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# Media flash flipbook for an interactive and immersive learning experience

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**ABSTRACT**

Traditional learning, which focuses solely on lecture methods and texts, is now being replaced by more interactive and technology-based approaches. One increasingly popular approach is digital media-based learning, which emphasizes interactive and immersive learning experiences. Learning media must be packaged attractively so that students do not easily become bored with the material, one example being the Flash flipbook. The research method used in the preparation of this article is literature study (Library Research), which involves collecting data obtained through studies of existing literature relevant to the topic being examined by the researcher, falling under the category of qualitative research. Technological advancements have transformed the simplicity of flipbooks into something more engaging. The advantages of Flash flipbooks include the ability to incorporate files such as videos, moving images, or animations, which greatly assist in the learning process and help keep students engaged. Immersive learning can be found in Flash flipbook learning media, such as VR and AR. Flash flipbooks have been shown to enhance students' understanding, engagement, and motivation. The strengths of Flash flipbooks include the ease of presenting material in a concise and flexible manner.

## I. INTRODUCTION

Education is an important aspect of life for shaping quality Human Resources that are competitive and able to adapt to the increasingly advanced developments of the times [1]. Without the implementation of a good educational process, it is difficult for an individual to adjust and adapt to developments [2]. Education can develop rapidly thanks to an interactive learning process, where teachers and students are actively involved in discussions, sharing ideas, and utilizing various innovative methods and technologies that can enhance understanding, creativity, and the skills of learners [3].

The learning process is interactive, enjoyable, and challenging education that motivates students to participate actively and develop spontaneity, creativity, and independence in accordance with their talents, interests, and physical and psychological development [4]. To support the learning process based on government regulations, teachers are responsible for the design of the learning that is implemented to help students achieve competencies. Educators must make various efforts to educate students to acquire competencies. These efforts can be achieved by providing new innovations in the learning process. Innovations in the learning process occur through the use of appropriate strategies and methods for learning materials [2].

The characteristics of 21st-century learning demand student-centered learning. However, in reality, the learning process tends to be teacher-centered, which causes most students to become passive, lazy to learn, feel bored during the learning process, and have a poor understanding of the concepts taught by the teacher [6]. Therefore, teaching materials are needed for students and teachers. Teaching materials are a collection of systematically organized content to create a good learning environment for students [7]. The passive nature of students can be caused by the lack of media used by teachers to support the teaching and learning process; a student definitely needs media to support the material in the learning process, for example, books. So far, we know that books are generally thick and heavy, which reduces students' interest in reading learning materials. Through this, the utilization of technology-based learning media can be applied as much as possible in all subjects [7].

In the era of Industry 4.0, it demands that teachers and students possess skills, knowledge, and abilities in the fields of technology, media, and information, as well as lifelong learning and career skills. Based on this, innovation in learning materials based on information technology is absolutely necessary in the teaching of every subject. This relates to the use of appropriate and varied media in the learning process, both online and offline, to enhance learning motivation and reduce student passivity [3]. Along with the development of technology, learning media always undergoes innovations to create an engaging and enjoyable learning process, including the development of technology-based media. In the learning process, technology-based media helps students to obtain new information and knowledge that is not only sourced from books and other printed media but can also be supplemented with additional links that are beneficial when connected to the internet.

Traditional learning that focuses solely on lecture and text methods is now being replaced by more interactive and technology-based approaches. One of the increasingly popular approaches is digital media-based learning that prioritizes interactive and immersive learning experiences, such as those found in the use of flipbook media [8]. Flipbook is a learning medium that initially takes the form of an illustrated book that creates the illusion of movement when the pages are flipped. Learning media must be packaged attractively so that students do not easily get bored while studying a subject. One type of learning media in the form of printed media that has been developed into electronic media is the flipbook, which is then known as the Flash flipbook [8].

The Flash flipbook has advantages because it falls under the category of interactive multimedia, which can include components such as images, videos, and navigation, making its use more diverse yet still easy for users to understand. In addition, flash flipbook media is also more flexible because its display can be enlarged (zoom in) or reduced (zoom out), cost-effective, and provides more interesting learning variations, thus preventing boredom among students [9].

Along with the development of technology, Flash flipbooks have now transformed into multimedia-based digital Flash flipbooks that combine text, images, animations, sound, and video to create a more dynamic learning experience. In this form, Flash flipbooks not only present material in a more engaging way but also allow students to actively participate in learning through interactive

features provided, such as quizzes, navigation, and multimedia content that can be tailored to each student's needs [3]. Interactive learning in this context refers to the use of learning media that enables students to interact directly with the content. This aims to increase student engagement, help them understand the material better, and motivate them to be more active in the learning process. This interactive learning provides students with the opportunity to explore learning materials more deeply, respond to the content, and conduct self-evaluation [10].

Meanwhile, immersive learning, which has become the latest trend in education, focuses on a more in-depth learning experience by integrating advanced technologies such as Virtual Reality (VR) and Augmented Reality (AR). In the context of flipbook media, immersive learning can be realized by incorporating VR and AR elements that provide more realistic visual, audio, and even tactile experiences, making students feel as if they are within the material being studied [11]. This technology not only enriches the learning experience but also allows students to engage in simulations or real-world explorations that were previously difficult to achieve with conventional learning methods [12].

The integration of digital Flash flipbooks in interactive and immersive learning provides many advantages, including enhancing material comprehension, making it easier for students to access various types of learning content, and creating a more enjoyable and engaging learning environment. By utilizing this technology, the learning process is no longer monotonous and rigid, but becomes more flexible, in line with the times, and capable of meeting the individual needs of students. Therefore, the use of flipbook media in interactive and immersive learning becomes an effective solution in addressing the challenges of 21st-century education, which demands a more innovative, relevant, and efficient learning approach to prepare students for various global challenges [13].

## II. METHODS

The research method used in the preparation of this journal is the literature study method (Library Research), which involves the collection of data obtained through studies of existing literature that aligns with the topic to be examined by the researcher, falling under the category of qualitative research. The data collection method in this literature study is carried out by searching for and reading available written sources. Similarly, data and information are gathered by seeking knowledge or information from sources such as books, articles, and other materials relevant to the research object [2].

## III. RESULTS AND DISCUSSION

### 3.1. Multimedia Flash Flipbook as an Interactive Learning Experience

A flip book is a type of classic animation made from a stack of paper resembling a thick book, where each page depicts a process of something that eventually appears to move or animate. For example, if you want to show the process of a falling leaf, each page of the flip book depicts the gradual

descent of the leaf until it finally reaches the ground. After the images are completed, you flip it over and see the result [3]. The flip book was first introduced in the United States on May 16, 1882, by Van Hovenbargh and Elizabeth. Initially, flip books consisted of simple images stacked sequentially with a movement pattern. When the pages are flipped, the images will create the illusion of moving pictures [14].

In the 1900s, flip books were popularized by Cracker Jack, a company that included flip books as travel prizes. Other companies quickly followed suit, including breakfast cereal manufacturers, gum, cars, and snacks. The trend continued into the 1940s. In the 1960s, innovative marketers from Disney, Gillette, McDonald's, Post Cereals, Canada Cleaning, Ford, etc., created a creative trend by making interactive brochures and using gifts to promote their products. In the 1970s, this trend ended as interactive multimedia began to take the spotlight. After more than a century, the basic concept of the flip book has been engineered to create engaging and entertaining media [15].

Flippingbook means a book that flips. The name Flip Book is derived from a children's toy that contains a series of different images, which, when flipped from one page to another, appear to be moving [16]. A flip book is one of the classic animations made from a stack of paper resembling thick books, where each page depicts a process that eventually appears to move and be animated. Flip books are not always in the form of separate books but can appear as an additional feature in regular books or magazines, usually found in the corner of the pages. Essentially, a flip book is a primitive form of animation, but with the rapid development of information technology, the idea of a flip book has been adopted and used in the creation of e-books and e-magazines with characteristics that allow them to be opened and flipped through like regular magazines or books [17]. In the learning process, a teacher must be able to master and select appropriate learning media to be used in the teaching process. One of the learning media that is often seen is multimedia technology available through computer devices [18]. Technology in education includes two forms, namely software and hardware. In the process of independent learning, students are faced with many developments in multimedia-based learning media, one of which is the Flash flipbook [8].

The advancement of technology has transformed the simplicity of flip books, making them more engaging. Interactive multimedia that can be used in the learning process can vary, Flash flipbook is an interactive electronic book, the advantage of Flash flipbook is that it can contain files in the form of videos, moving images, or animations as well as sound, thus it will be very helpful in the learning process which can prevent students from getting bored during learning activities. Unlike other electronic books (e-books) that are only in the form of PDF files or documents containing text and static images [19]. In the process of creating a Flash Flipbook, there are several applications that can be used, including Kvisoft. Kvisoft is a Flip Book creation application that can include files such as videos, moving images or animations, as well as audio, and present them in the form of an electronic book.

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Flipbook has several advantages, including: 1) It can be used to deliver learning materials concisely, easily, and practically; 2) It can be used in any room, whether enclosed or open; 3) It is easy to carry anywhere (moveable); and 4) It can enhance student activity and interest in learning. The numerous advantages and benefits gained from the use of flipbook learning media in this educational activity prompt the researcher to further describe flipbook learning media in online learning activities. Flipbook learning media is one of the teaching materials presented in the form of an electronic book (e-book). Flipbook learning media can be developed by writing lesson material texts, accompanying them with interesting images and videos related to the material, adding engaging audio effects, creating concept maps, quizzes, material summaries, and practice questions [20].

The characteristics of the flipbook learning media to be used in the research are: (1) It provides a flipping experience that feels like truly opening a book due to the display and sound effects present in the flipbook learning media. (2) It can be combined with video files from any source, thus complementing the material in the form of text and images. (3) It can be combined with interesting animation files, making students more enthusiastic about using the flipbook learning media (SWF). (4) It includes a search facility, making it easier for students to find the material they are looking for. (5) It can also be combined with images and music, making the material in the flipbook learning media more complete [21]. According to Sunaryo Soenarto, learning media are all kinds of tools or equipment in any form that can be used by teachers, instructors, or trainers to assist and facilitate the learning process. The main purpose of using learning media is to ensure that the messages or information being communicated can be absorbed as much as possible by students as the recipients of the information [22]. Interactive multimedia comes from two words, namely multimedia and interactive. Multimedia is a combination of various media in the form of images, graphics, sound, video, animation, and others. The term interactive consists of two words, namely 'inter' and 'active'. Inter means between two or more parties involved in the process [23]. Active means not being silent, and by not being silent, it means responding. Based on that definition, it can be concluded that the word interactive means actively responding to the actions performed between the sender of the action and the receiver of the action. Interactive is a two-way or more communication between components of communication. Another opinion states that multimedia is considered interactive if it can follow the user's desires, display multimedia projects, and control what and when elements are delivered [10].

Interactive multimedia design must have control tools that can be used by the people who use it. These control tools are used to make it easier for users to operate the media. Based on the understanding of multimedia and interactivity, it can be concluded that interactive multimedia is a multimedia display designed by teachers, consisting of various media that are synergized to ensure the display fulfills the function of conveying messages and providing interactivity to its users [24]. The Multimedia Flash flipbook has elements that are combined and synergized to become an interactive multimedia. The elements are text, graphics, audio, video, and animation [25]. Text is a basic type of

data and uses the least storage space compared to other multimedia elements. Text in multimedia is an important element because it can convey information easily and meaningfully. Text can be combined with other media to convey information. Text elements, besides having the advantages mentioned above, also have disadvantages in their use, such as being less suitable as a medium for providing motivation and causing eye strain and other physical discomforts. In certain conditions, such as reading overly long and dense material on a computer screen, it can cause the user's eyes to become quickly fatigued [12]. However, in a Flash flipbook, teachers can present interactive learning by using reading texts with various fonts. This way, students no longer see a monotonous series of texts but rather more varied and engaging texts.


Figure 1. Cover Flash flipbook

The image above is an example of text fonts in a Flash flipbook that can be used by teachers as an interactive learning medium. The various text fonts and colors can foster a sense of enthusiasm for learning among students, making them less passive in their lessons. Graphics are a visual medium that serves the function of conveying a message from the source to the message recipient, where the message is expressed in symbols or visual communication symbols [26]. Multimedia Flash flipbooks also have graphic elements as one of the interactive learning components, as seen in the article "Flash flip book applications to measure the level of nationalism with quasi-experiment on primary school students." The conclusion of this article is that interactive Flash Flip Book applications can enhance students' understanding of history and national values, as well as foster a sense of nationalism among primary school students in Indonesia. Research shows that the use of multimedia learning tools such as Flash flipbooks is effective in engaging students and enhancing their knowledge of Indonesian culture and history [15].


Figure 2. Nusantara map

In this article, the learning of history and national values is presented in the form of a map of Indonesia, which also includes graphic elements that serve the function of conveying messages from the source to the message recipient, where the message is expressed in symbols or visual communication symbols [15]. Audio is defined as sound in digital form such as voice, music, narration, and so on. Audio-based media is a medium for conveying messages through the sense of hearing. The use of audio elements has advantages and disadvantages. The advantages of these elements include being suitable for use as a medium for providing motivation, delivering material that closely resembles the original state, such as the sound of an animal, and increasing student focus because they only need to listen without engaging in other activities [12]. The weakness of audio elements is that they require a large amount of storage space on the computer, as well as specific hardware and software. Based on the source of the sound, sounds can be classified into conversation, which is sound originating from people speaking, music, which is sound originating from musical instruments, and sound effects, which are sounds other than conversation and musical instruments, such as airplanes [14].

The Flash flipbook media also includes an Audio element as one of the interactive learning components, as discussed in the article "Development of Audio Flipbook Media as a Learning Tool for Reading Aloud in Second Grade Elementary School." This article discusses the development of audio-assisted flipbook learning media to train students' reading aloud skills based on a needs analysis. This development considers the principles of media suitability with learning objectives, learner characteristics, as well as efficiency, interactivity, and flexibility. The flipbook content uses literacy-based text that makes it easier for children to read, understand, and pronounce words. The reference is a child-friendly book organized in 12 stages based on the frequency of letters in the Indonesian language [27].


Figure 3. Content Display for Each Reading

This article concludes that the development of audio flipbook learning media to improve reading aloud skills in second-grade elementary school students is very valid and effective. This media received a feasibility percentage of 95.4% for the media aspect and 94.8% for the material aspect, as well as positive responses from students (87.3%) and teachers (94.2%). This research emphasizes the importance of using interactive digital media in education to enhance students' interest and reading skills. The recommendation for future research is to develop audio flipbooks to make them more engaging and varied [27].

The term video comes from Latin, specifically from the word vidi or visum, which means to see or to have the power of sight. Video is a technology for capturing, recording, processing, storing, transferring, and reconstructing sequences of still images by presenting scenes in motion electronically [12]. The Flash flipbook media also includes video elements as one of the interactive learning components, as mentioned in the article. This article discusses the development of STEM-PJBL (Science, Technology, Engineering, and Mathematics-Project-Based Learning) based chemistry learning materials with the help of instructional videos for redox and electrochemistry topics embedded in the Flash flipbook learning media [28].

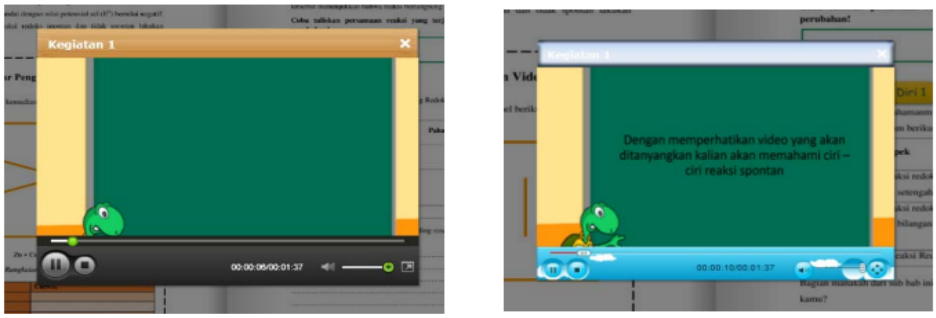


Figure 4. Video Material on Redox and Electrochemistry

Learning using videos in flipbook media is explained that learning materials in the flipbook display can be supplemented with educational videos, which can enhance students' learning outcomes and understanding in the learning process. The use of this flipbook can also help students become

proficient in using media, information technology, and communication (ICT) to meet the demands of 21st-century skills. The conclusion of this article is that the development of STEM-PJBL-based chemistry teaching materials with the aid of instructional videos for redox and electrochemistry topics results in highly valid and usable flipbook teaching materials, with a validation percentage reaching 92.78%. These teaching materials are effective in enhancing student understanding and meeting the feasibility standards set by the National Education Standards Agency (BSNP). Additionally, the readability of the teaching materials is rated very good by students, reaching 98.30%. The final product can serve as a learning resource and reference for high school students, and it emphasizes the importance of integrating technology and innovative teaching methods in chemistry education [28].

Another important part of multimedia is animation. Animation comes from the Latin word "animatio," which means soul, life, spirit. This element can explain abstract concepts in a concrete way and clearly demonstrate a procedural step, making difficult concepts easier to understand [12]. The Flash flipbook media also includes Animation as one of the interactive learning elements, as seen in the article "Flipbook (FP3SA) Development to Improve Self Protection." This article discusses the development and evaluation of an educational flipbook aimed at preventing child sexual abuse, specifically for sixth-grade elementary school students. The flipbook includes various multimedia elements such as text, audio, images, videos, and practice questions, as well as illustrated stories to enhance understanding. In addition, this article also highlights the importance of parental involvement and collaboration between parents, teachers, and children in efforts to prevent sexual abuse [17].

The comic animation element in the learning media in this article is implemented by including a comic that contains illustrated stories to attract children's attention and help them understand the material better. This comic is designed to facilitate the understanding of the flipbook's content related to the prevention of child sexual abuse. On this page, flipbook users are presented with a comic about "puberty" featuring Reno and his grandfather. This flipbook was created using the Pixton Comix comic-making application. In addition, it is also equipped with practice questions to determine how much readers understand about puberty after using this media. The conclusion of the learning using flipbook media in this article is that the flipbook can be designed to provide education on preventing child sexual abuse, equipped with various elements such as text, images, videos, audio, and practice questions. This media aims to enhance children's understanding of self-protection and related materials, and can be accessed through mobile devices and laptops [17].

### 3.2. Multimedia Flash Flipbook as an Immersive Learning Experience

Recently, the world has been abuzz with virtual-based learning, namely immersive learning. Virtual reality began to emerge in human life alongside the advent of digital computer technology several decades ago. Most people started to experience it when computer games first appeared, initially quite simple and displayed on a television screen or monitor, up to today where they can be displayed using head-mounted devices. There are even schools that do not have physical buildings, but with virtual

reality, it can feel real with classrooms, teachers, students, and other facilities just like a school, or the Ministry of Religious Affairs plans to conduct Hajj rituals in an immersive manner. Immersive learning involves the use of technology to create immersive digital or artificial environments [29]. Educators then 'bring' their students into the teaching topic, allowing them to experience and interact with the learning, rather than just reading or hearing about it. Immersive learning is a highly effective way for many learners to develop their knowledge and skills. This immersive learning provides digital content and artificial environments that accurately replicate real-life scenarios so that new skills and techniques can be learned and perfected. Through immersive learning, learners are not just passive observers; they become active participants who directly influence the outcomes of a learning process [13].

The digital era has brought about many significant changes in various aspects of life, one of which is immersive learning technology. Immersive learning technology is a technology that provides experiences similar to the real world without any boundaries between the virtual world and the real world. Currently, immersive learning technology is divided into three categories: Augmented Reality, Virtual Reality, and Mixed Reality (a combination of Augmented Reality and Virtual Reality) [30]. Immersive learning technology provides direct experiences that can help enhance understanding and memory. Technology is not only a learning tool but can also be utilized as an analytical tool that facilitates teaching and learning activities in educational environments. This technology often involves the use of devices such as virtual reality (VR) and augmented reality (AR) that create a full sensory experience, including visual, auditory, and sometimes tactile. As discussed in the book "Education and the Fourth Industrial Revolution," technologies like VR and AR have high potential to transform lives, making them increasingly engaging, effective, and relevant to the needs of each individual in the 21st century. The goal is to create experiences that are increasingly profound, realistic, immersive, and provide users with the possibility to engage more deeply with digital content than what can be achieved with traditional media. The effort to utilize immersive learning technology media is to adapt to the changes and developments occurring in society because technology is currently advancing rapidly and is interconnected with various fields, such as education [11].

Immersive learning can be found in Flash Flipbook learning media; Flipbooks can be used as immersive learning tools, depending on how the flipbook is designed and used. especially if it combines strong visual elements, engaging narratives, and interactive features. However, for a more immersive and realistic experience, other technologies such as Virtual Reality and Augmented Reality. Virtual Reality (VR) is a high-level technology that operates on computers, involving real-time simulations and interactions across various sensory channels, such as visual, auditory, and tactile. VR is usually displayed through a head-mounted screen, which is worn like glasses to view projections from the screen that show the results of the computer simulation. Immersive learning experiences using VR have a positive impact on students, where they can easily understand the material presented and their motivation towards learning activities also increases [31]. Virtual Reality has experienced rapid development from Ivan Sutherland's vision of the Ultimate Display, which he proposed in a journal in

1965, to Virtual Reality technology as we encounter in Google VR. According to Ivan Sutherland, if the purpose of a display is to serve as a window to a world located within a computer's memory, then the display must meet the needs of various senses. Therefore, the ultimate display must be a room that can be controlled by a computer. The term Virtual Reality itself was coined by Jaron Lanier in 1989, which ultimately spurred various research and efforts to design a machine to achieve that virtual reality. Then in 2012, a project called Oculus Rift was initiated, seeking funding for its research [32].

The use of VR in education is very useful and helps educators, as well as enhancing student engagement and learning motivation. Additionally, VR allows students to visualize material and plays a role in memory and student engagement. As in one of the articles titled "Development of Virtual Reality Media in Understanding Confucian Religious Places of Worship in Immersive Learning at Early Childhood Education," this article discusses the development of Virtual Reality (VR)-based learning media using Flipbook learning media to introduce Confucian places of worship to preschool children at TK Karya Yosef Pontianak. This research aims to assess the feasibility of VR-based learning tools using flipbook learning media and to enhance the immersive learning experience for children [33].

Figure 5. VR Klenteng

VR in flipbook learning media is implemented by presenting the VR Klenteng media in the form of a flipbook created with the Heyzine application. This aims to facilitate teachers or users in displaying VR during lessons. This VR media also includes voiceover to facilitate users in utilizing the VR media. The use of VR in the flipbook learning media in this article demonstrates that the developed virtual reality media can be used as a learning medium for introducing Confucian places of worship to early childhood. The Klenteng VR media created has undergone validation by several experts and received very good evaluations. The trial results show that this media is effective in enhancing children's knowledge about Confucian places of worship, as well as facilitating educators in conducting lessons in the digital era [33].

Education is a systematic process aimed at transferring knowledge, skills, and values to individuals or groups in a planned and structured manner. In the context of education, Augmented Reality (AR) technology is a technology that allows users to see and interact with the real world enriched or augmented with virtual elements, such as images, text, or 3D objects [30]. By using devices such as smartphones, tablets, or AR glasses, users can see their physical environment enriched with additional information that can enhance understanding and learning experiences. The use of AR in

education aims to create a more immersive and experience-oriented learning experience [34]. By leveraging AR's ability to combine the real world with virtual elements, education can be tailored to individual learning styles and provide a more enjoyable and relevant learning experience [35]. For example, in the article "Augmented Reality: Enhancing Student Interest in Learning through Interactive Media," this article discusses the development of interactive and immersive learning media based on Augmented Reality (AR) to increase student interest in accounting education, particularly in the subject of income statements. This research follows the 4D model (Define, Design, Develop, Disseminate) and includes interactive features such as financial transaction simulations, 3D visualization of income statements, and interactive quizzes embedded in the flipbook learning media [36].

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AR learning that uses flipbook learning media in this article begins with the initial display of the learning media, which includes a concept map of the income statement material, core and basic competencies, as well as learning objectives. In the flipbook, there is a barcode scan used to access interactive learning media and practice questions that will be used by the teacher for learning evaluation [36].

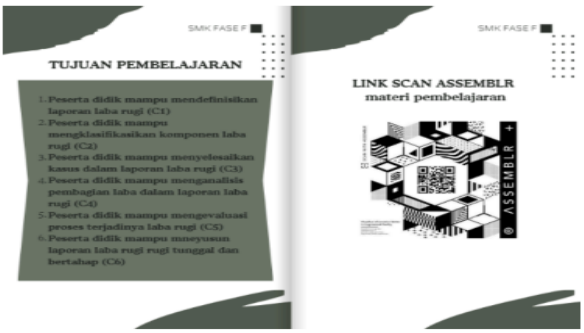


Figure 6. Learning Objectives and Learning Media Scan

Then continued with the learning material on the income statement presented in 3D format.

Figure 7. Display of Learning Material for the income statement presented in 3D format

The results of AR learning in flipbook learning media in this article show that immersive learning media based on Augmented Reality (AR) has been successfully developed using the 4D development model. The output produced includes a flipbook that contains concept maps of the material and barcode scans for learning media. This immersive learning media is designed to enhance student engagement and learning skills in a more interesting and effective way, as well as to create a more enjoyable and efficient learning experience for students [36].

## IV. CONCLUSION

The important role of education in shaping quality human resources that are adaptive to the changing times is crucial. A student-centered approach, utilizing technology-based learning media such as flash flipbooks, becomes an effective solution to address the traditional teacher-centered learning. Flash flipbooks, which combine elements of text, graphics, audio, video, and animation, have been proven to enhance students' understanding, engagement, and motivation. Originally a classic animation, flipbooks have evolved into interactive digital media in the form of flash flipbooks. By leveraging Virtual Reality (VR) and Augmented Reality (AR) technology, flash flipbooks provide a deeper and more immersive learning experience. Their advantages include the ease of presenting material in a

concise and flexible manner, as well as the ability to be used across various educational fields. In addition to improving material comprehension, flipbooks also support enjoyable learning that meets contemporary needs, while helping to develop 21st-century skills, moral values, and cultural awareness in education.

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