

QR CODE-BASED BIBLE STORIES DEVELOPMENT: ACCESSING METAVERSE FOR CHILDREN BIBLE LEARNING ENHANCEMENT

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Abstract

This study aims to develop a learning prototype based on QR codes to enhance Bible learning in Sunday Schools, particularly by integrating mobile-accessible video, augmented reality, and metaverse-based Bible stories for children. Bible education, as a form of lifelong learning starting from early childhood, is traditionally delivered face-to-face in churches, schools, families, and Christian communities. However, engaging with the Bible is often perceived as tedious and abstract, posing a challenge for young learners. To address this, the study adopts the Research and Development (R&D) methodology outlined by Borg and Gall, which includes ten stages: need assessment, planning, early product development, initial testing, product revision, field testing, further revisions, operational testing, final revision, and implementation. Through this approach, the re-search identified the potential and challenges of using QR codes to support Bible learning. The need assessment stage gathered children's informational needs, guiding the development of a QR code-based prototype. This prototype allowed students to access rich multimedia content—videos, augmented reality, and metaverse experiences—using their mobile devices. The findings suggest that QR code-based Bible learning can increase motivation, facilitate access to Bible stories anytime and anywhere, and support teachers by providing engaging digital resources tailored to children's learning needs.

Keywords: metaverse, QR code-based learning, education, research and development

I. INTRODUCTION

Learning is a lifelong journey that holds significance for individuals of all ages. Through learning, people acquire the knowledge and skills needed to navigate the ever-changing environments [1]. In the context of Sunday School, studying the Bible in its formal and theoretical aspects and learning from conventional books is customary [2]. However, the subject of the Bible often lacks an element of enjoyment, as it is perceived as challenging for children and not particularly engaging. Children typically encounter Bible lessons in school alongside subjects like history, comics, storytelling, as Mogute explored [3]. Understanding the Bible can be a complex task for students, and despite

the best efforts of teachers to facilitate comprehension, it remains a challenging endeavor [4]. Conversely, Bible stories, often considered a complex subject, can be enjoyable and support learning when integrated with games. Implementing these strategies for incorporating Bible story videos and games into Sunday School activities is highly beneficial.

The rapid advancement of Information and Communication Technologies (ICT) has led to transformative changes in various aspects of our lives, including learning methods. Many ICT-based learning approaches have emerged, such as computer-assisted learning, e-learning, and distance education, all conveniently accessible through devices like tablets and smartphones [5]. Integrating computer-assisted learning into the educational process, mainly through multimedia, has been observed to enhance student creativity and innovation [6]. In this context, multimedia refers to the fusion of text, images, audio, and

video delivered through computers and digital devices [7]. By combining these multimedia elements—such as text with images, animations with audio, and text with video—learners can better understand the content. Vaughan also notes that multimedia transforms the learning dynamic from teacher-centered to student-centered, harnessing the capabilities of information technology to facilitate novel teaching methods that enhance content comprehension. With the ever-evolving landscape of mobile devices, the potential for designing mobile applications to facilitate learning has significantly expanded [8]. Utilizing mobile technologies empowers educators to contextualize science education within natural environments. Mobile phones have become increasingly prevalent in educational settings, at home, and various other locations, indicating the growing ubiquity of information technology. Children born into a tech-savvy world are adept at using mobile phones independently. However, this access also exposes them to content, such as movies and games, that may only sometimes align with their educational needs [9] [10]. Thus, educators are encouraged to explore innovative models of learning that captivate children's interests, combining play and education to create a more engaging and constructive learning experience.

II. STATE OF THE ART

A. Children Bible Learning

The Bible is a collection of books that many different authors wrote over an extended period. Still, many people do not put much effort into reading the Bible. Sometimes the problem is just laziness or a wrong set of priorities. As a result, the Bible can be a difficult book to understand. While its most important teachings are understandable by some people, there is much in the pages of Scripture that is not easy to grasp without some extra effort and help [4].

Bible education is lifelong education conducted from early childhood, usually face-to-face in schools, churches, families, and Christian communities [11]. But reading Bible is uninteresting and tedious since the Bible study objects are abstract. In addition, the book is presented without multimedia, virtual reality, and augmented reality technology is uninteresting to raise awareness of the younger generation, especially the Z Generation. [12] [13].

Reaching the millennial generation with the Bible involves understanding their unique preferences, values, and challenges [14]. Some ways to explore the Bible for the millennial generation are 1) Digital En-

gagement: Millennials are tech-savvy and prefer digital platforms. Create engaging digital content, such as mobile apps, websites, and social media, to make the Bible accessible and interactive. Offer daily devotionals, Bible study resources, and podcasts that can be easily accessed on smartphones, and 2) Visual and Interactive Content: Millennials are drawn to visually appealing and interactive content. Utilize multimedia elements like videos, infographics, augmented reality, metaverse, and interactive Bible study tools to make the Bible's teachings more engaging [15].

B. Metaverse

The term “metaverse” is a combination of the prefix “meta,” meaning “beyond,” and “universe,” resulting in a virtual space beyond our physical reality. This concept was first introduced in Neal Stephenson's 1992 novel *Snow Crash* [16]. In a virtual world or metaverse, users are represented as avatars with pseudonyms and can interact with a simulated natural environment. MultiUser Virtual Environments (MUEs) also exist, which allow multiple users to engage in daily activities similar to Massive Multiplayer Online Role-Playing Games (MMORPGs). As noted by Díaz [17], the virtual world is a fictional environment where users interact with each other through their avatars. The experience is not limited by time or space, creating a virtual metaphorical space that resembles real life.

The IT industry defines the metaverse as a three-dimensional virtual world, which is becoming increasingly relevant in today's society. The metaverse is essentially a virtual realm integrated with the natural world through the internet and the web [16]. The distinguishing feature of the metaverse is that it allows users to represent themselves as avatars in a three-dimensional virtual space [18]. The metaverse offers a unique opportunity to engage with the MZ generation in a way that aligns with their interests and habits. By creating a metaverse-based learning environment, educators can tap into the digital world that MZ is accustomed to and make learning more appealing and engaging for them [19]. Moreover, this technology can facilitate the development of skills that are becoming increasingly important in the modern workforce, such as virtual collaboration, digital communication, and technological literacy [13]. By integrating the metaverse into education, educators can prepare children for the rapidly changing digital landscape and equip them with the skills they need to succeed in Bible learning.

C. Millennials Generation

Youth profiles undergo transformation with time, and the community's approach to care and commitment to these evolving generations may diverge [20]. Interestingly, the teaching landscape in schools and universities has yet to see much adaptation to successive youth generations' shifting needs and characteristics [21]. How young individuals learn is intricately linked to their opportunities and their prospects for the future. This underscores the importance of recognizing the unique attributes of each generation, including their cognitive processes, their interactions with authority figures, the impact on families and communities, and the measures that can be taken to enhance their prospects and optimize their goals. Various concepts have been synthesized to offer diverse and comprehensive teaching strategies tailored to the learning dynamics of 21st-century students. Students of this era can be classified into three distinct generations: Generation X (1965-1985), Generation Y (1978-2000), also known as Millennials, and Generation Z (1995-2012) [13].

One intriguing approach to Bible learning, particularly for primary and middle school students, involves providing students with a web address they can access independently. In this setup, the teacher's role shifts towards that of a learning facilitator, empowering students to take ownership of their learning process. Smartphones, which have become an extension of young people's hands, are ubiquitous for accessing this digital learning platform [22]. While typing lengthy web addresses can be cumbersome and error-prone, the ease of accessing subject matter can be greatly simplified through QR codes. Students can effortlessly scan these codes to access the desired content, enhancing their engagement with the learning material.

D. QR Code

Utilizing QR codes offers several compelling advantages, with the primary benefit being the ease of providing students with web addresses, enabling greater independence in their learning. QR codes effectively mitigate the frustrations associated with manually entering web addresses, a task even seven-year-olds may find challenging in terms of precision. With QR codes, students can save time and eliminate the need for typing, ensuring accuracy from the first attempt. It is a rarity for students to input web addresses incorrectly on their smartphones, as noted by Park. [23].

Integrating computer-aided learning enriched with multimedia has become a pervasive educational approach in schools, and it seamlessly extends into the mobile environment. Children are growing up in a world where mobile phones are ubiquitous, granting them a natural proficiency in using these devices [24]. QR codes have surged in popularity, supplanting traditional barcodes in numerous applications due to their superior capabilities, such as increased data capacity and reduced size. With their versatility and enhancements, QR codes hold a distinct advantage over barcodes. They can represent the same volume of data while occupying only a fraction of the space compared to conventional barcodes.

The advantages of QR codes over traditional barcodes, as depicted in Table I, are as follows: (1) QR codes serve as a versatile gateway to online content, while barcodes cannot facilitate online content access [25]; (2) QR codes empower students to access an extensive array of information; (3) QR codes possess the capability to store significantly more information than barcodes, making them indispensable for various purposes; (4) Through QR codes, students can seamlessly access multimedia learning content, encompassing text, images, and videos; (5) Scanning a QR code redirects students to a wealth of information presented in text, images, or videos, whereas barcodes primarily convey machine-readable product information in a visual format [25]. A barcode typically includes details about the product type, size, manufacturer, product number, and country of origin [26]; (6) QR codes can be effortlessly scanned using a smartphone [24], while barcodes necessitate dedicated barcode reader machines for reading; (7) QR codes found in magazines, brochures, store shelves, and billboards can be

Table I. Advantages QR Code over Traditional Barcode

		QR code	Barcode
1	Connect to web page	Yes	No
2	Access information	Unlimited	Limited
3	Using purpose	Many	Product information
4	Access to multimedia object	Yes	No
5	Get product information	Yes	Yes
6	Device to scan	Mobile phone	Bar code reader
7	Distance where it is scanned	At a distance	Near

scanned using a smartphone's camera from a considerable distance. In contrast, barcodes are typically read at a close range [27].

III. RESEARCH METHOD

Research and Development (R&D) according to Borg and Gall [28] uses in this research, as can be seen in Figure 1, which consists of ten stages: (1) Need Assessment, (2) Plan, (3) Early Product Development, (4) First Test, (5) Revise of Early Product, (6) Field Test, (7) Revise Product, (8) Operational Test, (9) Revise Final Product, and (10) Implementation.

This research only involved seven stages, according to the requirements of the course material in Sunday School. These include: (1) Need Analyzing. In this stage the information of learning is collected and searching literature; (2) Planning. Now that researchers have the information needed, plan to build an application; (3) Early Product Development. After creating a plan, the next stage is to develop early product. Reviews and suggestions from colleagues in fields of education, visual communication design and computer science are needed; (4) First Test. The first reviews of experts are carried out after the product developed was fully related to education, visual communication design, and computer science. (5) Revise Early Product. After conducting the first test, the product is revised in the next stage according to the comments of respondents. (6) Field Testing. After revising the original product, a field test is conducted to evaluate the product. Students and teachers fill the questionnaires to give feedback. During the test stage, interviews will be conducted with several students and teachers; and (7) Revise Operational Product. After conducting field test, the next stage is revising the product based on the

feedback in Field Test.

The research subject is QR Code-based Bible stories, especially mobile games, and the location of the study is a Sunday School in Jakarta, Indonesia. Respondents consists of children who study in the school and experts in the fields of education, visual communication design and computer science.

A. Participants

The research is conducted from August 2022 to December 2022. The research subject is QR Code-based Bible stories, especially mobile games, and the location of the study is a Sunday School in Jakarta, Indonesia. Respondents consists of children who study in the school. In addition, three experts in Bible education, art, and information technology evaluated the application and gave suggestions.

B. Instrument and Procedures

Data collection is essential in research in all fields of study. Data collection aims to obtain quality evidence for analysis to obtain convincing and credible information. Accurate data is critical to maintaining research integrity, regardless of the field of study or quantitative or qualitative research approach [29]. Researchers will collect data in a preliminary survey, conduct testing, focus group discussions, and implementation, including observation.

C. Data Analysis

Data analysis and processing consist of data collection and preparation, intensive reading, coding, and data analysis. This process needs thorough preparation and analysis to ensure correct and in-sightful results. By following these five phases, researchers can provide the data is appropriately processed and analyzed, leading to more meaningful and thriving research findings. [30]. The methods include questionnaires, interviews, and observations, which support gathering comprehensive information from different perspectives. Using a qualitative approach ensures that researchers can gather infinite information from respondents to inform the application's development for improvement.

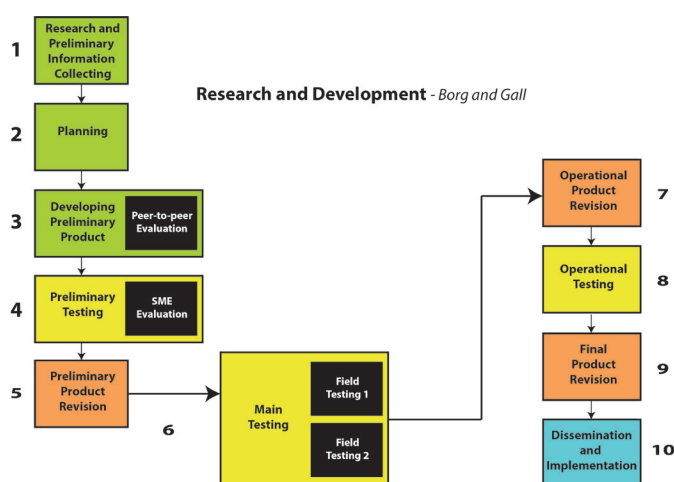


Figure 1 Model of Research and Development according to Borg and Gall [11]

IV. RESULT AND DISCUSION

A. Results

1. Need Assessment

The object of the research was QR code-based learning, and the research was conducted in a Sunday School in Jakarta with students and teachers as the respondents. Analyzing and processing data carried out with seven stages including need assessment, plan, early product development, first test, revise early product, field test and revise product [28].

The goal of this stage is to get information that students and teachers need to develop QR code-based learning. The research was conducted at a Sunday School in Jakarta, Indonesia, where children and teachers participated. Data of the research were collected from the instruments with details: (1) Open-ended questionnaires were used to find useful information to support the theory, information needed for system development, information about what kind of system to be developed; and (2) Open-ended interviews were used, then the respondents gave answers that was not restricted from a general point of view. In addition, extensive interviews were conducted to get data on the Bible learning. The following questionnaires were distributed to the respondents.

Questionnaires used in the first stage:

1. If you compare digital learning resources with book learning resources, can you explain which ones are interesting and easy to use?
2. How do you find other sources for learning Bible? There are many methods such as in classrooms, in groups, in libraries or on the internet.
3. People need interactive media through smartphones, play augmented reality, and play games, but some people still like reading books. How about you?
4. Which Bible topics are difficult for you to understand?
5. Which Bible topics are interested in you?

Data that was collected by students and teachers, were processed using software for qualitative data processing. As a result of answering the questions above, most respondents gave the following statement as follows.

Need assessment results:

1. Most of the respondents liked the internet and social media more than books and printed media.
2. Most respondents found Bible resources from internet.

3. Most of respondents used smartphones for everyday activities, getting information and enhancing their knowledge.
4. Almost all respondents agreed that Numbers would be the most difficult to understand.
5. Many respondents were fond of Moses and David.

Multi-step analysis and data processing involves collect data, prepare data, read intention, create code, display data, and analyze data [31].

The audience's goals and desires influence the style of the application. Based on research findings after discussions with students and teachers, QR code-based learning were described in Table 2, about users, modules consisting of several topics, and applications that explain how and what types of devices were used.

2. Plan

After the Need Assessment stage had been conducted, the next stage was Plan with creating design that consisted of instructional design, conceptual design and book design.

Instructional Design

This process included deciding the learning objectives, the best methods, and actions to guide the learning. Learning methods included classroom learning. Table 3 shows the instructional design.

At this stage, the learning organization was made as a master plan for providing instructions. This process involved choosing the optimal teaching method and creating practical subjects of learning, action-oriented and focused learning goals that guide learning. Possible teaching methods included classroom learning, as shown in Table 3.

Table 2. The concept of QR Code-based and competency learning

Object	Description
User	Sunday School students and teachers
Module	Module: - Topics of learning - Source of learning - Competency gain on learning - Process of learning - Evaluation of learning
QR code	QR code is printed on a book page that links to learning resource

Table 3. Instructional design

Object	Description
Course Id	CB-01
Title	Bible Story for Children
Duration	48 hours
Module	Module: 1. Introduction 2. Adam and Eve 3. Noah 4. Abraham 5. Moses 6. David 7. Jesus
CR code	QR code is printed on a book page that links to a video, augmented reality or metaverse
Description	During the learning in class, teacher asks children to access a video, augmented reality or metaverse by scanning a QR code that is printed in the book using their smartphones.

Conceptual Design

The first step was creating Course outline, as part of learning, that was the first display of a learning.

The learning was divided into three subjects as Course Outline, Course Plan, and Assignment. In Course Outline, user could find information about course title, duration of course, teacher identity, and name of teacher. Teacher could see the teaching schedule and entry the score of students, and download the instruction guide.

Learning resources must be accessed via a smart-phone as needed by the user [32]. The design of the learning course integrated into the design of QR codes. This concept was the concept of application development and must be considered in all aspects. Creating a design must be considered a simple and generic design. Design described application functionality and methods such as the relationship between learning objects, QR codes and learning source URLs, as can be seen in Figure 2. Functional design could reduce the possibility of implementation errors.

Book Design

The book design comprises three essential parts: front matter, primary matter, and back matter. The design of the front matter encompasses critical elements such as the French title, book title, copyright page, preface, and table of contents. The primary matter contains the central content of the book, delving into the subject matter. Finally, the back matter includes essential components like the index, word lists, and bibliography [33]. Figure 3 visually represents the book's design, serving as a guiding framework for developing instructional content to create a high-quality book.

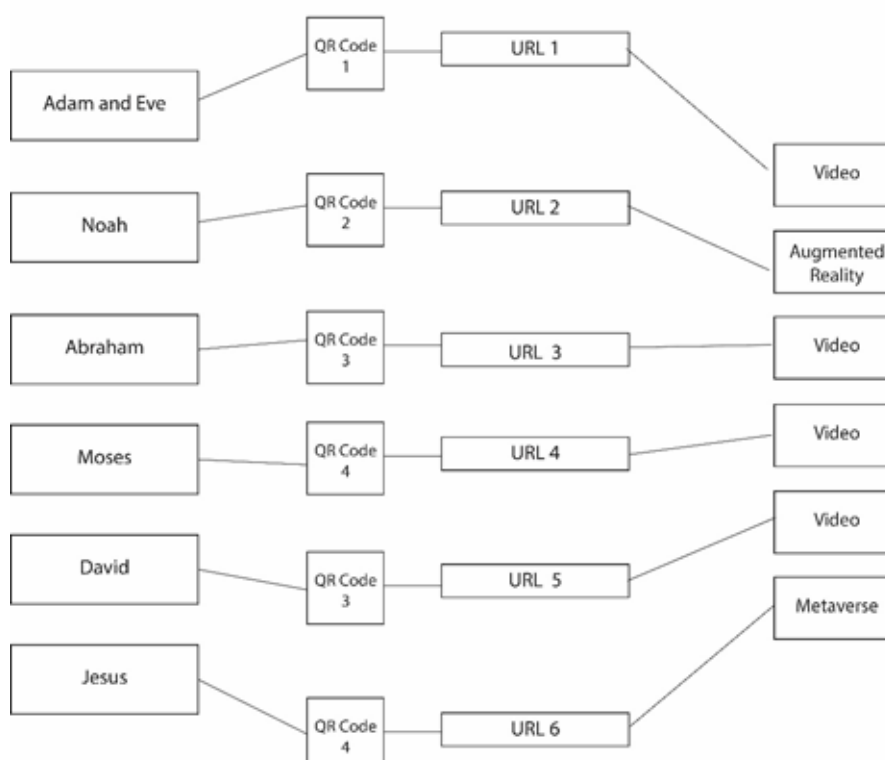


Figure 2 Relationship between the subjects, the QR code, URLs, and object

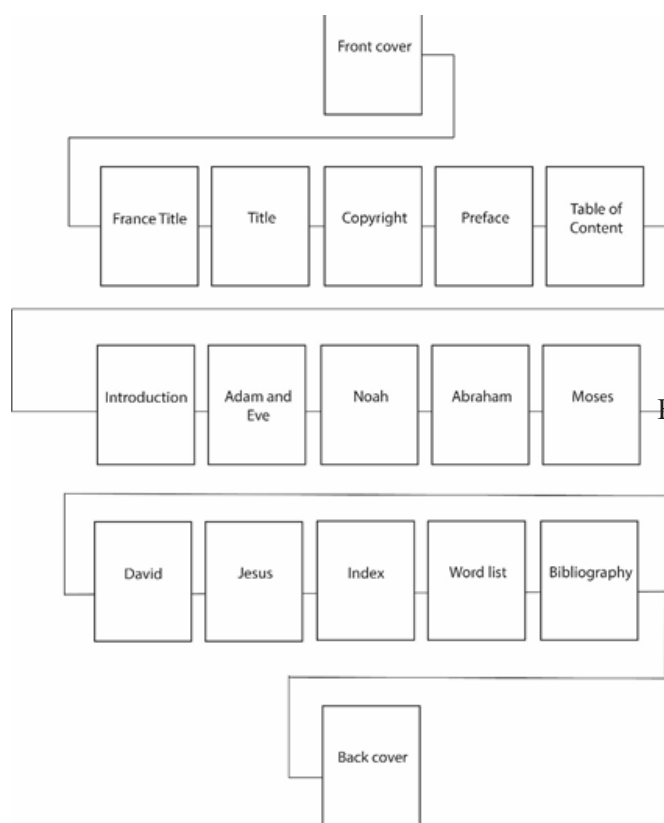


Figure 3 Book design of QR Code-based Bible Stories instructional design

Following the design phase, the subsequent stage involves development, including creating instructional content, learning resources, and integrating QR codes

B. Discussion

After the Plan stage had been conducted, the next stage was Early Product with creating book of Bible stories instruction, resource learning and qr code.

1. Development

The initial step involved the creation of a course outline, serving as the primary framework for the learning journey. This learning outline comprised three essential elements: the Course Outline, Course Plan, and Assignment details. Within the Course Outline, users could access vital information such as the course title, duration, teacher's identity, and the teacher's name. Conversely, teachers could utilize this section to view the teaching schedule, input student scores, and download instructional guides. Figure 4 illustrates the Course Plan, which further delineates competencies, topics, learning methods, durations, and recommended references for the course.

Resource Learning

In this stage, a diverse array of learning resources in various formats, including text, images, sounds, and

Bible Story for Children					
Duration:					
Course Plan					
No.	Competency	Topic	Learning Method	Duration	Learning Resource
	Introduction Adam and Eve Noah Abraham Moses David Jesus	Subtopic 1 ----- Subtopic n			
Reference					
Figure 4 Course plan					

Figure 4 Course plan

Figure 4 Course plan

animations, were either created or collected to enrich the learning experience. This study utilized Augmented reality and videos as an essential learning resource from YouTube. These resources, be they single or a combination of multimedia elements, conveyed information clearly and engagingly. At the same time, the metaverse application was developed by the authors. Children were empowered to access information and employ images, sounds, augmented reality, and metaverse applications to communicate what they had learned effectively. The proliferation of mobile devices has opened up new possibilities for individuals to access information via mobile phones [34].

QR Code

As depicted in Figure 2, QR codes offer numerous advantages over traditional bar codes [25][26]; Notably, QR codes can store up to one hundred times more information than standard horizontal bar codes. Moreover, from a marketing perspective, their unique and visually appealing appearance significantly enhances customers' engagement when employed in campaigns.

There are many websites where instructional designers can produce QR codes, and most of them are free. The researcher can then download it to print on the computer. Google search for "QR code makers" leads to countless results with different options. So this is just about choosing an option that works well [26]. QR code readers can be downloaded by anyone to smartphone, and most of them are free. This means that each student can scan the QR code with smartphone. Android users can use a QR code reader, and iPhone users can download the Quick Scan application.



14 Chapter 1



The story of Jesus

The story of Jesus, also known as the life of Jesus or the Gospel narrative, is a central and foundational element of Christianity. It is primarily documented in the New Testament of the Bible, particularly in the four Gospels: Matthew, Mark, Luke, and John. The story of Jesus is a narrative that recounts the life, teachings, and significant events in the life of Jesus Christ, who is regarded as the central figure and the Son of God in Christian belief.

Key elements of the story of Jesus include:

1. **Birth and Early Life:** The story begins with the birth of Jesus in Bethlehem, as recorded in the Gospels of Matthew and Luke. It includes the visitation of the Magi, the flight to Egypt to escape King Herod's order to kill male infants, and Jesus' upbringing in Nazareth.
2. **Ministry:** The story then follows Jesus as he begins his public ministry around the age of 30. This ministry involves teaching, performing miracles, and spreading the message of love, forgiveness, and the Kingdom of God. The Gospels contain numerous parables and teachings of Jesus.
3. **Crucifixion and Resurrection:** The climax of the story is Jesus' crucifixion, which is a central event in Christian theology. According to the Gospels, Jesus was crucified in Jerusalem and buried in the tomb. He is believed to have risen from the dead on the third day.

Figure 5 Relationship between the subject, the QR code, and the metaverse



Figure 6 Metaverse application the story of Jesus

2. Testing

In the innovative approach of utilizing QR codes for learning, printed QR codes were integrated into books. During the study, teachers instructed children to navigate to the specific page in the book where the QR code was printed. Children, following these instructions, scanned the QR code to gain access to the Bible video, augmented reality, and metaverse via a website, as depicted in Figure 5. Once the QR code had been successfully scanned, the game and the book were tested by students and teachers alike.

The Bible stories allowed children to access it at their convenience, from any location, enabling them to reinforce the QR Code-based Bible Stories concepts covered during class. A diverse range of Bible games could be created as learning resources, contributing

to enhanced learning outcomes by integrating mobile technologies into education. Figure 5 shows the relationship between the subject, the QR code, and the game. Figure 6 shows the metaverse application that can be accessed anytime and anywhere.

V. CONCLUSIONS

The results of this research are: (1) Need assessment in which children take information needs for QR code-based Bible stories prototypes. The initial investigation information serves as a guide for developing QR code-based Bible stories. (2) The development of QR code-based Bible stories was conducted and organized according to the Borg and Gall model; and (3) QR code-based learning supported teachers in the learning process (St. Papadakis & Kalogiannakis, 2017b), since it can access a video, augmented reality, and metaverse application, children can be motivated to learn Bible. The application as a learning resource can be accessed by children anytime and anywhere, increasing children's to learn the Bible. The learning model can be used for practice by teachers and educational technology developers for learning improvement.

Future research aims to continue the QR code-based learning stage in operational tests and revise the final product and implementation. In addition, the QR

code-based learning process must be able to run on any platform, product, and resolution of the mobile device.

REFERENCES

- [1] C. R. Semiawan, *Landasan Pembelajaran dalam Perkembangan Manusia*. Jakarta: Centre of Human Competency Development, 2007.
- [2] S. Papadakis, M. Kalogiannakis, and N. Zaranis, "Improving Mathematics Teaching in Kindergarten with Realistic Mathematical Education," *Early Child. Educ. J.*, vol. 45, no. 3, pp. 369–378, 2016.
- [3] M. Mogute, "Influence of Christian Mothers in Nurturing Spiritual Development of Children," *Int. J. Res. Educ. Soc. Sci. A Ref. Int. J. OIRC JOURNALS*. Mogute, M, vol. 1, no. 2, pp. 38–46, 2018, [Online]. Available: www.oircjournals.org38%7CPageMogute%0Awww.oircjournals.org.
- [4] J. Im and Y. Ham, "A Study on Theological Students' Perception of Artificial Intelligence and the Christian Educational Implications * 3) I . Introduction," vol. 61, pp. 233–262, 2020, doi: 10.17968/jcek.2020..61.008.
- [5] S. Papadakis, M. Kalogiannakis, and N. Zaranis, "Comparing tablets and PCs in teaching mathematics: An attempt to improve mathematics competence in early childhood education," *Presch. Prim. Educ.*, vol. 4, no. 2, pp. 241–253, 2016.
- [6] S. Papadakis, M. Kalogiannakis, and N. Zaranis, "The effectiveness of computer and tablet assisted intervention in early childhood students' understanding of numbers. An empirical study conducted in Greece," *Educ. Inf. Technol.*, vol. 23, no. 5, pp. 1849–1871, 2018.
- [7] T. Vaughan, *Multimedia Making It Work*. Yogyakarta: Andi Publisher, 2006.
- [8] Q. H. Mahmoud and A. Dyer, "Integrating BlackBerry Wireless Devices into Computer Programming and Literacy Courses," 2007.
- [9] J. Y. Lee, "A Study on Socio-technical System for Sustainability of the 4th Industrial Revolution: Machine Learning-based Analysis," *Int. J. Internet, Broadcast. Commun.*, vol. 12, no. 4, pp. 204–211, 2020, doi: 10.7236/IJIBC.2020.12.4.204.
- [10] A. Sulleyman, "The majority of young people sleep with their handset within arm's reach, and check it when they wake up briefly during the night." 2018, Accessed: May 16, 2018. [Online]. Available: <https://www.independent.co.uk/life-style/gadgets-and-tech/news/millennials-generation-z-smartphone-habits-apps-communication-real-life-a8008641.html>.
- [11] S. Silverthorne, *You Can Draw Bible Stories for Kids*. Eugene: Harvest House Publishers, 2014.
- [12] A. Silalahi, W. Hutabarat, S. Tarigan, and Y. Chandra, "Impact of Multimedia-Based Off-Line Learning on Student Motivation and Impact of Multimedia-Based Off-Line Learning on Student Motivation and Outcomes," *Asian J. Soc. Sci. Stud.*, vol. 3, no. May, pp. 1–11, 2020, doi: 10.20849/ajsss.v3i4.471.
- [13] R. Swanzen, "Facing the Generation Chasm: The Parenting and Teaching of Generation Y and Z," *Int. J. Child, Youth Fam. Stud.*, vol. 9, pp. 127–128, 2018, doi: 10.18357/ijcyfs92201818216T.
- [14] P. Phillips and R. S. Briggs, "The Bible as Augmented Reality : Beginning a Conversation . 1," vol. 1, no. May 2011, pp. 1–10, 2012.
- [15] L. Vera, R. Campos, G. Herrera, and C. Romero, "Computer graphics applications in the education process of people with learning difficulties," *Comput. Graph.*, vol. 31, no. 4, pp. 649–658, 2007, doi: 10.1016/j.cag.2007.03.003.
- [16] S. Kwang-heon, "Metaverse business model and ecosystem analysis," *Electron. Telecommun. Trends, Korea Electron. Telecommun. Res. Inst.*, vol. 36, no. 4, pp. 81–91, 2021.
- [17] M. Díaz, "Virtual World as a Complement to Hybrid and Mobile Learning," vol. 15, no. 22, pp. 267–274, 2020.
- [18] W. of F. Metaverse-Digital Earth, *Metaverse-Digital Earth, World of Floating*. Soul: Plan by Design Publishing, 2020.
- [19] J. Kim and J. Kim, "Advertising in the Metaverse : Research Agenda Advertising in the Metaverse : Research Agenda," in *Journal of Interactive Advertising*, 2021, vol. 21, no. 3, pp. 141–144, doi: 10.1080/15252019.2021.2001273.
- [20] R. M. Vieira and C. Tenreiro-Vieira, "Fostering Scientific Literacy and Critical Thinking in Elementary Science Education," *Int. J. Sci. Math. Educ.*, vol. 14, pp. 659–680, doi: <https://doi.org/10.1007/s10763-014-9605-2>.
- [21] J. Grajczonek, "Early Childhood Education," *J. Relig. Educ.*, vol. 59, no. 3, p. 3, 2011.
- [22] M. K. Chang and S. Law, "Factor structure for Young's Internet Addiction Test: A confirmatory study," *Hum. Behav.*, vol. 24, no. 6, pp. 2597–2619, 2008.
- [23] A. Park, "Cell-Phone Distracted Parenting Can Have Long-Term Consequences: Study." 2018, Accessed: Jul. 26, 2018. [Online]. Available: <http://time.com/4168688/cell-phone-distracted->

- parenting-can-have-long-term-consequences-study/.
- [24] H. Kinjal, "A Survey on QR Codes: in context of Research and Application," *Int. J. Emerg. Technol. Adv. Eng.*, vol. 4, no. 3, pp. 252–258, 2014, [Online]. Available: <https://pdfs.semanticscholar.org/b539/f689b62594e14cdc8ae641d0ad3c94502721.pdf>.
- [25] A. Ashish, "What's a QR Code And How Is It Different From A Barcode?" [Online]. Available: <https://www.scienceabc.com/innovation/whats-qr-code-how-its-different-from-barcode.html>.
- [26] B. Johnson, "Barcode Education Guide," *ID-Automation.com*. 2012, [Online]. Available: <https://www.idautomation.com/barcode-faq/barcode-educational-guide.pdf>.
- [27] "Definition of: QR code," *PC*. Accessed: Dec. 04, 2018. [Online]. Available: <https://www.pc-mag.com/encyclopedia/term/61424/qr-code>.
- [28] M. D. Gall, W. Borg, and J. P. Gall, *Educational Research: An Introduction*, 7th ed. Upper Saddle River, NJ: Pearson, 2003.
- [29] W. L. Neuman, *Social Research Methods: Qualitative and Quantitative Approaches*. 2011.
- [30] J. W. Creswell, *Research design: Qualitative, quantitative & mixed methods approaches*, 5th, Inter ed. Thousand Oaks, California: SAGE Publications, Inc, 2018.
- [31] J. W. Creswell, *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research*. Boston: Pearson, 2014.
- [32] M. Kalogiannakis, M. Ampartzaki, S. Papadakis, and E. Skaraki, "Teaching Natural Science Concepts to Young Children with Mobile Devices and Hands-on Activities. A Case Study.," *Int. J. Teach. Case Stud.*, vol. 9, no. 2, pp. 171–183, 2018.
- [33] Book Designer, "Understanding Book Layouts and Page Margins," *Book Designer*, 2021. <https://www.thebookdesigner.com/book-layouts-page-margins/>.
- [34] M. Neil, "What Is a QR code and How Does It Work? Technology Trends 14." 2014, Accessed: Feb. 02, 2019. [Online]. Available: <https://smallbiztrends.com/2015/05/what-is-a-qr-code.html%0A%0A>.