Incorporating Interactive Elements into Children's Storybook to Improve Children's Motivation to Learn Bible: Case Study on the Parable of the Sower

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Abstract. Christian children frequently show low enthusiasm in learning the Bible due to difficulties in understanding the language and unappealing content for their taste. Moreover, their motivation towards Bible studies getting even lower by the exposure to more captivating multimedia products available in this age. Some parents and Sunday School teachers have attempted to use various teaching aid in the form of multimedia or physical property to engage children to no avail. The problem found regarding of current situation is the lack of interactivity in traditional teaching aids no longer captivate children who have already been exposed to a multitude of more exciting media alternatives. Therefore, this research proposes another form of teaching aid to capture the attention of both younger (grades 1-3) and older (grades 4-6) Sunday school children. One potential solution involves the creation of an interactive Bible Story Book, presented through a simple projector and enhanced with Augmented Reality technology, incorporating two-dimensional animations on each page. ARCS Model would be used to evaluate if the solution proposed increase the motivation to learn.

Keywords: Interactive Book, Bible Learning, Augmented Reality, ARCS Model

1　　Introduction

Understanding and applying Bible is utmost importance for Christians as the Bible is serving as a guide for every Christian's life. As the bible stated itself, learning about it should be started since the very young age consistently. Children typically learn about the Bible through Sunday School and sometimes accompanied by the teaching initiated by their own parents at home.

The Parable of the Sower, taken from Mark 4:1-20, is one of the parables Jesus shared with a large audience. This parable depicts the attitude of each believer in receiving the Word of God. In this story, there are four types of soil where the seed falls,

representing different heart attitudes of Christians in receiving the Word of God. These range from the seed falling on the wayside, on rocky ground, among thorns, to the seed falling on good soil.

Based on the interviews with Sunday School teachers from different denomination churches located in Surabaya (Indonesia), it was found that Sunday School teachers used simple teaching aids such as pictures and flannel boards to teach the story of the Parable of the Sower. They have also attempted to use other teaching aids like hand puppets, illustrated PowerPoint presentations, videos, and classroom activities to convey this story. However, those teachers stated that their Sunday School children seemed uninterested. This conclusion drawn from the fact that those children tend to talk to their peers while the teacher is telling the story in class. This finding inline with the claim of unattracted children due to boredom caused by traditional teaching experience made by Harefa from the observation on a Sunday School in Tarutung[1] and another similar observation by Yulianingsih[2]. Lost in attraction would resulting in lacks of minimal or zero cognitive assimilation of material conveyed to children's schema which means the learning process is not effective.

Therefore, there is a need for a medium that can assist either parents or Sunday School teachers convey Bible material, particularly in teaching the Bible story of the Parable of the Sower in a more appealing way to induce children's engagement and at the end increase their motivation of learning. Augmented Reality (AR) can create a space where digital virtual objects feel alive within the real-world setup [3] while smartphones at this age considered one of the most captivating media for children [4]. Hence, AR technology can capture the attention of children, making it an attractive teaching and bring some level of engagement.

Often, debates arise regarding whether education constitutes art or science. Specifically, concerning the enhancement of learning motivation, the question arises as to whether it is the duty of instructional material providers, educators, or the actual responsibility of diligent learners. Learner expected to concentrate and committed to learn when the instructional material already provided. Nonetheless, no matter how high a student's enthusiasm for learning is, inappropriate methods can lead them to boredom or even extinguish their learning drive [5].

The ARCS Model is designed to assess the effectiveness of instructional materials in enhancing student learning motivation. ARCS itself is an acronym for the four main constituent components of the ARCS Model: Attention, Relevance, Confidence, and Satisfaction.

Attention refers to the instructional tool's capacity to capture the learners' attention. Various components within instructional materials, such as games or opening stories employing animated elements are frequently developed as scaffolding tools [6]. Just as a plot of land needs to be cultivated and prepared to receive learning content, a learner needs to prepared for learning process.

Relevance pertains to the instructional tool's ability to convince learners that what they are studying is useful and not in vain [5]. In other words, learners are willing to engage in learning because it is relevant to their needs. Occasionally, this aspect can be

fulfilled even when learners enjoy the entire learning process. As with the preceding aspect, various multimedia components prove useful in enhancing this aspect.

The Confidence aspect demonstrates an instructional tool's effectiveness in boosting learners' self-confidence in acquiring knowledge. Learners often lose motivation when they had failure and not able to maintain and learn from it. Therefore, instructional materials need to provide diverse methods to bolster learners' self-confidence.

The final aspect, Satisfaction, alludes to learners' contentment during the learning process. This satisfaction can arise from obtaining rewarding outcomes, gaining useful knowledge, having enjoyable experiences, or merely exercising full control over the learning process.

Numerous studies have leveraged diverse multimedia elements to capture children's attention. However, the interactions primarily encompass interactions between children and the devices employed, rather than enhancing children's interactions with other learning counterparts for social interaction which may develop more excitement and improve motivation on learning.

This research aims to increase children's excitement in learning bible using the Parable of the Sower case by create a media in the form of interactive Bible storybook effectively convey the story and the message while capture the interest of the children. Additionally, this book can serve as an alternative teaching aid for Sunday School teachers in teaching the "Parable of the Sower" and provide a new media platform for activities for Sunday School children. At the end, this research aspires to delineate a multimedia implementation model that not only heightens children's learning motivation through interactions with devices but also fosters interactions with educators, parents, and their peers.

2   Research Methodology

The methodology of this research consists of four stages which are the analysis stage, the design stage, the implementation stage, and ended with the evaluation stage. For the analysis stage, it would be broken down to several parts, starting with the analysis of current situation by conducting interviews to several Sunday School teachers and distributing questionnaire to children in order to apprehend the existing classroom conditions, followed by the analysis of available media addressing similar problems, analysis of the problems, and analysis of the system requirements.

On evaluation stage, verification and validation would be conducted and followed with a benchmarking using ARCS model. ARCS which is abbreviation for attention, relevance, confidence, and satisfaction; was a model to answer the problem of motivation deficiency in learning material [5].

Overall, qualitative and quantitative analyses are conducted using various approaches. Product verification is carried out to ensure that the product has been implemented according to the requirements and is ready to be tested with the target users. Quantitative analysis, based on interviews with users, is employed to assess the effectiveness of the designed solution approach. Subsequently, qualitative analysis is performed through benchmarking against the ARCS Model approach. This analysis is

applied to instructional tools that have been traditionally used, in comparison with the designed solution.

2.1   Analysis on Current Condition and Available Media

The analysis of the current situation is conducted to determine the level of interest among Sunday School children regarding the usage of current teaching aids employed by the teachers in Sunday School. Moreover, this analysis would be used to identify the favorite teaching aids chosen by Sunday School children. This analysis also aims to assess the classroom conditions during the lessons conducted by Sunday School teachers, the responses of Sunday School children regarding the teaching aids used, and the difficulties faced by Sunday School teachers during their lessons. This analysis is conducted through the interviews with three Sunday School teachers and the distribution of online questionnaires to Sunday School children with the help of their parents.

Based on the result of those interview and survey, several conclusions can be drawn. First of all, apparently the most frequently used teaching aids are in the form of pictures (both physical and digital forms) and real objects present in their surroundings. Having said that, the limited variety of teaching aids available for the Parable of the Sower cause the boredom on Sunday School children as evident by their seemingly distracted activity such as doing some other activity on their own or playing with their peer, especially when the same teaching aids used repeatedly, the boredom is even reach the peak when no teaching aid employed at all. Another obstacle faced by the teachers are related with the preparation process where Sunday School teachers encounter difficulties in preparing teaching materials, particularly when the material is lengthy and the available teaching aids are inadequate. And finally based on the previous conducted lessons, evidently the most preferred teaching aids amongst children are 2D animated videos and illustrated storybooks.

To capture more on the current condition, we conduct observation on available media used by Sunday School teachers as teaching aids for the story of the Bible's Parable of the Sower. Some commonly used media by Sunday School teachers include free Bible story images from the website www.freebibleimages.org, animated videos from Children's Bible Comics, and flannel board images provided in the Sunday School teaching materials which accompanied the teaching guideline book with the title Suara Sekolah Minggu. From this analysis, several advantages and disadvantages are identified as shown in Table 1.

Table 1. Comparison of Available Teaching Aid

Media	Advantages	Disadvantages
Free Bible Images Web	Provides high-quality and visually appealing images Can be easily accessed and downloaded	Limited variety of available images May not cover all scenes or aspects of the parable

Children's Bible Comic Animated Video	Quite entertaining for children Help capturing children's Attention	Minimal engagement Limited availability of specific parable animations
Flannel Board Images	Tangible and can be used interactively Easy to use and manipulate	Limited flexibility in creating dynamic visual elements Requires additional storage space and setup

Result of the previous analysis provides insights into the strengths and weaknesses of available teaching aids, which should be taken into account while designing the propose solution. By incorporating the strengths and addressing the weaknesses, an improved teaching aid can be developed to enhance the engagement and learning experience of Sunday School children.

2.2   Problem Analysis and Requirement Analysis

Considering the previous analysis, several issues are identified as follows. First, there is a limited variety of teaching aids available for the Parable of the Sower which in return effect the Sunday School teachers to face difficulties in teaching due to inadequate teaching aids. Further consequences of the problem show the lack of interestedness of the children. The height of this problem getting event heighten due to the distraction children faced. Children often appear more attracted to their gadgets during class. Especially since the teaching aids frequently used by Sunday School teachers are not the one most preferred by Sunday School children. Moreover, the effectiveness of available teaching media is questionable since some teaching aids fail to provide real-life scenarios or illustrative examples of the application of the Bible message.

Based on concluded problem from previous findings, system requirements for developing the solution can be obtained. The teaching aid developed would take a form as interactive Bible storybook for the Parable of the Sower since this form of teaching aid is children's favorite. The solution must maintain children's attention through interactivity which parallel with the engagement. This approach applied to fight the distraction children faced along the lesson time. The Bible storybook could incorporate AR technology since it can help maintaining children's attention. To create more wow effects, we can create a new experience for the children by incorporate media rarely or never exposed to the children before.

Animation should be incorporate somehow on the solution since animation along with story book are among the media favored by the children. Furthermore, animation is one of the most suitable tools to facilitate learning methods for early childhood education [7].

Lastly, include a pedagogical agent character in the form of child-like characters that provide real-life scenarios and illustrative examples of the application of the lesson. Pedagogical agents are cartoon characters or animations designed to facilitate computer-based learning [8]. Pedagogical agents function as "virtual teachers" in education [9]. The use of well-designed animated characters can create an emotional impact that remains with the viewers, including the conveyed message [10].

3   Result and Discussion

3.1   Design and Implementation

Based on the requirement analysis, the solution built would be a story book of the Parable of the Sower. To gain attention from the children, the book would incorporate AI technology which will bring digital 2D animation to the physical story book. Another attention grabber incorporate with this media is created by offering new interactivity experience because this teaching aid will also be packaged in the form of a simple projector book, allowing children without smartphones to engage, enjoy and interested in reading this book even if they cannot access the AR technology.

The script for the interactive Bible storybook The Parable of the Sower is taken from Mark 4:3-4 and Mark 4:14-20 combined with sources from the Sunday School Teacher's Guide published by Gandum Mas and Suara Sekolah Minggu. The story is divided into two parts: the parable of the sower and the explanation of the meaning of the parable.

Each illustration in the book created using a flat design style to accommodate the animation videos that are popular among children. Furthermore, flat design as a simple design considered more appealing for children [11]. Additionally, a grain texture added to the animation to give more realistic visual. The storyboard design for the book divided into two versions: a black and white version for the projector and a colored version for the animation. The storyboard design starts with rough sketches that are traced and filled with black and white colors. Two font styles are used throughout the book: "Beachday" and "Children Sans." "Beachday" is used as the main font due to its bold size, which is suitable for emphasizing certain texts [12].

The book would be featuring three characters, they are the sower and two pedagogical agents in the form of a boy and a girl. These characters have facial features and proportions that are not overly detailed, giving them a cartoonish and non-realistic appearance. The depiction of the sower character is based on the characteristics mentioned in the Bible verse, Suara Sekolah Minggu book, Gandum Mas book, and other existing media.

The background of the story is a field. The depiction of the background is based on references from other media that have portrayed this story. Since the background is a field, warm tones such as yellow and orange are predominantly used, while cool tones like blue and green are also incorporated. The colors are used with a moderate level of saturation or muted colors to create a friendly and comfortable visual experience [13]. The overall appearance after the implementation of the story book can be seen in Fig.1.
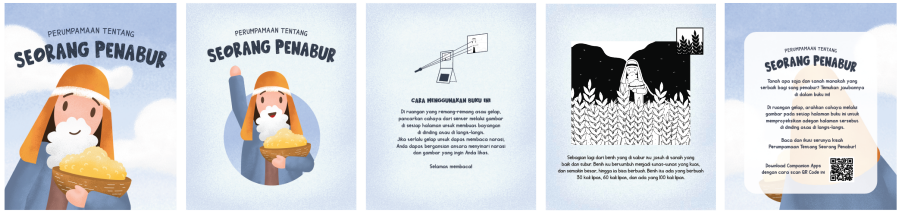
Fig. 1. Implementation of "the Parable of the Sower" Story Book

The companion app for the book consists of four pages, the main page, the settings page, the user guide page, and the page for accessing the AR camera. The app includes background music with a fun style, as well as chill background music to accompany the narrated script. The result of the companion app implementation can be seen in Fig.2.

Fig. 2. Implementation of "the Parable of the Sower" Companion App

The AR markers use the same assets as the storyboard images. However, each marker icon represents a highlight from a storyboard. The markers are designed in black and white to make the colored storyboard version exclusive and accessible only through the companion app.

3.2   Evaluation

The testing phase involves verification phase to ensure the solution which include the book and the companion app work properly as intended. Verification phase would be followed with validation phase to determine whether the created Bible storybook and companion app align with the initial objectives and address the research problem.

In verification process, the design printed physically in the form of a story book and developed digitally in the form of companion app. For the story book printing, it was

discovered to be challenging to locate printing service appropriate to print the projector part of the book with minimum noise. Another potential problem arise was the economic value of the book since the printing process more expensive than regular books. Having said that, the end result of the story book including the clarity of the visual image and text is good and similar with the design. The result of companion app development shows an appropriate app and all the feature work properly.

The validation phase following the verification is conducted with four Sunday School teachers and eight Sunday School children. In the validation process teacher will teach the story to the children using the story book developed and try all the available feature including the simple projection and AR. At the end of the session, both Sunday School teachers and children are interviewed to assess the effectiveness of the teaching aid. Figure 3 demonstrates the validation process conducted.

Fig. 3. Validation Process

The validation results indicated unanimous agreement among the Sunday School teachers that this storybook assisted them in teaching the Bible story "The Parable of the Sower" to the children. Additionally, the Sunday School children displayed interest in this teaching aid. Out of 8 children surveyed, 7 children or 87.5 percent actively expressed their interest in the teaching aid, and 6 of the respondents or 75 percents show their eagerness to read the book again. Children expressed their excitement due to AR and projector alike demeanor in this interactive book, and asked for more content. Thus it was proven that the adoption of AR and projector technology could enhance learning motivation since children eager to learn another content.

To ensure that the solution in the form of story book with the companion app give a better approach to solve the previous problem, benchmarking process using ARCS model conducted between the solution created and all available media used previously. The result of the benchmarking process can be viewed in Table 2.

Table 2. Benchmarking of the Solution and Previous Media

Media	Attention	Relevance	Confidence	Satisfaction
Free Bible Images Web	Minimum element to grab attention.	Depending on the teacher	Depending on the teacher	No evident.

Children's Bible Comic Animated Video	Animation can grab attention. No evident of factor to maintain the attention.	Pedagogy agent help share the life application to keep it relevant.	Quite simple to build confidence.	No evident.
Flannel Board Images	Minimum element to grab attention.	Depending on the teacher	Depending on the teacher	No evident.
Story Book "Parable of the Sower" and Companion App	Plenty element to grab attention: AR, Simple Projector. Dark room for the projector can help maintain the attention.	Pedagogy agent help share the life application to keep it relevant.	The simplicity of the media help learner build confidence to keep going.	Validation shows 75% satisfaction.

4   Conclusion

In conclusion, the solution created give a better opportunity to enhance children's motivation toward bible learning, in this case on the story the parable of the sower. Children's interestedness evident from the interview with Sunday School Teachers which state the children showed interest in this teaching aid and from the survey to the students which indicate children fondness toward the teaching aid, with 87.5 percents expressing interest in the teaching aid and 75 percents show interest to read the book again. More research can be conducted, however, to evaluate the solution with different type of bible material other than the parables, for example the history or the doctrinal lessons. It is worth to mention as well that the economic value of this solution is still considered high, thus it is important to find a way to overcome this.

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