных, обработка сложных событий, ассоциация майнинг правил.

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DATA STREAM ANALYSIS

Abstract. Due to prevalent use of sensors and network monitoring tools, big volumes of data or "big data" today traverse the enterprise data processing pipelines in a streaming fashion. While some companies prefer to deploy their data processing infrastructures and services as private clouds, others completely outsource these services to public clouds.

Keywords: Data streams, Complex Event Processing, Association Rule Mining.

Мы живем в эпоху, когда тенденции не держатся долго. Поэтому временные аспекты рекомендаций чрезвычайно важны. К сожалению, когда объемы потоковых данных и правила вывода увеличиваются, аналитики данных реагируют на увеличение значений поддержки и