Development of Smart Link Book as a Medium for Interaction Between Special School Institutions and Parents Through User Centered Design

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Abstract. By redesigning linking books, this study seeks to enhance the user-communication experience (UX) between school-aged children with special needs (SLB) and their parents. Understanding special education pupils’ growth, needs, and progress depends heavily on effective parent-school communication. Current link books, however, frequently fall short in terms of providing information in a user-friendly and inclusive manner. This research employs a user-oriented design approach to comprehend the requirements and preferences of parents and special education students. We found possible issues in the current bridge books through content analysis and engagement methods. The findings of this study will be used to guide the redesign of link books so that they are more user-friendly and available to everyone. The creation of a new linking book prototype involved the application of iterative design techniques. This prototype includes design components like inclusive language, understandable graphics, and improved accessibility features. Then, to gauge reactions and identify areas for development, this prototype was tested with the help of parents of SLB students and the students themselves. It is intended that the findings of this study would help those who create connecting books for special schools and other educational institutions that wish to enhance communication with special needs student groups. Better design will allow us to establish more efficient lines of communication between parents and schools, enhancing parental support for the academic growth of special education kids.

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1 Introduction

A key factor in enhancing children's education is effective parent-school communication, particularly for kids who attend Special Schools (SLB) and have special needs. A contact book is a tool for informing parents about their child's development and for facilitating communication between these two parties. For this communication to be truly helpful, there are a number of obstacles that must be solved in the context of connecting books for special education students [1]. The main issues with SLB's children's connecting books are their limited accessibility, lack of interaction, lack of inclusion in design, and navigational issues [2]. Many times, connectivity publications fail to consider the particular requirements of parents and their special needs children. Schools and parents can communicate with one another using link books to share information on children's growth and accomplishments. Traditional liaison booklets, on the other hand, might not be sufficient to enable communication between schools and parents of special education students. There is a chance to make connected books more inclusive and available to everyone with the advancement of technology and a greater understanding of user experience (UX) driven design [3]. In terms of UI/UX (User Interface/User Experience), a well-designed bridge book is crucial, and this cannot be overstated. A link book's UI/UX should be user-friendly and accessible in order to encourage parental involvement in their children's education, ensure that vital messages are properly communicated, and improve accessibility. It should also help schools and parents communicate more effectively with one another. Therefore, the goal of this research is to close the gap in the UI/UX design of books that link parents and children in special schools. The goal of this study is to restructure link books so that they are more accessible, interactive, and inclusive of all users, including special education students and their parents. By doing this, we intend to enhance the level of communication between parents and schools, which will benefit special education students in SLB and their growth as learners [4].

2 Theory

2.1 Autism and Communication Challenges

Many parents find having a child with special needs to be quite difficult. Many individuals claim that raising and caring for children with special needs takes more time and effort because they don't receive the same level of as simple I-CORE 2023 1570965768 1 as doing it with typical kids. But this is essential. can be positively responded to, allowing parents to take the proper actions to maximize growth and diverse potentials still belonging to the kids. However, despite the fact that it possesses limits, this does not mean that there are no options available to kids with special needs to be successful in life and to be able to live each day independent toward others [4].

2.2 Link Book

The contact book is a periodic report in the form of information from the school that is sent regularly to each each parent. The content relates to new events just happened, so parents can get an idea about what experiences their child has recently had [5].

2.3 E-Learning

E-learning is an approach to education that uses digital technology, such as computers, the internet, and special software, to deliver course material, facilitate learning, and measure
student progress. This can include a variety of formats, including online courses, virtual classes, webinars, and online learning platforms. E-learning allows access to education remotely, provides time flexibility, and can be tailored to individual needs.

2.4 Design thinking

Developers identify issues and come up with solutions using design thinking. In order to uncover alternate, perhaps unexpected solutions, this calls for a high degree of empathy and understanding for the end user as well as an iterative process of developing new ideas, making assumptions, and defining challenges.

Design thinking is a product's effort to understand user needs more deeply, and create ideas based on data and input from users. After that, the developer tries to make a prototype to be tested again on the user. There are 5 stages in design thinking, namely: empathize, define, invent, prototype, and test. [6].

3 Theory

Design thinking with the methodology of User Centered Design (UCD) is the research and development process of user experience design utilized in reaching this objective. An approach to product design that is focused on user requirements and challenges is the application of the Design thinking process with the UCD methodology. This approach may be broadly divided into three primary stages: predevelopment, development, and assessment. Each of these stages is composed of five Design thinking substages: empathize, define, ideation, prototype, and testing [7].

Fig. 1. Design Thinking.

3.1 Empathize

In this stage, the problem to be solved is investigated using an empathic methodology. During this phase, the developer gathers information, determines, and validates the issues faced by users. Additionally, creators are instructed to learn what sort of achievements users desire.

3.2 Define

Developers examine and synthesize the data they gathered from the step of empathy during this stage. To pinpoint the root of the issue, more details will be gathered about it. As a result, developers will have a simpler time finding troubleshooting fixes.

3.3 Ideate

Innovation is necessary at this time, where the developer will come up with concepts that will then be evaluated and adjusted to establish ideas that have modern approaches to tackling
problems. Additionally, if there are limitations on future development, developers must be ready to offer alternatives.

### 3.4 Prototype

To determine if the solutions provided have adequately addressed the concerns of the consumer or not, this stage involves creating a system based on specialized features or goods in tiny and affordable forms. A lay user or the developer themselves can test the prototype.

### 3.5 Testing

This step involves expert testing and evaluation of the products. In order to get the best results, the evaluation's findings will subsequently be used as a guide for system enhancement and refinement.

Testing of the prototype has reached testing. Therefore, the discussion in this paper will center on creating the Short User Experience Questionnaire (UEQ) framework, which is based on six scales, including Attractive, Perceptive, Efficiency, Dependability, Stimulation, and Novelty. The scale is translated into 8 questions based on the UEQ-S framework with 2 groupings, namely data with Attractiveness, Pragmatic Quality and Hedonic Quality [8].

### 4 Result and Discussion

#### 4.1 Need Assessment

This Prototype Smart Link Book developed according to user needs to improve interaction between parents and special schools' institutions. As is well known, special schools often discourage collaboration with students' parents. Their parents consistently serve as a key player in the education of their children, and they struggle to find educational programs that are appropriate for their needs. However, the link between the school and parents is only in the form of a physical book.

In managing interaction between parents and school, a user-friendly and efficient platform is needed. To achieve this, a development method that refers to user problems is used. So that the development of Smart Link Book platform is carried out using design thinking. With design thinking, the development of a product refers to the needs of potential users. Prospective users of this Smart Link Book are directed to improve interaction between both parents and schools.

By using this Smart Link Book, users are expected to find it easier to interact between parents and schools and vice versa. So, parents are not left behind and have easy access to find out about their child's development.

#### 4.2 Design and Development

This is the start page or login page. On this page there is a feature to login with your email address and password.
Fig. 2. Login Page.

The Dashboard and News Page menu information about the grades of each subject and the latest news. If any information is opened, the page will change to News Feed and contain details about the news content and information for each subject.

Fig. 3. Dashboard And News Page.

The Feed News menu contains latest news about schools, school achievements, curriculum and other information about schools.
Fig. 4. Feed News.

The following menu is the news menu display when you click on the information above, and it will move your page to the news page which contains complete news details.

Fig. 5. Feed News.
The account section contains the personal information of students who have successfully created an account. In addition, you can change student accounts to check reports or information for each student.

![Dashboard Change Account](image)

**Fig. 6.** Dashboard Change Account.

In the student's daily report, there is the date and day, teacher notes for students in each subject, and grades in each subject.
Fig. 7. Daily Logbook.

This menu also has a feature to change the month and year to set the note date for students. To add notes, teachers can click "Add Note" then fill in the text column to enter notes so that parents can read them.

Fig. 8. Daily Logbook-Change Month.
4.3 Evaluation

User-conducted tests to judge the reliability of the media. Based on the test results, it can be concluded that Smart Link Book is a legitimate medium that can be utilized for learning.

4.3.1 Results Questionnaire User Experience (UEQ)

Data generated by testing the UEQ framework used by Link Book is analysed using a data analysis tool. To obtain a value with predetermined parameters, the data is computed using a specific formula. The outcomes of data processing using the UEQ framework are as follows.

<table>
<thead>
<tr>
<th>Short UEQ Scale</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attractiveness</td>
<td>1.50</td>
</tr>
<tr>
<td>Pragmatic Quality</td>
<td>1.30</td>
</tr>
<tr>
<td>Hedonic Quality</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Eight validation questions measured using the UEQ framework are divided into three data groups according to the standards outlined in Table I. These three data groups are data based on attractiveness, pragmatic quality, and hedonic quality [10]. The quality of user involvement when performing a task to get the desired result is represented by pragmatic quality. The hedonic quality, on the other hand, is a measure of how well a user enjoys using a website without having any bearing on how well the system functions to accomplish objectives.

The data in Table I is the result of data processing that has been collected from respondents using the UEQ framework. Based on the assessment range from UEQ, where the range of positive ratings is in the range > 0.8 while negative ratings are in the range <-0.8. In the table, the attractiveness of Smart Link Book has received a positive assessment from respondents with a final score of 1.50. The pragmatic quality of this website has also received a positive assessment from respondents with a final score of 1.30. The last is the hedonic quality which has a final score of 1.10.

Fig. 9. Statistics.
More clearly, the results of data processing are depicted through statistical graphs in FIG 10. It can be seen in the graph above that the statistical values of the three categories are in the green zone which indicates a positive assessment.

4.3.2 Test Results Usability Testing

Smart Link Book testing is based on aspects that become efficient of using a software. In this test, the data taken is subjective data from respondents. The results of this test lead to user satisfaction with the usability of the app. The following are some of the opinions expressed by the respondents. Based on the subjective test results from respondents, there are several things that must be done in the development of The Smart Link Book. From the opinions expressed by Respondents 2, and 6 as well as several respondents who have similar opinions, they want to add some features for parents so they can interact with each other if they having any problem. If the developer can consider this opinion, then the usability side of the Link Book app can develop for the better and answer the needs of users.

### Table 2. Usability test result

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Registration can be made easier by putting sign in features in login page</td>
</tr>
<tr>
<td>2</td>
<td>Features that other parents can talking via app to sharing about their children</td>
</tr>
<tr>
<td>3</td>
<td>It's good, maybe we need to add some help features for users who are new to the application</td>
</tr>
<tr>
<td>4</td>
<td>The app can be used properly.</td>
</tr>
<tr>
<td>5</td>
<td>The app is easy to understand. However, having instructions on the use of Smart Link Book would be better.</td>
</tr>
<tr>
<td>6</td>
<td>Suggestions, maybe can add more features that are connecting the other parents like grup chat to consultation if they are having problem with their children</td>
</tr>
<tr>
<td>7</td>
<td>The Prototype is fine, but would be better if there some features like advice features to help other parents to improve their interaction with their child</td>
</tr>
<tr>
<td>8</td>
<td>Look pretty good for me</td>
</tr>
</tbody>
</table>

Based on the subjective test results from respondents, there are several things that must be done in the development of The Smart Link Book. From the opinions expressed by Respondents 2, and 6 as well as several respondents who have similar opinions, they want to add some features for parents so they can interact with each other if they having any problem. If the developer can consider this opinion, then the usability side of the Link Book app can develop for the better and answer the needs of users.

On the other side, a number of respondents responded that user manuals or modules should be created to make it simpler for users who are unfamiliar with online apps. The existence of instructions will certainly be very helpful for users in exploring the features that have been provided by the website [11].
Another opinion that is quite widely expressed is the respondent's opinion for this app is to have features that can help parents to improve interaction between both parents and their children like Advice features.

The conclusion that the Smart Link Book is sufficient in terms of usability to help increase communication between parents and special education institutions may be drawn from a variety of viewpoints that have been stated by respondents. There are certain features that can still be thought about by developers for potential future development. It is intended that by addressing user wants, developers will be able to implement these features as a kind of system development.

5 Conclusion

Developing Smart Link Book intended as an interaction platform between parents with special school institutions student in SLB Autism Malang University, this Link Book has many features of which is a feature Dashboard, Feed News, and so on. The existence of this Link Book is expected to help improve parents to interaction with their child's schools and can see their child's development process, especially children in the SLB Autis Malang University. To do this, a user experience must be designed in order for the platform to be created to adequately match user needs. The User Experience Questionnaire (UEQ) framework and Usability Testing are used to test the functionality of the system. The Smart Link Book received a total score of 1.50 for attractiveness, 1.30 for pragmatic quality, and 1.10 for hedonic quality based on the testing method on respondents. As a result, the Smart Link Book is legitimate as a whole and according to usability testing, although consumers are generally happy with this prototype, there are still some improvements that might be made to make it simpler for users to handle digital marketing content.

In order to maximize the potential for a systemically valid user experience, the development of this Smart Link Book will continue. It is hoped that developers will use the results of the tests that have been conducted in the future to implement key elements that can be developed so that the Smart Link Book's usefulness can be implemented as a more helpful platform to connect parents with their children through special schools' institutions.

Equations should be centred and should be numbered with the number on the right-hand side.

References


