

Demystifying the User Experience of K–5 Students With a Digital Book Application

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Digital technologies have, over the past few decades, brought significant changes to the learning tools that are available to teachers and students. One of the reading interventions that has contributed to enhancing the reading ability of elementary school students is known as MyON. This intervention helps students easily identify books they can use for independent reading. The primary aim of this study was to comprehend how elementary school students can obtain and use digital book libraries through usability research. Further, this study was critical in helping to improve understanding of how MyON can help students find relevant information about a book and their experiences while using my website. Research findings indicated that approximately 97% of the participants completed tasks, implying that the website effectively enabled them to complete their tasks.

Further, it was observed that the overall satisfaction score was above average, meaning that most participants were satisfied with the website and its operations. There was a common consensus among the participants that MyON effectively enabled students to read a wide range of books online.

Keywords: user experience, K5 students, usability testing, digital book application



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INTRODUCTION

The internet is widely used by students for academic purposes globally. With the advancement in technology, it has become easier for stu-

dents to use the internet as a research tool compared to the early years when the internet was only used for scientific research and military purposes (Syed, 2017). The internet has made significant progress to become the primary communication tool that everyone relies on to convey various types of information (Radich, 2013). Despite the significant progress made in the expansion and access of the internet, there exist some negative aspects of internet use. For instance, there is limited regulation on the information published on the internet. In addition, information can be published over the internet by anyone. Thus it can lead to the publication of biased and unreliable information accessed by internet visitors (McDowell et al., 2016). Usability evaluation is critical as it emphasizes how users can obtain and use a product to achieve their goals. Moreover, it can describe the satisfaction of operators using the route. This article sought to outline the various ways that can be used to enhance the usability of digital book applications to clients.

BACKGROUND

Digital technologies have, over the past few years, dramatically changed the learning tools used by students and their teachers. The evidence indicates that since 2007, there has been a significant increase in the number of applications and devices used for presenting digital book libraries (Biancarosa & Griffiths, 2012). Establishing digital reading programs to meet students' diverse learning needs and abilities is critical to successful reading programs. In modern elementary classrooms, children possess diverse abilities. For example, some children know how to read upon entering the first grade, while others do not have basic prereading skills. For some children, English is not their first language, while others may suffer from learning disabili-

ties. Digital reading programs have been developed to promote personalized reading to address these needs. The development of digital reading programs considered the variation in students and consequently ensured that all students have access to resources aligned with their level of ability (Brekhus, 2011).

One of the key objectives of user experience research is to help identify the needs as well as expectations of users and to explore their interaction with the systems (Demir et al., 2017). Usability testing is a technique that helps determine the interaction of users with the product by collecting data on effectiveness, efficiency, the success rate of task completion, time taken to complete predefined tasks, and user satisfaction with the product (Demir et al., 2012). Usability testing also helps understand how elementary school students can obtain and use digital book libraries. As such, this involves understanding how students employ the use of digital technologies to search for important information about a book and their experiences while using the technologies. The rapid advancement in technology and the introduction of digital learning platforms have brought numerous advantages outlined in this review.

DIGITAL BOOK LIBRARY

Digital book libraries have significantly contributed to the development of early reading skills in children. Moreover, digital book libraries enable students with visual or language-based disabilities to easily access reading materials. The ease with which these groups of children can read is promoted by using the text-to-speech feature. Synchronized highlighting of texts helps draw students' attention to some important words (Biancarosa & Griffiths, 2012). The digital reading tools provide students with practice opportunities and individualized feedback, which is critical to improving their reading skills.

DIGITAL READING PROGRAM (MYON)

Digital technologies and interactive media have continued enhancing children's learning (Radich, 2013). Basic applications available on digital platforms, such as text-to-speech features and the use of the internet for collaborative learning, have contributed to improving the learning experience of many children. MyON program is one of the key reading interventions that has helped improve elementary school students' reading ability. MyON facilitates the identification of the Zone of Proximal Development (ZPD) and suggests the most appropriate books that elementary school students can use for independent reading. Further, MyON helps enhance reading skills and comprehension, motivating students through extrinsic rewards (Brekhus, 2011).

USABILITY EVALUATION OF MYON

Usability tests are critical to evaluating the ease students can access and utilize digital libraries to enhance their reading. Before using MyON, students must take the Lexile Placement Exam and Interest Inventory. The Lexile score helps the program determine the books most suited to meet the interest and proficiency of the student (MyON, 2018).

Another critical feature of MyON is that it can provide valuable data regarding the number of books an individual has opened and read, the amount of time spent reading, the quizzes taken, and the progress made. MyON has a plan that can be used to enhance student achievement as well as growth in reading. The usability tests evaluate the ease or difficulty with which elementary school students find a book or information about a book using MyON. The usability tests help assess students' experiences following their interaction with my website. MyON provides quality digital books that contain multimedia support, active reading tools, news articles, and real-time assessments for students.

This project focused on establishing a proper understanding of the usage and compliance of students with MyON. The MyON usability tests were used to evaluate the effectiveness and efficiency of MyON and the satisfaction obtained by users by using the MyON website. The information obtained would be used to improve the website. The school administration and teachers must devise instructional decisions that can be used to promote growth in student learning.

The usability study was designed to determine the interaction of users concerning three key aspects; effectiveness, efficiency, and subjective satisfaction. In order to obtain the usability data, a set of tasks was given to the users. Data was then obtained on the ability of users to find a book using the application. Participants were also given a postquestionnaire and a system usability scale (SUS) survey to gather quantitative data on the participants' satisfaction with MyON (Brook, 1986). The usability tests helped identify the participants' concerns and obtain recommendations that would be used to improve the design of MyON to make it more user-friendly. The key questions that were developed and which helped to guide the evaluation included:

1. How effectively do participants complete predefined tasks on MyON?
2. How efficiently do participants complete the predefined tasks on MyON?
3. What is the satisfaction level of the users with the MyON?
4. What is the difference in effectiveness and efficiency rates between the experienced and nonexperienced MyON users?

METHOD

The methodology used for this study was both qualitative and quantitative. A mixed method was used to help understand more about the effectiveness and efficiency of

MyON and the satisfaction of participants with the MyON website. The mixed method would also help obtain critical information that would be used to improve the MyON website where necessary.

A moderated-in-person usability study was conducted to evaluate how participants interacted with my website. This evaluation was important in understanding the relevance and accuracy of the information contained on the website. The 10 elementary students were each given predefined tasks to determine the website tools' effectiveness. The interview session with each participant lasted approximately 45–90 minutes. This time was adequate to gather all the necessary information, and the time was also not too much to create disinterest among the participants.

The interview method was used because it is widely acknowledged as one of the best methods that can be used to obtain first-class data that has no interferences (Erickson, 1986). The participants were then asked posttest questions to obtain qualitative feedback on MyON. Finally, the users were taken through a SUS survey and a semistructured interview, which took approximately 5 minutes. The two approaches were used to collect qualitative data on participants' satisfaction with MyON.

PREDEFINED TASKS

- Task 1: I want you to discover the MyON website before we start and tell me about this website.
- Task 2: I want you to log in to MyON using your username ... and password (12...).
- Task 3: You are now on the MyON page; search for "Big Dinosaurs" book to read.
- Task 4: You need to read *What if There Were No Bees* and rate the book. How would you do this?
- Task 5: You need to read the "Space Left-over" book and share your thoughts

about the book. How would you do this?

- Task 6: Search for a third book to read under the *Because I Like Seasons and Weather*.
- Task 7: whether the "Once Upon a Time" book is in the teacher's Recommend for you to read.
- Task 8: You need to open a new book from books recently opened. How would you do this?
- Task 9: You need to know how much time you spent reading. How would you do this?
- Task 10: You need to read the *Motion* book and take a quiz. How would you do this?

RESULTS

To obtain sufficient data and information that would facilitate the development of a proper conclusion, the study involved 10 students (seven males and three females) who consented to participate in the usability tests and survey. Five participants were familiar with MyON, while the other five were novices. Four participants were in the fourth grade, while six were in the fifth. Six participants were 11 or 12 years, while four were 9 or 10 years.

EFFECTIVENESS—TASK COMPLETION SUCCESS RATES

The rate of success in carrying out tasks using a website determines its effectiveness. There were 10 participants, with each participant involved in 10 tasks. Therefore, there were approximately 10 tasks, in general, to be completed by the participants. Nine out of the 10 tasks were completed effectively, resulting in a 97% task success rate. The 97% completion rate of the tasks indicates that the website effectively enabled the participants to complete their tasks. However, the average time to complete all the tasks for participants with experience was 100%, and the average

time to complete all the tasks for participants without experience was 94%. It can be noted that three participants without experience could not complete Task 6, which required them to search for the third book to read under the *Because I like Seasons and Weather*. I observed that even some of the participants who had experience with how to use MyON found it challenging to complete the task at the beginning. All the other tasks except Task 6 experienced a 100% completion rate.

EFFICIENCY–TASK COMPLETION TIME

The efficiency of a website is determined by the amount of time taken to complete a given task. The average time to complete all the tasks for participants with experience was 29 minutes and 14 seconds. The average time to complete all the tasks for participants without experience was 37 minutes and 58 seconds. Further, it can be observed that the time between the longest and the shortest task for participants with experience was 7 minutes and 45 seconds, and the time between the longest and the shortest task for participants without experience was 7 minutes and 45 seconds. The average time to complete each task ranged from 24 seconds to 8 minutes and 09 seconds. In addition, Participant 9 was the fastest in completing all the tasks while participant 6 was the slowest, registering a time of 44 minutes and 59 seconds. From this, it can be concluded that Participant 9 was more efficient in using the website. All the participants completed Task 8 below 1 minute, and Participant 6 completed the task in 4 minutes and 20 seconds. Finally, Task 6 was fairly difficult for three participants because they took a long time to complete the task, but the rest of the participants could complete the task below the average time of 7 minutes and 41 seconds.

THE DIFFERENCE BETWEEN EXPERIENCED AND NONEXPERIENCED USERS IN TERMS OF EFFECTIVENESS AND EFFICIENCY

Effectiveness. The difference in effectiveness between the two participant groups was based on the success rates of completing tasks using MyON. The experienced users effectively used MyON, with all the participants having a 100% completion rate. On the other hand, the nonexperienced users demonstrated a 94% completion rate of the tasks.

Despite the failure of a few of the nonexperienced users (3 users) to effectively complete their tasks, the high completion rate in the two groups illustrates that the application effectively enabled the participants to complete tasks.

Efficiency. The efficiency was determined by the time taken to complete a given task. The difference between the two participant groups was observed in the average time to complete all the tasks. The average time used by the experienced users was 29 minutes and 14 seconds, while the nonexperienced users took 37 minutes and 58 seconds. However, two groups of participants had a similarity in the time between the longest and the shortest task at 7 minutes and 45 seconds.

USER SATISFACTION SURVEY RESULTS

We obtained user satisfaction using the standard SUS survey for this usability test. The survey's outcome indicated that the mean SUS score for this usability test was 77.3, which is higher than 68. The overall SUS score was above average. This score indicates that most participants were satisfied with the website enabling them to complete their tasks.

INTERVIEW RESULTS

To get more information and data from the participants, test the website. Posttest

questions were conducted to understand the user's experiences, their feelings about the website, and certain aspects not covered in the task questions. All the participants agreed that the website was fun, easy, and good for kids to read the different books online. Six out of 10 participants found that Task 6 was the most challenging task, and three failed to complete it. However, four participants found that Task 3 was the most straightforward task because the navigation was clear and easy to use. One of the participants claimed, "I don't know why ... when I used the search engine to search for a book to read, it does not come first," and because of that, most of the participants took a long time trying to find a book.

DISCUSSION

The outcome of this study shows that the participants found some of the tasks confusing. As a result, various participants did not complete their tasks successfully. For example, three of the users could not complete Task 6 effectively. The participants felt that MyON was not well designed. The users had to click on the library navigation tab that directed them to the library page. Afterward, the participants had to scroll to the end of the page to see the "Because I like Navigation" tab, which contained a drop-down menu. It was observed that some of the participants who were experienced with MyON found this task challenging at the start but were able to complete it eventually. Given the challenge faced by the participants in navigating through the library page, there is a need to redesign the search engines and substitute with a drop-down menu. This change will allow all the essential features to be visible at the top of the page and thus minimize the problems encountered in navigating the pages.

This study provides significant evidence showing the need for redesigning and improving the MyON website. One of the

pieces of evidence can be linked to the fact that it took a long time for the participants to locate a book using MyON. For instance, it took one of the participants approximately eight minutes longer than the other participants to complete the task of finding a book. The participant, in this case, required more assistance on how to use the website. Therefore, the website's home page should be redesigned to make it more transparent and accessible for users to find the navigation tab. Moreover, to eliminate the challenge faced by users scrolling down the page to find the scroll-down menu, there is a need to ensure the visibility of all the essential features at the top of the page. This design will make it easy for the users to navigate through the pages.

Ten participants were found to have split attention, which affected the search process as they completed their tasks. This distraction occurred when the participants were forced to split their attention between various navigations with similar link information. The key recommendation to avoid the split-attention effect is the need to change and redesign one of the search engines to ensure that it has a drop-down menu, making it easy for the students to search and locate all the books in the database. As such, the students will have no problem finding the books that they need.

Some of the participants also suggested that if the timer could be initiated when the users began reading their books, they would be able to know the amount of time spent reading a book. Therefore, it is necessary to include and activate this feature in MyON to enable the users to monitor the time they spend reading a given book.

This study determined the difference in the effectiveness with which the experienced and the nonexperienced users were able to complete their tasks using MyON. The participants with prior experience with MyON could complete their tasks successfully. The participants who did not have experience with MyON were

reported to complete an average of 94% of the tasks. Even though completing 94% of the tasks is considered to be significantly high, there is a need for first-time users to gain more experience with MyON to increase their success rates. As outlined earlier, some of the critical issues associated with the lack of effectiveness among non-experienced users include design problems, mislabeling, and navigation issues.

The efficiency rates showed that the experienced participants could complete their tasks by spending less time compared to the nonexperienced participants. This finding indicated that the nonexperienced users require more assistance in understanding the structure of the site and how to use the website efficiently. Further, it was observed that the overall SUS score was above average. The above-average score indicated that more than half of the participants were content with the website in facilitating their ability to complete their tasks. However, the score was not perfect, which illustrates the need for further modification and improvement of the website highlighted in the recommendations. The findings from this study also showed that the average learnability was approximately 57.5%, indicating that the participants were not fully knowledgeable on how to use the website. As such, most of the participants still needed to be guided on how to use the website.

CONCLUSION

MyON is a form of a digital library that has been developed to meet the requirements of individual learners. MyON provided all the essential information needed by parents and teachers to monitor and assess students' progress as they read. The usability evaluation contained in the website is critical in determining the usability and effectiveness of the services offered by the website.

This study has evaluated participants' efficiency, effectiveness, and satisfaction in

employing MyON to complete various tasks. The methods used in the evaluation process include semistructured interviews, observation by researchers, and a usability scale satisfaction survey.

The outcome of the efficiency evaluation showed that the average time used to complete all the tasks by the participants with prior experience was approximately 29 minutes and 14 seconds. The participants without experience, on the other hand, spent an average of 37 minutes and 58 seconds completing their tasks. The split-attention effect influenced the users' ability to complete their tasks in the search engine effectively. The split-attention effect occurred when the participants were required to divide their attention between the various navigations with similar link information.

Further, the effectiveness rate in using MyON showed that 100% of the participants with experience could effectively complete their tasks. Approximately 94% of the participants without experience could complete their tasks effectively. Three participants without experience found difficulty-completing Task 6, which required them to find a book to read under the section "Because I like Seasons and Weather." It was also observed that some of the participants with experience in using MyON faced difficulty completing tasks at the beginning. Apart from Task 6, all the other tasks reported a 100% completion rate. The average SUS score was approximately 77.3, above the overall average of 68, illustrating that many participants were satisfied with how the website enabled them to finish their tasks.

There was a common consensus among all the participants that MyON was easy and fun to use and suitable for students who had difficulty reading books online. There was no significant difference in the usability scores between the two groups concerning effectiveness, efficiency, and satisfaction with MyON.

For future research, it is recommended that an eye-tracking device be used to assess how users interact with MyON because it provides accurate data that can aid in identifying where users are looking and the amount of time spent in specific areas on the screen.

REFERENCES

- Biancarosa, G., & Griffiths, G. G. (2012). Technology tools to support reading in the digital age. *The Future of Children*, 22(2), 139–160.
- Brekhus, T. (2011). *Building proficiency through personalized reading: Capstone digital's MyON reader*. <https://about.MyON.com/sites/default/files/attached/Building-Proficiency-through-Personalized-Reading.pdf>
- Brook, J. (1986). *SUS-A quick and dirty usability scale*. <https://hell.meiert.org/core/pdf/sus.pdf>
- Demir, F., Ahmad, S., Calyam, P., Jiang, D., Huang R., & Jahnke, J. (2017). A next-generation augmented reality platform for mass casualty incidents (MCI). *Journal of Usability Studies*, 12(4), 193–214.
- Demir, F., Karakaya, M., & Tosun, H. (2012). *Research methods in usability and interaction design: Evaluations and case studies* (2nd ed.). Lambert Academic.
- Erickson, F. (1986). Qualitative methods on research on teaching. In M. Wittrock (Ed.) *Handbook of research on teaching* (3rd ed., pp. 119–161). Macmillan.
- McDowell, M., Lytle, M., & Rafail, J. (2016). *Guidelines for publishing information online*. <https://www.us-cert.gov/ncas/tips/ST05-013>
- MyON. (2018). MyON. <https://about.MyON.com/what-is-MyON>
- Radich, J. (2013). Technology and interactive media as tools in early childhood programs serving children from birth through age 8. *Every Child*, 19(4), 1–15.
- Syed, N. (2017). Internet-users and internet non-users attitude towards research: A comparative study on post-graduate students. *Journal of Education and Practice*, 8(1), 1–9.