Zbornik radova Fakulteta tehničkih nauka, Novi Sad

UDK: 5.1
DOI: https://doi.org/10.24867/31GI03Ikrasev

# EVALUATING THE "SDG-EDU" APP PROTOTYPE USING THE USABILITY PLATFORM TEST

# ЕВАЛУАЦИЈА ПРОТОТИПА АПЛИКАЦИЈЕ "SDG-EDU" КОРИШЋЕЊЕМ МЕТОДЕ USABILITY PLATFORM TEST

Kristina Ikrasev, Slavko Rakic, *Faculty of Technical Sciences, University of Novi Sad, Serbia*

**Research Field – Engineering Management**

**Abstract** – *Education for sustainable development (ESD) is crucial in equipping future generations with the skills needed to address global challenges like climate change and resource depletion. The "SDG-EDU" educational application prototype was developed to support ESD through interactive content. This study evaluated its usability using the Usability Platform Test (UPT), focusing on key areas such as navigation, design, content quality, and user satisfaction. Initial testing with 18 participants identified areas for improvement, including simplifying account creation, enhancing content organization, and improving the app's visual design. Based on user feedback, updates were made to optimize the user experience. The UPT effectively refined the prototype, demonstrating its potential to support ESD and broader market adoption.*

**Keywords:** *Usability Platform Test, SDG-EDU, Sustainable Development Goals, EdTech.*

**Кратак резиме** – *Образовање за одрживи развој (ESD) је кључно за опремање будућих генерација вештинама потребним за суочавање са глобалним изазовима попут климатских промена и искоришћења ресурса. Прототип образовне апликације "SDG-EDU" развијен је како би подржао ESD кроз интерактивни садржај. Ова студија је оцењивала њену употребљивост коришћењем методе Usability Platform Test (UPT), са фокусом на главне области као што су навигација, дизајн, квалитет садржаја и задовољство корисника. Почетно тестирање са 18 учесника идентификовало је области за унапређење, укључујући поједностављење креирања налога, побољшање организације садржаја и визуелног дизајна апликације. На основу повратних информација корисника, извршене су промене ради оптимизације корисничког искуства. UPT је ефикасно побољшао прототип, показујући његов потенцијал да подржи ESD и ширу примену на тржишту.*

**Кључне речи:** *Usability Platform Test, SDG-EDU, Циљеви одрживог развоја, EdTech.*

## 1. INTRODUCTION

Education for sustainable development (ESD) is crucial role in equipping younger generations with the skills and knowledge necessary to tackle global challenges such as climate change, diminishing natural resources, social inequality, and economic instability. In the 21st century, the role of education has expanded beyond the simple transmission of knowledge to actively encouraging students to engage in problem-solving and critical thinking to address these pressing issues [1]. The integration of ESD into educational systems is considered a fundamental process for creating a more informed and responsible society that can work towards achieving sustainable development goals (SDGs). However, the successful implementation of ESD is often hampered by several challenges, including limited financial resources, lack of teacher training, and slow adoption of innovative teaching methods [1]. To address these challenges, digital tools and applications have emerged as valuable resources, offering interactive learning environments that engage students with topics like climate change, resource management, and energy efficiency [2]. One such tool, the "SDG-EDU" educational application prototype, aims to enhance ESD through interactive and engaging digital content. However, the success of these digital tools is contingent upon their usability and user experience [3]. Therefore, it is essential to conduct usability testing to ensure that such applications meet the cognitive and functional needs of students. This study seeks to evaluate the usability of the "SDG-EDU" prototype using the Usability Platform Test (UPT) method, which has been shown to effectively assess digital tools in various educational contexts [4]. By focusing on the app's design, functionality, and user experience, the study aims to identify key areas for improvement, ensuring that the application can effectively support sustainable development education. Thus, the research addresses the question: *"How effective is the UPT in evaluating the user experience and functionality of the 'SDG-EDU' educational application, and how can the feedback from UPT be used to improve the features of 'SDG-EDU'?"*. This research is expected to contribute to the growing body of knowledge on ESD and the development of digital tools that support it [5].

## 2. EDTECH AND SDG

ESD must address societal challenges and technological advancements in today's world. The integration of EdTech in ESD is essential to equip learners with the necessary skills and knowledge to navigate global challenges such as climate change, resource depletion, and social inequality. Digital tools provide an innovative platform for students to engage in problem-solving

**NOTE:**
**This paper is derived from a master's thesis supervised by Dr. Slavko Rakic, Assistant Professor.**

activities that are directly related to SDGs [6]. Through the use of digital applications and e-learning platforms, educational institutions can effectively bridge the gap between traditional learning models and the pressing demands of the modern world. For example, gamified learning platforms can make subjects like environmental science and social responsibility more engaging, thus promoting awareness and action towards achieving SDGs [7]. Furthermore, EdTech enables more inclusive access to quality education by breaking down geographical and financial barriers. This aligns with SDG 4, which seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030 [8]. The use of digital platforms in ESD allows for more personalized and interactive learning experiences, making it easier to integrate sustainability into various disciplines.

## 3. DESIGN THINKING

Design thinking is a user-centered methodology aimed at solving complex problems through a structured, iterative approach that prioritizes the needs of the end users. This method has proven highly effective in sectors such as healthcare and education, where user experience plays a critical role in determining the success of services and products. In EdTech, design thinking has become an essential tool for developing applications that engage students, facilitate learning, and address diverse educational challenges. By focusing on user needs, EdTech companies can design solutions that are not only functional but also intuitive and accessible for students and educators alike [9]. One of the key aspects of design thinking is its emphasis on empathy, where developers and educators collaborate to understand the challenges and needs of students. This approach helps in creating personalized learning experiences that cater to different learning styles and educational goals. For example, through iterative testing and feedback loops, educational applications can be fine-tuned to enhance user satisfaction and learning outcomes. A successful application of this methodology is seen in how companies like Google have developed tools like Google Classroom, which integrates user feedback into its design process to improve usability and performance [9]. Moreover, the design thinking process encourages rapid prototyping and testing, which is essential for adapting to the fast-changing demands of both the technology landscape and educational systems. By continuously iterating on product designs based on user feedback, EdTech companies can stay agile and responsive to the needs of educators and students [9].

## 4. USABILITY PLATFORM TEST

The UPT is a structured approach designed to assess the effectiveness, efficiency, and user satisfaction of digital platforms, particularly in educational contexts. This method involves systematic observation, data collection, and analysis to evaluate various aspects of platform usability, such as ease of use, navigation, and visual design. By identifying strengths and weaknesses, UPT enables iterative improvements to enhance user experience and engagement [10]. In the case of EdTech solutions, the UPT has been employed to support the international expansion of educational applications. Through collaboration with local researchers and partners, the test adapts to regional needs, addressing challenges like language barriers, educational systems, and technical constraints. The UPT has proven valuable in bridging the gap between EdTech companies and academic institutions by facilitating collaboration and optimizing usability for diverse markets.

## 5. CASE STUDY: SDG-EDU

The Persona Canvas for the development of the „SDG-EDU“ prototype focuses on understanding the users' challenges, needs, and motivations related to sustainable development education. This tool helps align the design and functionality of the „SDG-EDU“ application with the specific pain points, goals, and behavior patterns of its target users, who are primarily students. **Negative Trends:** the canvas highlights critical environmental issues, such as the excessive use of plastic products, increased air pollution from cars and factories, and the lack of recycling infrastructure. These challenges form the backdrop against which the „SDG-EDU“ app must engage students by offering education and practical solutions to these problems. **Headaches**: the students' major "headaches" include a lack of awareness about eco-friendly products, uncertainty about recycling rules, and the high cost of environmentally friendly products. These pain points suggest that the „SDG-EDU“ prototype should focus on education and guidance, offering simple, clear information on sustainable practices and accessible resources. **Fears**: the canvas also reveals students' fears, such as climate change, environmental pollution, and the negative impacts on human health. These concerns point to the need for the „SDG-EDU“ app to increase environmental awareness, making the urgency of sustainable development clear through interactive content and real-world examples. **Positive Trends**: there are also positive trends that support the development of „SDG-EDU“. Increasing numbers of people are recycling, using fewer plastic products, and switching to sustainable lifestyles. The app can tap into these trends by promoting positive behaviors, such as the use of recycled materials and home-grown food, making it more appealing to users who are already inclined toward sustainability. **Opportunities**: the canvas outlines several opportunities, such as providing information on recycling, promoting the switch to LED lighting, and encouraging energy-saving practices at home. The „SDG-EDU“ app can leverage these opportunities by offering practical tips and step-by-step guides, reinforcing actionable sustainability practices. **Hopes**: students expressed hopes that sustainable development efforts will lead to cleaner environments and more educational programs on sustainability. This aligns with the need for the app to inspire positive change and foster a sense of empowerment through learning, reinforcing the belief that small actions can make a big difference. **Needs**: the canvas captures the needs of the target audience, including the need for community support in adopting sustainable practices, access to positive role models, and practical advice on reducing household consumption. The „SDG-EDU“ app must address these needs by providing easy-to-access information, tools for community engagement, and practical solutions for sustainable living. Figures 1-3 illustrate key features of the initial prototype of the „SDG-EDU“ app.


Figure 1. *Homepage of the "SDG - EDU" app prototype*


Figure 2. *Menu of the "SDG - EDU" app prototype*

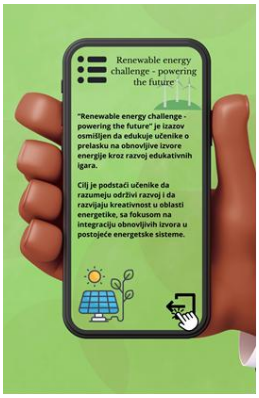


Figure 3. *Renewable energy challenge*

These three figures provide an overview of key features in the „SDG-EDU“ application prototype tested using the UPT. Figure 1 displays the homepage, serving as the main entry point with intuitive navigation to various sections of the app. Figure 2 highlights the menu, showcasing categories and options for exploring educational content related to sustainable development goals. Figure 3 illustrates the challenges section, where users engage in interactive tasks and quizzes to deepen their understanding of sustainability concepts.

## 6. RESULTS AND DISCUSSION

In the development process of the „SDG-EDU“ application prototype, an initial usability test was conducted involving 18 participants. The goal of this test was to gather detailed insights into how users interacted with the application and identify key areas for improvement in future versions. Participants evaluated the app through the UPT, which assesses eight core dimensions: navigation, communication effectiveness, visual and functional design, content quality and organization, technical performance, user satisfaction, motivation for continued use, and learning progress encouragement. The test aimed to pinpoint critical improvement areas to enhance the application's efficiency, attractiveness, and intuitiveness. Feedback provided by participants will allow the development team to refine the user experience and ensure that the application effectively promotes learning about sustainable development goals in an interactive and motivating way. Figure 4 shows the results of the UPT on the „SDG-EDU“ app prototype.

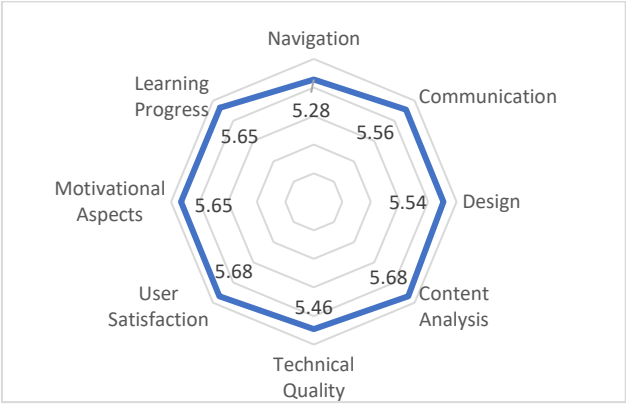


Figure 4. *UPT of the "SDG - EDU" app prototype*

Based on the Usability Platform Test (UPT) conducted for the application prototype, several areas requiring improvement were identified for future iterations of the app. Below are the five lowest-rated aspects:

1. "**I can easily create an account.**" This item received low scores, and an explanation of how to create an account in the app has been provided for future guidance.
2. "**I can easily log into the application**" was another poorly rated item, indicating that the login process needs to be simplified.
3. "**I can easily find content that suits me**" received negative feedback from users, suggesting the need for improved content organization and discovery features.
4. "**I like the aesthetic design of the application**" also scored low, highlighting a need to enhance the visual appeal of the app.
5. "**The application has good technical support**" was rated poorly, indicating that improvements in customer and technical support are necessary for future versions.

These comments provide actionable insights for improving the user experience and overall functionality of the application. To demonstrate how the UPT improved the application, Figure 5 highlights features specifically designed to address the first issue, "*I can easily create an account.*"

The updates focus on streamlining the account creation process by offering clearer instructions, simplifying navigation, and providing enhanced guidance for first-time users. These improvements aim to reduce user

frustration and ensure a smoother, more intuitive experience when setting up a profile, directly reflecting the insights gained from the UPT.


Figure 5. *User Profile Information*

## 7. CONCLUSION

In conclusion, the UPT has proven to be a highly effective method for evaluating both the user experience and functionality of the "SDG-EDU" educational application. By assessing the app across eight key dimensions—navigation, communication, design, content quality, technical performance, user satisfaction, motivation, and learning progress—the UPT identified critical areas for improvement, including account creation, login processes, content discovery, and visual appeal. Feedback from users provided actionable insights that led to targeted improvements, making the app more intuitive and user-friendly. The iterative nature of the UPT process allowed the development team to address these pain points directly, resulting in a smoother, more engaging experience for students. In answering the research question, "*How effective is the UPT in evaluating the user experience and functionality of 'SDG-EDU,' and how can the feedback from UPT improve the app's features?*" the UPT proved highly effective. It provided a structured framework for identifying and addressing weaknesses, ultimately enhancing the app's usability and supporting its role in sustainable development education. However, the study's limitations include a small sample size and a narrow demographic focus, which may impact the generalizability of the findings. Future research should expand the sample and explore the application of the UPT across diverse educational settings to further optimize educational tools for broader audiences.

## 8. ACKNOWLEDGMENT

European Union Funding has supported this research via call HORIZON-WIDERA- 2022-TALENTS- 03, through project "EdTech Talents" (project no. 101119689).

## 9. REFERENCES

**DOI: https://doi.org/10.24867/31GI03Ikrasev**

[2] M. Leicht, J. Heiss, and W. J. Byun, "Issues and trends in Education for Sustainable Development," UNESCO Publishing, 2018. [Online]. Available: https://unesdoc.unesco.org/ark:/48223/pf0000261445. Accessed: Sep. 21, 2024.

[3] S. Sterling, "Sustainable Education—Re-visioning learning and change," Schumacher Briefings, no. 6, Green Books Ltd, 2001.

**DOI: https://doi.org/10.24867/31GI03Ikrasev**

**DOI: https://doi.org/10.24867/31GI03Ikrasev**

**DOI: https://doi.org/10.24867/31GI03Ikrasev**

[8] United Nations, "Transforming Our World: The 2030 Agenda for Sustainable Development," UN General Assembly, 2015. [Online]. Available: https://sdgs.un.org/2030agenda.

**DOI: https://doi.org/10.24867/31GI03Ikrasev**

[10] „Usability Platform Test: Unlocking Education's Potential: Empowering Learning through Usability Testing!". [Online]. Available: https://sites.google.com/view/usability-platform-test/home?authuser=0. [Accessed: Sep. 21, 2024].

**Short biography:**

**Kristina Ikrasev** (born October 25, 2000, Novi Sad, Serbia) is a master's student in Engineering Management at the Faculty of Technical Sciences, with a GPA of 9.18. She specialized in Project Management during her undergraduate studies and continued the same focus in her master's, which she is set to complete successfully in 2024.
Contact: ikrasevkristina@gmail.com

**Slavko Rakic** (born February 14, 1994, Zrenjanin, Serbia) is an Assistant Professor of Industrial Engineering and Management at the University of Novi Sad, Faculty of Technical Sciences. His research, teaching, and advisory activities are at the intersection of innovation, service engineering, and EdTech.