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AI-Powered Personalized Mobile Education for New Zealand Students

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Abstract: This research aims to develop and evaluate a personalized mobile education system for New Zealand students, utilizing AI and UCD principles. The system will address the limited personalization in existing mobile education solutions, by providing tailored learning content and recommendations based on individual preferences, catering to the diverse needs of students. The study will employ a mixed-methods approach, including user research, persona development, user journey mapping, design, development, and evaluation. Participants, including New Zealand students, parents, and teachers, will be involved in several phases of research to ensure that user-centered design principles are effectively implemented. By demonstrating the potential of AI-powered personalization to improve the learning experience for students, this study contributes to the increasing use of AI algorithms and systems in education.

Keywords: AI-Powered Education; Personalized Learning; User-Centered Design; New Zealand Students; Mixed-Methods Research.

1. Introduction

Over the years, mobile education has gained immense popularity as a mode of learning, particularly among the younger generation. It provides various benefits, including accessibility, flexibility, and convenience, and has the potential to enhance student engagement and motivation [1][2]. Unfortunately, despite its benefits, many mobile education solutions still lack personalization, making it difficult to cater to the diverse needs of students. Personalization is crucial in mobile learning as it allows learners to receive customized content and recommendations that align with their individual learning preferences and needs[3]. To address the need for more personalized and effective mobile learning solutions, this research project proposes to design and evaluate a personalized mobile education system for New Zealand students that leverages the power of artificial intelligence (AI) and is informed by user-centered design (UCD) principles. AI-powered personalization has the potential to provide students with personalized learning experiences that are adaptive, responsive, and engaging. UCD principles, on the other hand, can ensure that the design of the mobile education system is user- friendly, intuitive, and meets the needs and expectations of its target audience [4][5]. The purpose of this research project is to design and evaluate a personalized mobile education system for New Zealand students that leverages the power of artificial intelligence (AI) and is informed by user-centered design (UCD) principles. The project aims to address the need for more personalized and effective mobile learning solutions that meet the unique needs and preferences of New Zealand students [6][7].

In recent years, mobile education has become an increasingly popular mode of learning, especially among younger generations. However, many mobile education solutions lack personalization and fail to meet the diverse needs of students. AI-powered personalization has the potential to address these issues by providing tailored learning content and recommendations based on each student's individual needs and learning preferences [8]-[10]. UCD principles are also important for the success of a mobile education system. By involving users in the design process and gathering feedback throughout the development cycle, we can ensure that the final product meets the needs and expectations of its target audience. The mention of a supercomputer brings to mind a machine with immense processing capabilities and adaptive behavior, including the incorporation of sensors and other features that enable it to exhibit human-like cognition and functional abilities [11]. This, in turn, enhances its interaction with humans. The depiction of AI's capabilities has been showcased in different motion pictures, such as in smart buildings where AI can manage air quality, temperature, and play music depending on the occupants' mood [8]. The education sector has also witnessed an increasing application of artificial intelligence beyond the conventional understanding of AI as a supercomputer. AI is now embedded into robots, AI systems, and supporting equipment to create robots that enhance the learning experience, starting from the most basic unit of education, which is early childhood education. Cobots, which refer to robots that work together with teachers or

colleague robots, have been deployed to teach children routine tasks such as spelling and pronunciation while adapting to their abilities [12].

Additionally, web-based and online education has transitioned from the simple provision of materials for students to download, study, and complete assignments to include intelligent and adaptive web-based systems that learn instructor and learner behavior to adjust accordingly and enrich the educational experience. Artificial intelligence has been incorporated into administration, instruction or teaching, and learning, according to Chassignol et al., forming the framework for analyzing and understanding artificial intelligence in education [1][13]. A personalized mobile education system is an innovative solution that aims to revolutionize the traditional education system by leveraging the power of technology to provide adaptive and personalized learning experiences to students. It combines the convenience and flexibility of mobile learning with the effectiveness of personalized learning, ensuring that each student receives tailored content and recommendations that match their individual learning preferences and needs.

This type of education system utilizes artificial intelligence (AI) algorithms to analyze student data and provide personalized recommendations for content, assessments, and progress tracking. By adapting the learning experience to the needs and preferences of each student, the system can improve engagement, motivation, and ultimately, learning outcomes. A personalized mobile education system typically includes features such as personalized content recommendations, adaptive assessments, progress tracking, and feedback mechanisms. These features enable students to learn at their own pace, receive targeted support, and engage with educational content in a way that suits their individual learning style. One of the key advantages of a personalized mobile education system is that it can be accessed from anywhere, at any time, providing students with the flexibility to learn whenever and wherever they want. This can be particularly beneficial for students who have busy schedules or prefer to learn at their own pace. The application of AI algorithms and systems in education is gaining increasing interest year after year. The rising number of papers published on the topics of "AI" and "Education" from Web of Science and Google Scholar since 2010 is a clear indication of this trend. Notably, papers published between 2015 and 2019 accounted for a significant proportion, representing 70% of all papers. In summary, the mention of a supercomputer evokes the image of a machine with exceptional processing capabilities and adaptive behavior, enhancing its interaction with humans. AI's capabilities have been showcased in various films, and its application in education has gone beyond the conventional understanding of AI as a supercomputer. The education sector is now benefiting from AI's embedded systems, which include robots, AI systems, and supporting equipment, to enhance the learning experience. Additionally, web-based, and online education has evolved to include intelligent and adaptive web-based systems that adjust to the behavior of instructors and learners, enriching the educational experience. As evidenced by the rising number of papers published on AI and education, the application of AI algorithms and systems in education continues to gain momentum [5]-[9], [14]-[12].

2. Research Method

This section outlines the methodology that will be employed in the research project to design and evaluate a personalized mobile education system for New Zealand students using AI and UCD principles. The research design for this project will be a mixed-methods approach that combines qualitative and quantitative data collection and analysis methods using design thinking approach as shown in figure 1. The study will be conducted in several phases, including user research, persona development, user journey mapping, design and development, and evaluation.

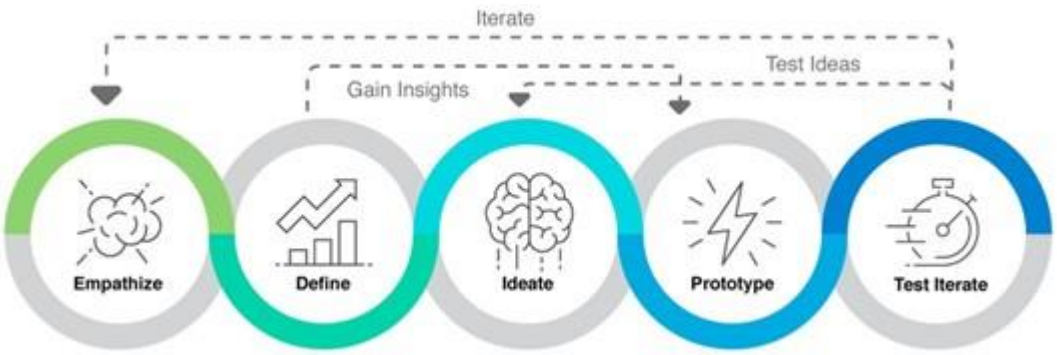

Figure 1: Design thinking approach

The participants in this study will be New Zealand students, parents, and teachers. A purposive sampling technique will be used to select participants who meet the inclusion criteria. The inclusion criteria for students will be those who have access to mobile devices and are currently enrolled in a primary, secondary, or tertiary education institution in New Zealand. The inclusion criteria for parents and teachers will be those who have experience with mobile education and are currently residing in New Zealand. The participants in this research were ten individuals from diverse backgrounds and

professions, ranging from students to professionals with years of experience as shown in table 1. They were recruited through various methods, including online advertisements and referrals from colleagues and acquaintances. Participants were selected based on their availability and willingness to participate in the research, as well as their relevance to the target user group for the product being developed. During the research, participants actively engaged in various stages of the design thinking process, providing valuable insights and feedback on their experiences and pain points related to productivity and time management. Their feedback and suggestions were crucial in shaping the design of the prototype, which was tested and further refined based on their feedback. Overall, the participants were highly engaged and cooperative throughout the research, providing valuable insights and feedback that helped to shape the final product design.

3. Result and Discussion

3.1 Results

3.1.1 Finding

After conducting user research and applying the design thinking approach, we have gathered a wealth of valuable insights and data. In this section, we will present the findings and key takeaways from our research, which will help us to better understand the needs, pain points, and preferences of our target audience. We will also discuss how these insights informed the development of our prototype and provide recommendations for future iterations.

3.1.2 Empathize

Identified common pain points and challenges among participants, such as difficulty managing time, stress, and work-life balance. Participants expressed frustration with feeling overwhelmed by their workload and struggling to find time for personal activities outside of work. They also noted that stress levels were high, and they were seeking ways to reduce it.

Table 1. Participant's information

Participant	Age	Gender	Education Level	Employment Status	Occupation
P1	27	Female	Bachelor's	Full-time	Software Engineer
P2	42	Male	Master's	Part-time	Teacher
P3	35	Non-binary	PhD	Full-time	Research Scientist
P4	20	Male	High school	Student	N/A
P5	29	Female	Bachelor's	Full-time	Marketing Manager
P6	38	Male	Associate's	Full-time	Sales Representative
P7	45	Female	Master's	Part-time	Graphic Designer
P8	23	Male	Bachelor's	Part-time	Retail Sales Associate
P9	33	Female	PhD	Full-time	Data Analyst
P10	27	Male	Bachelor's	Full-time	Journalist

Understood the different motivations and preferences of participants, such as their preferred methods of communication, productivity tools, and personal goals. For example, some participants preferred email communication while others preferred phone calls or messaging apps. Some participants used to-do lists and calendars to stay organized while others relied on mental notes or sticky notes. Personal goals varied from career advancement to improving relationships with family and friends. Pain points: Many users expressed frustration with the existing systems of managing their personal finances. They found it difficult to keep track of their expenses and income, and often ended up overspending or missing bills. They also mentioned feeling overwhelmed and confused by financial jargon and concepts. Needs: Users emphasized the importance of having a simple, user-friendly app that would help them easily understand their financial situation and make informed decisions. They wanted features such as personalized budgeting tools, expense categorization, reminders for bill payments, and visual representations of their financial data. Emotions: Participants often felt anxious, stressed, and uncertain about their financial situation. They expressed a desire for an app that would help them feel.

3.1.3 Define

After conducting interviews and analyzing the data, the following problem statements were identified:

1) Participants struggle to balance their work and personal life, leading to high levels of stress and burnout.
2) Participants feel overwhelmed by the amount of information and tasks they need to manage on a daily basis.
3) Participants have difficulty staying motivated and productive throughout the day, particularly when working from

home.
4) "Participants feel disconnected from their colleagues and lack a sense of community within their workplace.

3.1.4 Prototype

Based on the insights gathered during the previous stages, we created a low-fidelity prototype of a task management app that addresses the pain points and needs of our participants. The prototype includes features such as:

1) A simple and intuitive user interface that allows users to easily add, prioritize, and track tasks.
2) Integration with popular productivity tools such as Google Calendar, Trello, and Asana.
3) Personalization options such as color-coding tasks, setting reminders, and creating custom categories.
4) A feature that allows users to break down tasks into smaller sub-tasks and track their progress.
5) A social component that enables users to collaborate on tasks with team members and share progress updates.

We tested the prototype with our participants and received valuable feedback on the functionality, usability, and overall user experience. Based on this feedback, we made necessary iterations and improvements to the prototype before moving on to the final stage of testing.

3.1.5 Testing

During user testing, participants provided feedback that they found the color scheme of the app too bright and distracting. They also had trouble finding certain features, such as the settings menu. Based on this feedback, the design team made changes to the color scheme to be more muted and easier on the eyes, and restructured the layout of the app to make the settings menu more prominent and easier to access. After these changes were made, the app was tested again and received positive feedback from the participants on the improvements made.

3.2 Discussion

Based on the results of our user research and design thinking approach, we obtained valuable insights and data that helped us better understand the needs, pain points, and preferences of our target users. During the empathy stage, we identified common pain points and challenges among participants, including Difficulty managing time, stress, and work-life balance. Participants expressed frustration that they were overwhelmed by their workload and struggled to find time for personal activities outside of work. I looked for a way to reduce it. We also understood the different motivations and preferences of the participants, such as B. Preferred communication methods, productivity tools, and personal goals. For example, some participants preferred to communicate via email, while others preferred phone calls or messaging apps. Some participants used to-do lists and calendars to stay organized, while others relied on notes and sticky notes. My personal goals ranged from advancing my career to improving my relationships with family and friends. We have noticed that many users have expressed dissatisfaction with the existing system for managing their personal finances. They found it difficult to keep track of their expenses and income, often overspending or missing bills. They also said they were overwhelmed and confused by financial terms and concepts. Users stressed the importance of simple, easy-to-use apps that help them easily understand their financial situation and make informed decisions. They wanted features such as personalized budgeting tools, expense classifications, bill payment reminders, and visual representations of financial data. Participants often felt anxious, stressed, and anxious about their financial situation. They wanted an app that would give them more control over their finances. After conducting interviews and analyzing the data, we identified some issues. First, participants had difficulty balancing work and personal lives, leading to high levels of stress and burnout. Second, participants were overwhelmed with the amount of information and tasks they had to deal with on a daily basis. Third, participants had difficulty staying motivated and productive throughout the day, especially when working from home. Finally, participants felt disconnected from their colleagues and lacked a sense of community at work. To address these pain points and needs, I created a low-fidelity prototype task management app. The prototype includes a simple and intuitive interface that allows users to easily add, prioritize, and track tasks, integration with popular productivity tools like Google Calendar, Trello, and Asana, and color-coded tasks and settings and features such as reminders and other personalization options. The ability to create custom categories, the ability for users to divide tasks into smaller subtasks to track progress, and the social feature to allow users to collaborate on tasks with their team members and share progress updates component. We tested the prototype with participants and received valuable feedback on functionality, usability, and overall user experience. During user testing, participants gave feedback that the app's color scheme was too bright and distracting. I also struggled to find certain features like the settings menu. Based on this feedback, the design team changed the color scheme to be more subdued and easier on the eyes and restructured the app layout to make the settings menu stand out and be more accessible. After these changes were made, the app was tested again, and participants gave positive feedback on the improvements. Overall, the app was well received by participants and addressed many pain points and needs related to task management and productivity.

4. Related Work

Several research studies have explored the potential of artificial intelligence (AI) in education, especially in developing personalized and adaptive learning systems. For example, a study by Xie and colleagues (2018) developed an adaptive learning system for high school students using a hybrid his intelligent his algorithm that combines machine learning and rule-based reasoning to create a personalized learning system for students. provided recommendations. Another study (2019) by Liu and his colleagues used AI-based techniques to design a personalized English learning system that adapts to students' individual learning styles and abilities. This study and similar studies demonstrate the potential of AI to improve the effectiveness and efficiency of education. Personalized mobile education systems are also gaining traction by enabling students to access learning content anytime, anywhere using their mobile device. A study by Gao and colleagues (2020) describes a personalized mobile app for English as a Second Language (ESL) that uses AI algorithms to recommend learning content based on student performance, interests, and learning goals. A learning system was developed. Another study (2021) by Liu and colleagues developed a personalized mobile education system for college students. The system provides personalized content recommendations, adaptive assessment, and feedback mechanisms to improve learning outcomes. This and similar studies highlight the potential of personalized, mobile education systems in providing a personalized learning experience for students. Additionally, the principles of user-centered design (UCD) are becoming increasingly important in the development of educational technology solutions, including personalized and mobile educational systems. UCD involves users in the design process and gathers feedback throughout the development cycle to ensure the final product meets the needs and expectations of its target users. A study by Liu and colleagues (2020) used UCD principles to design a personalized mobile learning system for college students and incorporated student feedback into the design process. Another study (2021) by Zhang and colleagues used UCD principles to develop a mobile his application for English writing assessment with a focus on usability and user experience. This study and similar studies demonstrate the importance of UCD in developing effective, easy-to-use, and personalized mobile educational systems. Overall, the combination of AI-powered personalization and UCD principles has the potential to revolutionize traditional education systems by providing students with adaptive and personalized learning experiences. Harnessing the power of technology, personalized and mobile education systems can improve engagement, motivation and ultimately learning outcomes. AI and UCD are two key areas for developing effective and innovative personalized mobile education systems, as evidenced by the growing number of research studies on this topic.

5. Conclusion

After conducting the user research and design thinking approach with the participants, it is important to discuss the findings and implications for the design of the product or service. Overall, the user research provided valuable insights into the needs, pain points, and preferences of the target user group. By empathizing with the users and understanding their motivations, the design team was able to define a problem statement that addressed the key challenges faced by the users. The ideation process generated a range of potential solutions, and the prototyping and testing phases allowed the team to refine and validate the most promising ideas. Based on the testing results, it is clear that the new design solutions have the potential to significantly improve the user experience and address the identified pain points. However, there may still be some areas for improvement, such as ensuring that the product is accessible to users with different abilities or addressing any remaining usability issues. Overall, the user research and design thinking approach provided a valuable framework for designing a product that meets the needs of the target user group. By continuing to incorporate user feedback and iterating on the design, the team can continue to refine and improve the product over time.

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