

First Submitted: 27 November 2023 / Accepted: 10 January 2024

DOI: <https://doi.org/10.61707/ij6sa1w36>

## AI-Enhanced Teaching Materials for Education: A Shift Towards Digitalization

S Syahrizal<sup>1</sup>, Fifi Yasmi<sup>2</sup>, Thomson Mary<sup>3</sup>

### Abstract

*Considering recent technological advances and the growing prevalence of digitalization, Islamic educational instruction and training will need to adopt a fresh perspective. The field of artificial intelligence offers a path for additional research that has the potential to have a favorable impact on both the efficiency and the development of competencies. This article describes the process followed to create multimedia-based teaching materials for Islamic religious education subjects used in Senior High Schools in West Sumatra. These materials were designed to assist Islamic education students with their academic pursuits. While developing this model, the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) services that Dick and Carry developed were utilized during the design phase. In Islamic education, students engage in hands-on learning by interacting with previously crafted designs and observing how an evaluation of the model is built through time. These findings, implications, and potential future research areas involving artificial intelligence in Islamic religious education and training at Indonesia's senior high school level will be discussed.*

**Keywords:** Artificial Intelligence, Education, Islamic Education, Students, Teaching Materials.

### INTRODUCTION

The increasing prevalence of digitalization and automation in educational settings can be attributed to advancements in information technology and their practical applications [1–3]. One of the areas of focus pertains to acquiring knowledge regarding the religious education observed within Islamic education. The utilization of artificial intelligence (AI) is expected to have a significant impact in the coming decades [4, 5], particularly in the realm of Islamic religious education. This trend is anticipated to persist, and measures will be implemented to oversee and promote the investigation of Islamic religious instruction. It is projected that in the foreseeable future, secondary school students who undertake the study of Islam will possess the ability to comprehend and communicate proficiently through the utilization of diverse decision-support systems facilitated by artificial intelligence [6–8]. In light of the evolving religious landscape in media AI, Islamic religious education students must reconsider their coursework approach [9–11]. The K-13 curriculum, including the KI/KD (core competencies/basic competencies), merdeka belajar curriculum, and TP/CP (learning objectives/learning achievements), necessitates that educators and other invested parties in the Islamic religious education curriculum contemplate the cultivation of digital proficiencies and AI-facilitated education to equip pupils for forthcoming challenges sufficiently. The present research offers a proof of concept for applying artificial intelligence in Islamic educational contexts to investigate diverse facets of religion.

In recent years, considerable advancements have been achieved in artificial intelligence (AI). Its use offers many tangible benefits to various industries, including education [12–16]. Recent advancements in computational powers, refinements in machine learning methodologies, increases in memory and processing capabilities, and other technological innovations have all led to the creation of novel applications in various disciplines [17–19]. While the history of artificial intelligence can be traced [20–22], recent advancements have given rise to novel applications of this technology [23–25]. The utilization of artificial intelligence (AI) is presently being implemented across a wide spectrum of industries, encompassing but not restricted to finance, healthcare, services, governance, and education [17–19, 26]. Implementing artificial intelligence (AI) within specific

---

<sup>1</sup> Universitas PGRI Sumatera Barat, Padang, Indonesia. E-mail: syahrizalnastran@gmail.com

<sup>2</sup> Universitas PGRI Sumatera Barat, Padang, Indonesia. E-mail: fifyasmi1980@gmail.com

<sup>3</sup> Universitas PGRI Sumatera Barat, Padang, Indonesia. E-mail: thomsonmary1980@gmail.com

application domains is based on the belief that it can enhance productivity and facilitate innovation processes associated with said productivity [27–31].

Artificial intelligence is used in such problems centered on the interplay between associated human variables and the function of AI in these scenarios. Certain scholars and experts have posited that the advent of artificial intelligence (AI) may necessitate a concomitant shift in the workforce, requiring a reevaluation of their roles and a need for retraining [32–35]. This phenomenon would correspond to the necessity of providing the workforce with additional training in anticipation of implementing artificial intelligence. This pattern is analogous to the necessity of providing workforce retraining programs in anticipation of the emergence of artificial intelligence. A limited number of scholars and professionals proposed the concept. The underlying premise of artificial intelligence (AI) and its potential applications is that it will augment human performance [36–38].

The issue of individual understanding and proficiency in utilizing available technology, particularly in AI literacy, has surfaced as a key consideration in implementing AI within educational settings [37, 39]. The phrase pertains to competencies that empower individuals to utilize artificial intelligence (AI) as a digital instrument in domestic and professional settings. The authors limit a collection of proficiencies (such as human roles, data literacy, ethics, etc.) and guiding principles (such as critical thinking, social interaction, minimal barriers to entry, etc.) to facilitate AI development centered around the learner. This approach is intended to be useful for both developers and educators. This action enhances the educational experience of the individual acquiring knowledge. Among other initiatives, promoting AI literacy is consistent with efforts to enhance workplace technology and prepare the upcoming workforce. This is consistent with the proposed actions. Furthermore, the research results of [27] suggest a symbiotic relationship between technological advancements and educational opportunities. Therefore, integrating AI literacy into the educational system is necessary to facilitate the adoption of AI technology. Moreover, the progress in AI literacy can be utilized to influence the desired development of technology in diverse domains. Therefore, acquiring knowledge about AI is deemed essential for enhancing the education system.

Implementing AI technology primarily aims to improve the educational and training programs' learning outcomes. The utilization of artificial intelligence results in enhanced processing capacity and the dissemination of customized content that caters specifically to the unique needs of each student. The integration of artificial intelligence in educational institutions is closely linked to the advancement of AI technology in general [40, 41]. Numerous research endeavors have indicated that integrating artificial intelligence in educational settings can enhance student engagement, minimize redundant tasks, optimize individualized instructional materials, and detect newly surfaced areas of learning deficiency [42]. According to the author of the cited work, integrating artificial intelligence (AI) within the educational system necessitates the creation of models that cater to the academic discipline, the learner, and the subject matter. The utilization of AI in the educational setting offers the advantage of selecting pertinent content from the domain model based on the learner's requirements (model) and monitoring the interactions between the learner and the intermediaries (pedagogical model) [43–45]. The utilization of Artificial Intelligence (AI) in educational environments has the potential to provide customized content that caters to the unique requirements of individual learners.

Sobirin (2015) conducted a study entitled "Development of M-learning Applications as an Alternative Media for National Examination Preparation for Senior High School (SMA) Students," addressing the topic. Furthermore, the software applications designed to aid in preparation for national examinations have undergone rigorous quality assessments concerning their functionality, portability, correctness, and usability and have demonstrated successful outcomes. In 2015, a study was published by Sari [47] titled "Android-based mobile learning development using Adobe Flash CS6 in the subject of History of Tiger Cave Site Material in Class X of SMA Negeri 1 Tanjung Raja." The research was carried out at TKJ SMK Hidayah Semarang. The study was conducted at TKJ SMK Hidayah, located in the urban area of Semarang, within the Indonesian archipelago. The study's testing phase findings indicate that M-learning based on Android is a valuable instrument that can be employed in the learning process and potentially enhance student learning achievements.

The findings were based on the results of the study. Rahayu & Kuswanto (2021) and Anggara et al., (2023) conducted the research presented in this work.

The study was titled "The Effectiveness of the Use of the Android-Based Carom Games Comic Integrated to Discovery Learning in Improving Critical Thinking and Mathematical Representation Abilities." The study was carried out on students in the tenth grade. In 2017, a study was conducted to create M-learning-based educational materials for the Android platform. The researchers achieved normalized gain scores ranging from 0.2 to 0.6, indicating the feasibility of the application. In 2016, Christensen & Knezek[48] conducted a study titled "Relationship of M-learning Readiness to Teacher Proficiency in Classroom Technology Integration." The article was published in the peer-reviewed Educational Technology & Society academic journal. There was a certain degree of association between it and M-Learning. The research results show that mobile learning (m-learning) is highly prepared in diverse criteria, including opportunities, advantages, user preferences, and external factors. This inference can be drawn based on the outcomes of the research.

Artificial intelligence (AI) integration into educational technology has been exemplified through CD media and online applications. This holds particularly true concerning the instructional resources employed in high school Islamic religious education courses delivered globally. Previous research studies have revealed the insufficiency of employing diverse media forms in multiple MGMP sessions in Indonesia. Mariam[49] asserts this holds particularly true in interactive CD-based learning materials. Research has shown that incorporating CD program material into learning can positively impact student engagement and academic achievement. Individuals who confirmed this discovery's accuracy have employed an interactive CD learning platform, as Yuverza et al[50] reported. The excerpt above highlights the absence of an educator in educational media, specifically in the pedagogical resources employed for high school-level Islamic studies. Consistent with this, a study conducted at Senior High Schools (SMA) located in the province of West Sumatra exposed that most instructors had not utilized the latest technological advancements to create more engaging learning resources or instructional materials. One of the available options is using an AI-based approach in conjunction with interactive CD learning media technology. This study aims to develop instructional materials for Islamic religious education subjects in Senior High Schools located in West Sumatra. The multimedia resources will be disseminated through interactive Compact Disks (CDs) that utilize Artificial Intelligence (AI) technology. These CDs will be made available for purchase on desktop workstations.

## **METHOD**

The current study is classified as development research. The term in question pertains to a methodology that can be employed to either create a novel product or refine an extant product so that it can be duly accounted for [51]. The study is being conducted to create a novel product. Developmental research, commonly called R&D, refers to creating and verifying educational products [52]. The procedures encompassed in the production of the product entail a thorough examination of the relevant research findings, product development, product testing, and product modification to rectify any identified defects during the testing phase [53–55]. The process is iterated in rigorous research and development initiatives until the test data set confirms that the product meets the specified behavioral objectives. Before that point in time, the product did not meet the criteria for being deemed successful.

The ADDIE model is being utilized to formulate a study design for the progression of this project. The ADDIE paradigm is a systematic learning methodology that employs five development phases: analysis, design, development, implementation, and evaluation. The following is the sequential arrangement of the stages involved in the development process. The process of carrying out investigative inquiry is commonly known as research and development, or R&D, and follows the ADDIE model, which encompasses Analysis, Design, Development, Implementation, and Evaluation. Proceed incrementally, with the initial step being the one mentioned below: The instructional design process comprises five stages, namely Analysis, Design, Development, Implementation, and Evaluation. The analysis involves scrutinizing the course content, students, and learning materials. Design involves outlining and planning the material. Development involves creating interactive multimedia teaching materials in the form of interactive CDs and subjecting them to expert validation. Implementation involves conducting interactive CD trials to gauge the level of interest. Lastly,

Evaluation involves assessing the implementation of interactive CDs. Bernardez[56] presents an instance of the ADDIE model developed by Dick and Carey, which can be observed in its complete form. Educational institutions located in West Sumatra will be involved in every stage of the inquiry process [57]. The advancement of scholarly inquiry can be divided into distinct phases, which are enumerated as follows:

#### **A. Analysis**

The main aim of this undertaking is to examine the necessary conditions that must be met to create novel and relevant pedagogical materials, along with the significance of such an endeavor. In addition, as a protocol component, the educator will be required to address inquiries about challenges in acquiring knowledge, the accessibility of resources, and the instructor's proficiency in utilizing instructional materials.

#### **B. Design**

At this phase, a prototype of a set of multimedia instructional tools will be built for use in the secondary school classroom to instruct students on topics connected to PENDIDIKAN AGAMA ISLAM. During this study, the only students in the eleventh grade allowed to create multimedia instructional resources were those enrolled in the odd semester. As a direct consequence of this, the design comes fully equipped with the objectives that are planned to be achieved.

#### **C. Development**

In this phase, the learning materials were created based on the predetermined criteria established in the design stage, specifically regarding their practicality, convenience, aesthetic appeal, and usefulness. This action was taken to use the educational resources in the following phases. This phase assessed the potential applications of diverse educational media formats.

#### **D. Implementation**

The structure of the educational materials that have been designed will be applied to the conditions that will be present during the implementation phase. The subject matter is introduced via a wide variety of kinds of multimedia. An initial evaluation is carried out immediately following the successful completion of the implementation to gather feedback for use in later implementations.

#### **E. Assessment**

The purpose of the evaluation is to determine the extent to which the students have absorbed the knowledge that they have acquired. Therefore, formative and summative evaluations were both components of the overall evaluation process that was carried out.

### **RESULT**

The ADDIE model will be utilized to construct a study design for the advancement of this project. This process can be undertaken to generate a novel product or to enhance an already existing one, thereby rendering it marketable. These objectives can be achieved by implementing this approach. The ADDIE model is a systematic approach to learning that employs a series of development stages, including analysis, design, development, implementation, and evaluation, to guide its creation. The stages above encompass the following: analysis, design, development, implementation, and evaluation. Upon implementation of the model, it was observed that those above accurately depict the prevalent issues within the subject matter under investigation. One primary obstacle educators encounter the effective implementation of the K-13 curriculum. Specifically, educators encounter difficulties in comprehending Islamic religious education subjects and selecting suitable learning strategies.

Islamic religious education adopts a conceptual approach whereby attaining its objectives necessitates the manifestation of deep spirituality and faith. Islam is a religion that places great emphasis on the correlation between faith and spirituality. Thus, spiritual intelligence is being developed and desired, leading to the emergence of exceptional values in students. Islamic religious education is expected to be completed successfully due to its educational value and inclusion of various objectives, resources, practices, and

procedures. Secondly, with greater precision, the challenges that the children are presently encountering in their daily lives. The level of enthusiasm among students towards the diverse topics encompassed in Islamic religious education is low. Some individuals perceive that the process of acquiring Islamic religious education can be arduous due to instructors' predominant use of lecturing as a teaching method. This is the underlying reason for the problem. The challenge of selecting an appropriate instructional approach arises due to the limited exposure of educators, especially those who are advanced in age, to technology-based teaching aids.

Consequently, they tend to rely on traditional media in their daily teaching practices. Including captivating content in textbooks is likely to enhance students' engagement and motivation toward reading and studying, thereby emphasizing the significance of the presentation of educational resources. Textbooks incorporating captivating elements will likely pique students' interest and motivate them to read and study. However, the presence of unforeseen information within a learning medium, even those considered ordinary, such as textbooks, cannot be assured. Therefore, many educators design their instructional strategies and resources with a singular purpose.

The main aim of the proposed solution is to create an interactive learning tool in the form of a CD, which utilizes a simplistic AI image, to facilitate the acquisition of Islamic religious education among eleventh-grade high school students. The intended demographic for this CD comprises individuals inclined towards acquiring knowledge about the Islamic faith and its principles, particularly students. "Optical storage" refers to devices that utilize lasers to read and write data. Compact disks (CDs) are an instance of this type of storage. Initially, the act of engaging in musical activities was predominantly facilitated through the utilization of compact discs. However, in the latter half of the 1980s, individuals began using compact discs to store data on their computers. Consequently, it is imperative to establish a linkage between compact disks and specialized artificial intelligence applications that leverage data from servers distributed globally to acquire the essential information necessary for simulating artificial intelligence systems, such as computer systems capable of executing tasks that conventionally necessitate human intelligence. Furthermore, acquiring requisite data is imperative for emulating artificial intelligence systems, encompassing computer systems that can execute tasks that conventionally necessitate human intelligence.

Acquiring proficiency in these software applications and storing them on a compact disc can potentially enhance the efficiency of academic operations and facilitate a deeper comprehension of identity and the environment. This objective can be achieved by enhancing the efficiency of the educational system and promoting environmental sustainability. There are numerous options available. One of the skills required is proficiency in programming languages such as Java and JavaScript. Using Java can yield advantages in advancing artificial intelligence (AI) and machine learning (ML). This is a matter that warrants consideration. In artificial intelligence, search algorithms, artificial neural networks, and genetic programming play a crucial role and make valuable contributions to the discipline. JavaScript is a programming language that is lightweight, interpreted, high-level, and open-source. It is commonly utilized on the client side of applications. It is employed in the process of creating web applications. In website development, using Javascript with Node.js can be a highly effective language due to its access to the complete feature stack. JavaScript is a dynamically interpreted programming language that lacks static typing.

The preceding endeavors encompassed an analysis aimed at identifying various artificial intelligence (AI) applications that could be employed to generate interactive educational encounters using the compact disk (CD) in question. Upon completion of the application study, an interactive learning design was developed and stored on a compact disk (CD). The developmental phase follows the analysis phase. This phase follows the developmental stage. The ensuing step involves the creation of interactive instructional models that will be stored on compact discs (CDs). Subsequently, an analysis will be conducted to evaluate the CDs' efficacy.

### **Conduct a Needs Analysis**

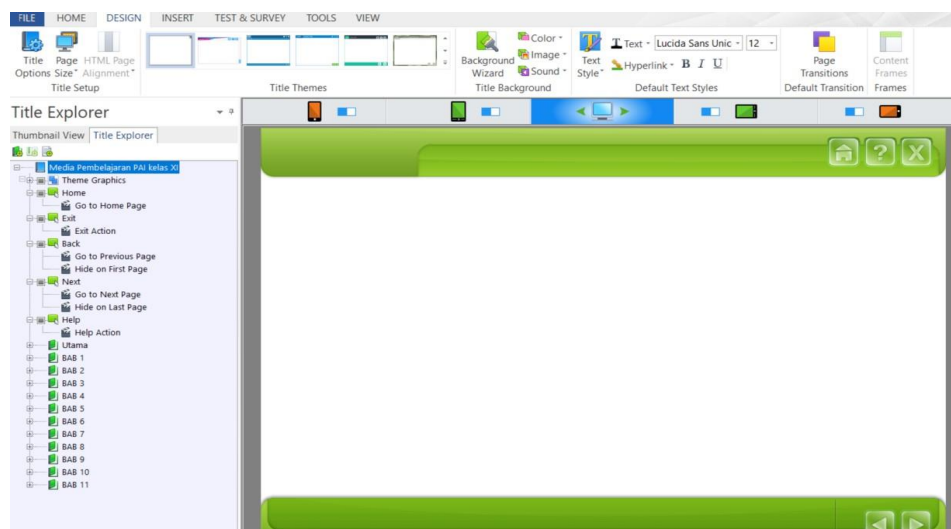
Setiyowati et al. (2020) conducted a study that revealed that various forms of media, such as audio, visual, audiovisual, and multimedia, can be effectively employed. The study examined the application of interactive CD media in the context of Islamic religious education. The initial phase of the investigation was undertaken. The present study employed the Google search engine to identify interactive CD media appropriate for use in

the Islamic religious education course for the eleventh grade during the odd semester. As a result, there is currently a lack of a comprehensive interactive CD that can be utilized as a frame of reference while developing educational resources. The availability of educational materials in discrete units, as exemplified by the resources provided in the following hyperlink (<https://blogpendidikan.agama.islamdepok.wordpress.com/bahan-ajar-pendidikan-agama-islam-sma-kelas-xi-semester-1/>), is a crucial aspect of accessibility in education. However, the availability of this resource is restricted solely to the PowerPoint file format. Consistent with the discourse on instructional materials, they must facilitate the learning process to achieve proficiency in attaining learning objectives [59]. The present study aims to incorporate an interactive multimedia learning approach based on CD technology. Scholars will evaluate extant interactive CD instructional resources as a component of this approach. It has been brought to our attention that comprehensive interactive CD-based educational courses about Islamic theology are limited, specifically for the odd semesters of class XI. Furthermore, the interactive instructional resources based on CDs have been examined about their utilization in response to student needs.

## Performing Model Design

The subsequent phase of the procedure entails the scholars devising interactive CD media. Utilizing the analyzed resources, the researcher intends to develop Islamic religious education instructional materials in CDs. This will be achieved by crafting narrative storyboards and designing interactive CDs that engage students effectively. The distribution of these materials will be in the format of compact discs. Like the media, the design endeavors to address the challenges. Elvarita et al. (2020) study suggests that the interactive CD medium can be customized to suit the needs of students and the teaching methodologies educators utilize. The document elucidates the interactive CD design for Islamic religious education, formulated due to focus group discussions involving scholars and experts.

- 1) The Lectora Inspire Application, which required payment, was utilized to produce a multimedia design that was interactive and intended for CD media. Trivantis vendors developed the application in question, and it is available for download at no cost at: <https://bit.ly/lectra18pendidikan.agama.Islam>.
- 2) The following actions constitute the initial stages of the design process:
  - a. The construction of a framework. The creation of a framework begins with the creation of buttons or buttons such as "home," "exit," "next," "previous," and "help" that will direct users through the process of carrying out operations within this application. The figure that shows it can be found below.



**Figure 1.** The construction of a framework

b. Main Menu Creation. The following pages were included in constructing this Main Menu: The Login Page, the Home Page, the Creator Profile Page, the Basic Competency Page, the Chapter Collection Page, and the Instructions Page. The image can be seen down below.

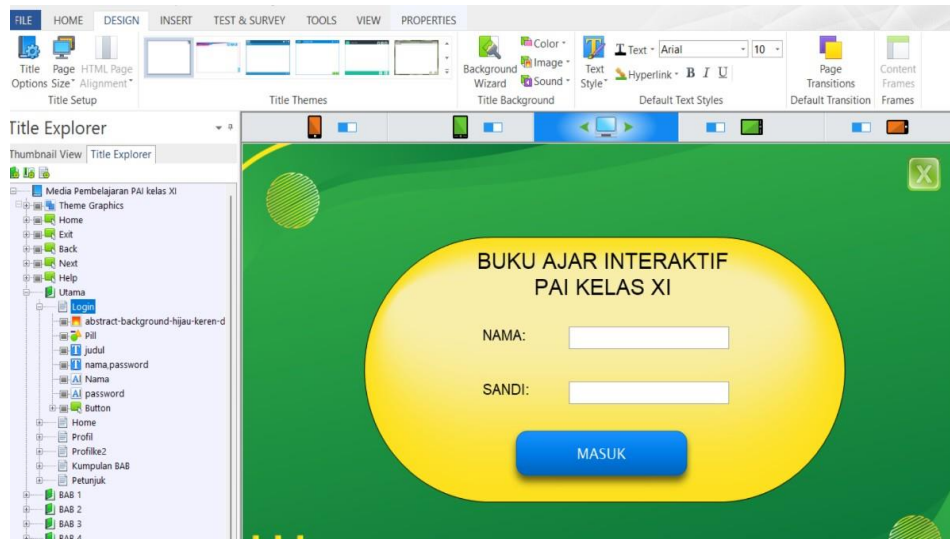


Figure 2. The Login Page

As depicted in figure 2, students and teachers must input their respective information into the designated login page to utilize a particular service. This approach will be employed to enter a system that houses login credentials. The current login page offers multiple methods for user authentication, including email addresses and mobile phone numbers, as well as integration with social media platforms. The system employed by the institution employs a simple approach to streamline the login procedure for educators and learners, with the school furnishing the pupils with their respective usernames and passwords. Subsequently, a fresh password may be established via the user's electronic mail account. The initial stage in creating an identity that can be utilized to obtain entry into the system involves logging in, which may require considerable time. Upon accessing a system, the user must provide accurate and error-free input for username and password fields. This is because the username and password are inherently interconnected and cannot be dissociated from each other.

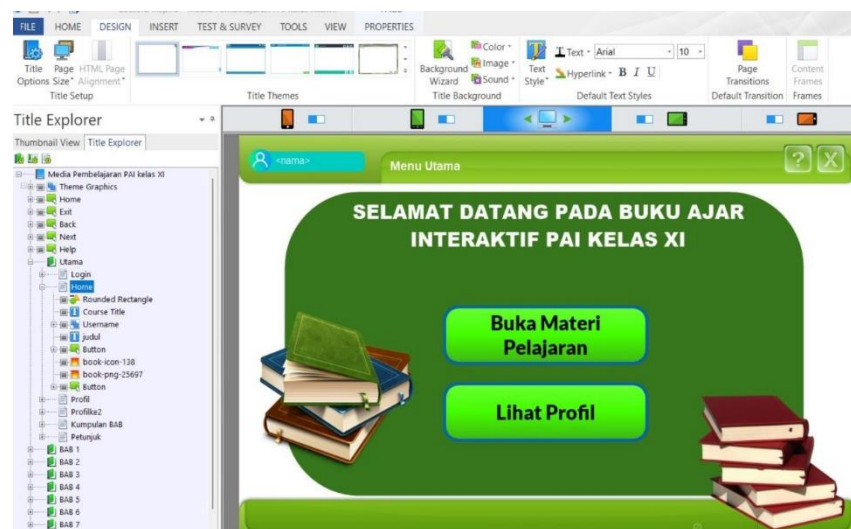


Figure 3. The Home Page



Upon successful login, users will be directed to the system's homepage. The homepage, alternatively referred to as the start page or home page, is the primary entry point for users to access any files or materials stored within the system. The website's homepage is strategically designed to serve as the primary landing page for visitors. Consequently, the construction's significance is greatly influenced by its role. This task aims to enhance the visual aesthetics of the learning environment, which can benefit educators and learners.

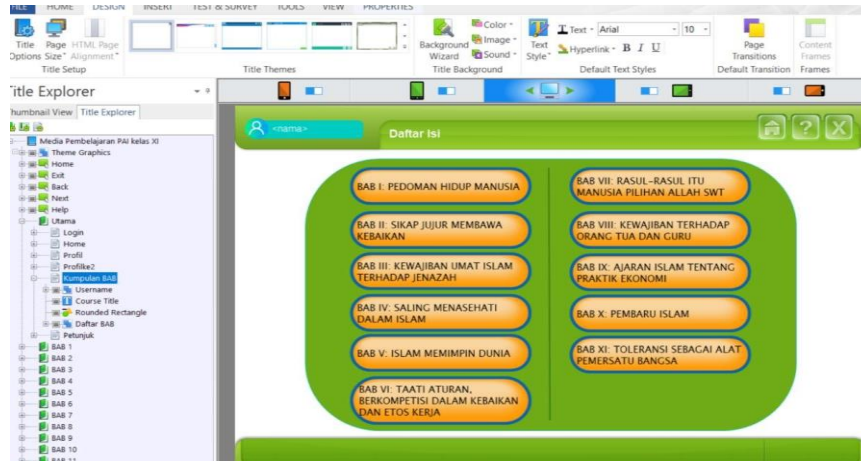


Figure 4. The Chapter Collection Page

Furthermore, this webpage serves as a navigational tool to access menus and other pages that offer essential resources for acquiring knowledge on Islamic religious education. The data can be located on alternative sections of this webpage. This phenomenon is observable in the figure presented below. The homepage of this system exhibits a range of educational resources, profiles of instructors, subject matter profiles, and material profiles about Islamic religious education materials intended for dissemination. The present text alludes to different sections that are available to the users in the system. In addition, the chapters will be made available to users. When formulating this material, it is reasonable to assume that every chapter will function as a distinct entity for knowledge dissemination. The sections within the chapters have been structured for the organization. The organization of pages is determined by the instructional content and the incorporation of artificial intelligence to facilitate students' comprehension and fulfillment of educational objectives. This entails grouping pages into chapters and parts. In addition, it encompasses the provision of instructional materials and the utilization of educational resources by individuals. The incorporation of accessibility features within the chapters of a learning medium is intended to guarantee unimpeded access to the content contained therein for all users. This phenomenon is observable in the figure presented below.

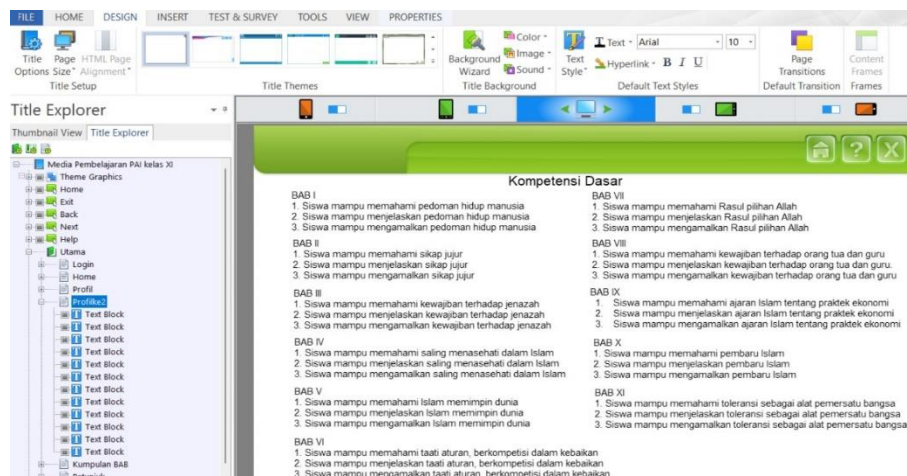


Figure 5. The Basic Competency Page



Apart from the Home Page, Login Page, Basic Competency Page, Chapter Collection Page, and Instructions Page, an additional Chapter Collection Page exists. The present document serves as instructions for individuals to adhere to when utilizing the website. Additionally, utilizing the hint menu may prove advantageous to users seeking to streamline their system navigation.

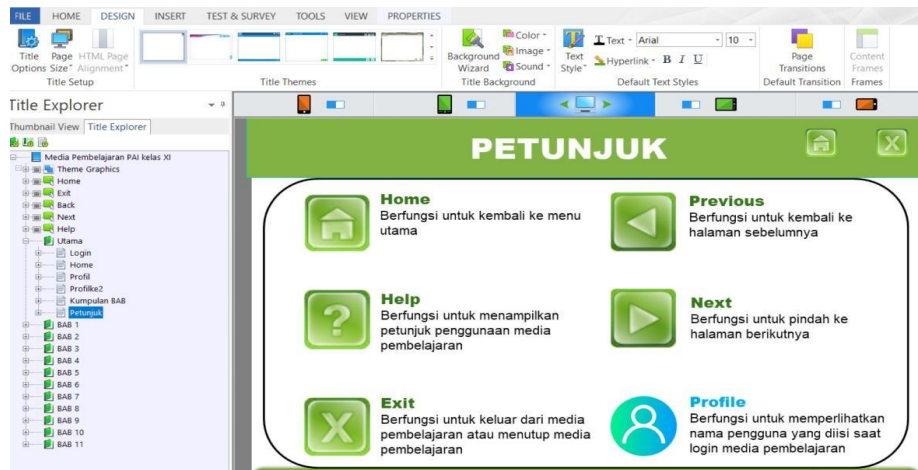


Figure 6. The Instructions Page

The menu guide incorporates fundamental details that are encompassed within the introductory section. The provided information encompasses the rationale behind the system's inception, a comprehensive overview, and a depiction of the system's characteristics. This document presents a comprehensive overview of the system requirements incorporated as an alternative to the instruction menu. The present exposition encompasses all pertinent technical details about constructing educational systems utilizing a rudimentary form of artificial intelligence.

- c. The material design for Chapters 1 through 11 includes a Preface, Quiz, Material, Evaluation, and Assessment. It is depicted in the image that can be found below.

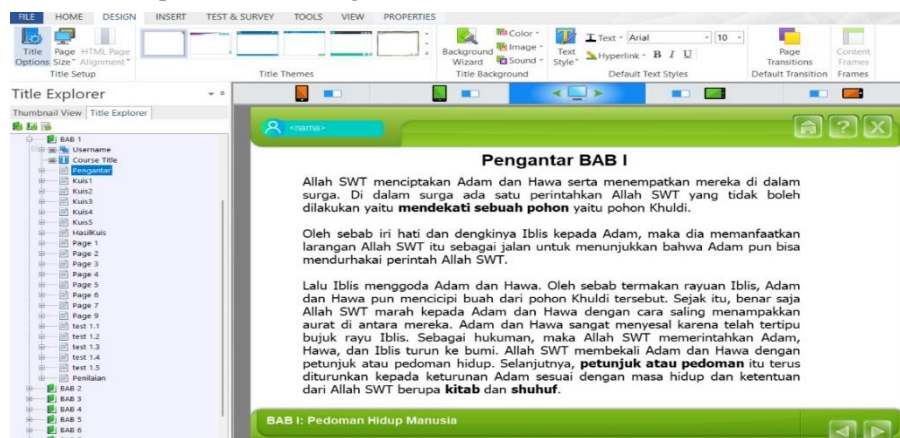


Figure 7. The Preface Page

In education, the term "learning media" pertains to any resource or tool that can substantially aid in attaining a learning objective. The utilization of learning media can aid educational institutions in addressing the issue of declining student engagement in book purchasing and reading, owing to its multifaceted nature and potential benefits. Furthermore, due to its adaptability to suit the specific needs of individual learners, this medium can be employed with great efficacy as an instructional aid. Implementing information and communication technology, particularly interactive quizzes, is among the diverse media tools for acquiring mathematical knowledge. Technology-driven interactive quizzes positively impact students' engagement in the learning

process, fostering their interest in comprehending mathematical concepts and making the learning experience more stimulating. Utilizing these quizzes additionally confers the advantage of enabling educators to evaluate the level of comprehension that students have attained regarding the subject matter. The progress of technological devices has a beneficial effect on this phenomenon. A reliable scoring mechanism has been designed to ensure that quizzes and examinations produce correct results. This algorithm utilizes animated emoticons of individuals to signify high and low grades, respectively.

- d. Execution Stage: Executed with two different methods: website-based execution and uploaded to the hosting server with the name: <https://pendidikan.agama.islam.indonetkreatifmedia.com> and desktop-based execution in the form of an interactive CD. Both techniques can be executed on a computer.
- e. After passing the necessary tests, this application can be used in real-world settings and facilitate learning.

### Doing Design Development

During this phase, the researchers conduct focus group discussions (FGDs) with experts in their respective fields. The focus group discussion aims to evaluate the appropriateness of the interactive CD medium for students in the odd semester of the eleventh grade at the high school level. The evaluation will be based on suitability, ease of use, wearability, attractiveness, and usefulness. Furthermore, this textbook offers commentary, criticism, and constructive feedback from industry professionals to enhance the quality of the content. Based on the focus group discussion (FGD) results, modifications are recommended for the sections that the specialists deem not adequately addressing this interactive textbook's central themes. The involvement of subject matter specialists, such as an Islamic religious education expert, and learning design experts, specifically those with expertise in IT-based design, are integral to the process. Feedback, suggestions, and expert insights have been furnished below.

**FORM VALIDITAS  
BUKU AJAR MULTIMEDIA INTERAKTIF PENDIDIKAN AGAMA ISLAM  
UNTUK SMA KELAS XI SEMESTER SATU**

**A. Pengantar**

Form penilaian validitas ini disampaikan kepada Bapak dan Ibu dimaksudkan untuk mendapatkan masukan tentang validitas Buku Ajar Multimedia Interaktif Pendidikan Agama Islam untuk SMA Kelas XI Semester Satu. Hasil penilaian digunakan sebagai data penelitian dengan judul "Pengembangan Bahan Ajar Multimedia Pendidikan Agama Islam SMA di Sumatera Barat".

Peneliti sangat mengharapkan bantuan Bapak dan Ibu ahli untuk memberikan pendapat atau masukan tentang validitas Buku Ajar Multimedia Interaktif Pendidikan Agama Islam untuk SMA Kelas XI Semester Satu. Atas bantuan dan kerjasama Bapak dan Ibu, peneliti mengucapkan terima kasih.

**B. Petunjuk Pengisian**

1. Bapak dan Ibu diminta untuk mengisi form ini sesuai dengan kategori masing-masing kriteria dan pernyataan pada tabel yang telah disediakan.
2. Bapak dan Ibu diminta mengisi saran umum dan perbaikan pada form ini.
3. Pilihlah jawaban pernyataan dengan cara memberi tanda cek (✓) pada kolom yang dianggap paling sesuai.


**C. Form Penilaian Validitas Buku Ajar Multimedia Interaktif Pendidikan Agama Islam untuk SMA Kelas XI Semester Satu**

No.	Kriteria	Pilihan			
		4	3	2	1
<b>Komponen Desain Penyajian</b>					
1.	Teknik Desain Penyajian				
	a. Konsistensi sistematika penyajian dalam bab		✓		
	b. Kelogisan penyajian, keruntutan konsep, dan koherensi	✓			
	c. Keseimbangan substansi sub bab		✓		
	d. Kemeramikan desain warna		✓		
2.	Pendukung Desain Penyajian Materi				
	a. Kesesuaian dan ketepatan ilustrasi dengan materi		✓		
	b. <i>Advance organizer</i> (pembangkit motivasi belajar) pada awal bab		✓		
	c. Adanya rujukan/ sumber/ acuan termasa untuk teks, tabel, gambar, dan lampiran		✓		
	d. Ketepatan penomoran dan pencamaan tabel, gambar, dan lampiran	✓			
3.	Penyajian Desain Pembelajaran				
	a. Keterlibatan aktif peserta didik dan berpusat pada	✓			

	peserta didik				
	b. Mengembangkan pendekatan saintifik		✓		
4.	Kelengkapan Desain Penyajian				
	a. Pengantar		✓		
	b. Kuis	✓			
	c. Materi		✓		
	d. Rangkuman		✓		
	e. Evaluasi		✓		

**D. Saran Umum dan Saran Perbaikan**

1. *Sebutanya Interface lebih interaktif*
2. *desain layout sebaiknya memiliki nilai estetika.*
3. *tambahkan video atau link*
4. *balas ke email atau aganet*
5. *ref ditambahkan dan bentuk link.*

Padang, 7 Agustus 2022  
Validator  
  
Faiza Rini, M.Kom.

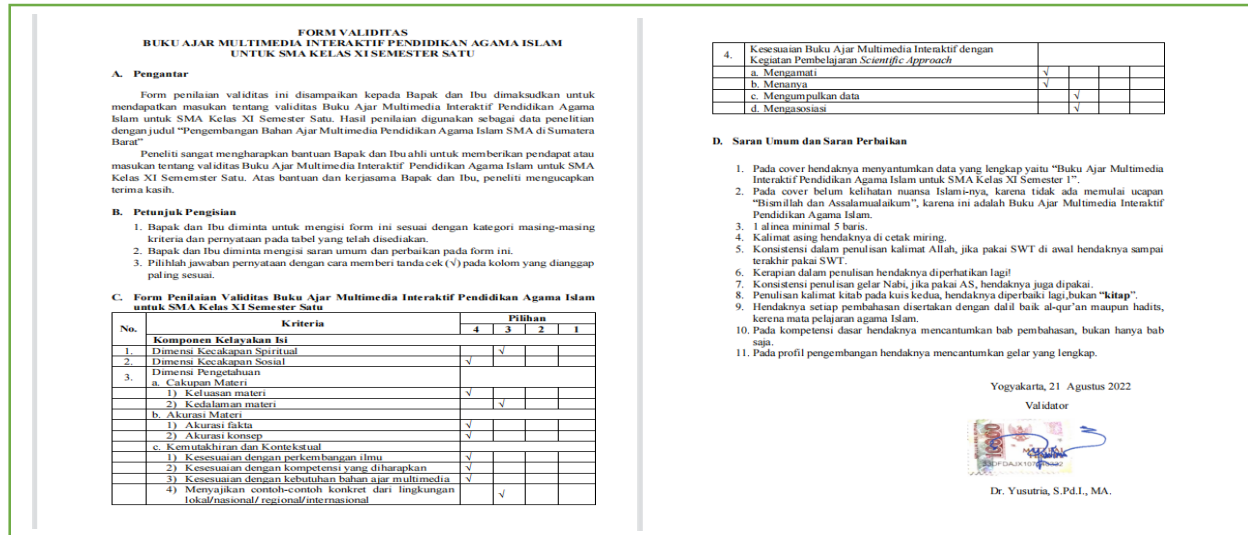


Figure 8. Display of FGD results with experts

The evaluations and recommendations made by specialists have been incorporated into the design and development process, resulting in an improvement that is more in line with the requirements of students in the eleventh grade of high school.

## IMPLEMENTATION

During the initial semester of the fourth phase's implementation, interactive CD-based media is planned for the eleventh grade. Implementing this approach will provide specific benefits to students actively participating in Islamic religious education within the classroom setting. The focus is on enhancing students' skills and achieving the expected competencies due to their educational endeavors. The present study aims to implement interactive CD media in high school classrooms throughout West Sumatra, utilizing several high schools in the Solok Regency, namely SMA 1 Pantai Cermin, SMA 1 Danau Kembar, and SMA 1 Gunung Talang, as research examples. Furthermore, the South Pesisir Regency has multiple secondary schools: SMA 3 Pendidikan agama Islamnan, SMA 1 Bayang, and SMA 1 Pendidikan agama Islamnan. In addition, Agam Regency has several high schools, such as SMA 1 Tanjung Mutiara, SMA 1 Lubuk Basung, and SMA 2. The implementation is bifurcated into two distinct categories: offline and online. The requests and willingness of the schools contacted to determine the categorization of schools. Furthermore, the technique was implemented by researchers in the educational institutions of SMK 1 and SMK 3 located in South Solok. In addition to vocational institutions that provide foundational IT education, these academic institutions offer a more comprehensive and nuanced approach to IT learning. Therefore, the interactive textbook is utilized through computer technology in educational institutions.

## EVALUATION

During the initial semester of the academic year, the researchers investigated students in the eleventh grade as part of the sixth step in the procedural framework. The strategy involved the implementation of both summative and formative evaluation assessments, which are distinct types of examinations. This study investigates the potential impact of Islamic religious education teaching material on students' academic performance and skill development. Furthermore, this project will collect data about the suitability and efficacy of interactive CD media.

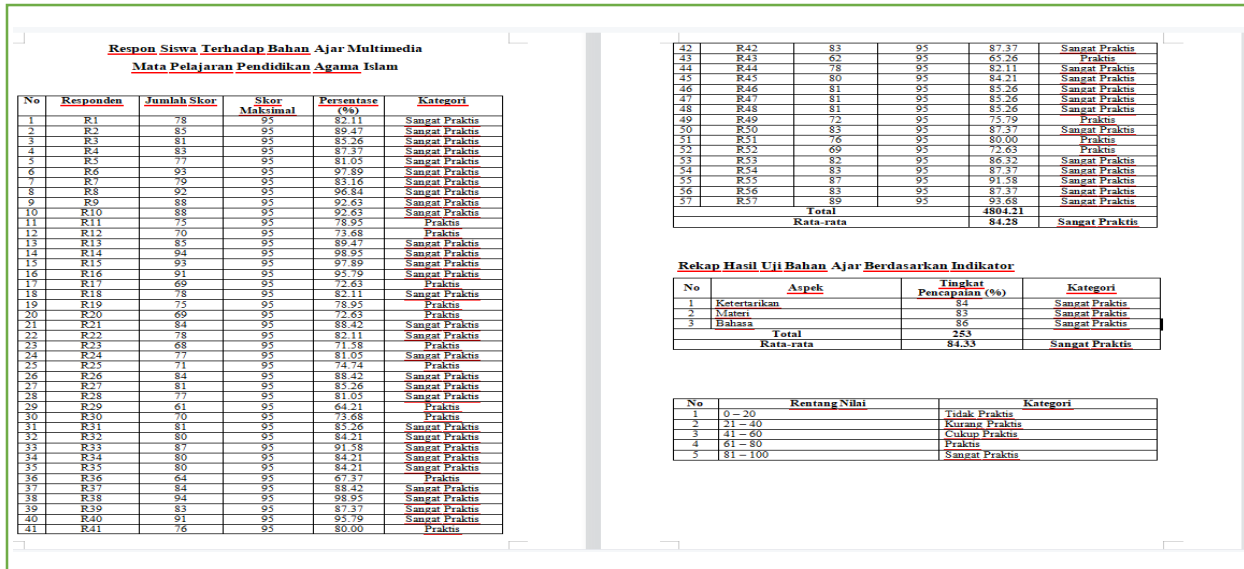


Figure 9. Recapitulation of the practicality of multimedia PENDIDIKAN AGAMA ISLAM teaching materials.

From this Figure, the study conducted in high school classrooms throughout West Sumatra revealed that the efficacy of incorporating multimedia PENDIDIKAN AGAMA ISLAM textbooks was 84.28%, as determined by a convenient scale that measured indicators such as interest in multimedia textbooks, materials, and languages. The results were presented in the form of a statement of stance. On the contrary, the efficacy evaluation is highly productive using a numerical scale. Based on the assessment provided by experts, it has been concluded that the multimedia instructional material for the PENDIDIKAN AGAMA ISLAM can be deemed valid once the recommended modifications and critiques are incorporated. The present discourse provides a synopsis of multimedia tools' efficacy in educational pedagogy, specifically about pendidikan agama Islam.

Following the design phase, the finalized model undergoes a battery of assessments during its ultimate developmental phase. At this juncture of the research process, the responsibility of the user partners is to furnish a substantial quantity of input that will be employed for the investigation. This phase holds great importance in guaranteeing the accuracy and orientation of the ensuing investigation. Therefore, one of the responsibilities of this organization is to gather information about various learning methodologies, teaching materials, and models presented thus far, as well as the challenges and limitations researchers have faced. Furthermore, the role of partners during the design phase is to offer crucial input in developing interactive CD media for textbooks.

Furthermore, the role partners are expected to fulfill currently in the developmental phase. The partner's responsibility entails evaluating the preliminary phase of the interactive CD media for the textbook, offering constructive feedback and recommendations on the finalized interactive CD media, and proposing potential enhancements that should be incorporated with the input of specialists to minimize the extent of revisions during the implementation phase. The subsequent phase involves assessing the role of partners during the implementation phase. The implementation phase assumes paramount importance as it facilitates the application of the proposed solution to the schools affiliated with the partners. Following verifying the authenticity of the textbook interactive CD media, the partners assume a crucial responsibility of providing recommendations on the optimal utilization of the said media within the educational institutions in West Sumatra.

## Conclusion

Many improvements have been achieved in artificial intelligence learning media, encompassing print-based formats such as Student Worksheets and technology-based formats like Flash and E-Learning, which require computer equipment. However, despite their efficacy, these learning media formats are not without

shortcomings. Due to the complex nature of artificial intelligence content, a comprehensive understanding necessitates supplementary media beyond a visually appealing design. In addition, the educational media utilized must not be bound by temporal or spatial limitations, enabling students to engage in self-directed learning, as mobile learning exemplifies.

In forthcoming times, endeavors should be undertaken to provide digital interventions and support for Islamic religious instruction and preparation. These endeavors should transcend the mere provision of basic information retrieval and utilization. These endeavors aim to educate and enlighten individuals about the principles and doctrines of the Islamic faith. The efficacy of digital interactive tools, such as the ones presented in this study, has been demonstrated in facilitating the acquisition of advanced knowledge across diverse settings. This study presents several instances of such instruments. To optimize the solution's efficacy, all pertinent stakeholders must comprehensively understand its diverse applications within the educational setting. Given the swift advancement of educational technology and evolving customer expectations, it is plausible to contemplate seeking assistance from artificial intelligence (AI) through interactive CDs. This is a factor that warrants consideration. Incorporating technology in traditional curricula necessitates that the designs should reflect and draw inspiration from the continuous innovation in the industry. This holds particularly true for those designs of conventional curricula that are influenced by the integration of technology. This investigation utilized an interactive CD approach within the ADDIE paradigm to construct a proof of concept for artificial intelligence in Islamic religious education and training. Subsequently, the proof of concept was integrated into the syllabus of secondary school religious studies courses. Future research should focus on exploring the potential of AI in Islamic religious education to support the various components of Islamic religious knowledge and its application while also enhancing efficiency and competency development in learning. This is particularly relevant for Islamic religious education in schools.

## REFERENCES

- Frolova, E. V; Rogach, O. V; Ryabova, T. M.; Federation, R. (2020). Digitalization of Education in Modern Scientific Discourse: New Trends and Risks Analysis, *European Journal of Contemporary Education*, Vol. 9, No. 2, 313–336. doi:10.13187/ejced.2020.2.313
- Upadhyaya, P.; Vrinda. (2021). Impact of technostress on academic productivity of university students, *Education and Information Technologies*, Vol. 26, No. 2, 1647–1664. doi:10.1007/s10639-020-10319-9
- Majid, M. (2023). English Speaking Varieties of English Instructors at Some English Courses in Makassar ( A Case Study ), *Athena: Journal of Social, Culture and Society*, Vol. 1, No. 3, 108–115
- Marcus, G. (2020). The Next Decade in AI: Four Steps Towards Robust Artificial Intelligence, No. February
- Ahmad, T.; Zhang, D.; Huang, C.; Zhang, H.; Dai, N.; Song, Y.; Chen, H. (2021). Artificial intelligence in sustainable energy industry: Status Quo, challenges and opportunities, *Journal of Cleaner Production*, Vol. 289. doi:10.1016/j.jclepro.2021.125834
- Dr. T. Senthil Kumar. (2020). Data Mining Based Marketing Decision Support System Using Hybrid Machine Learning Algorithm, *Journal of Artificial Intelligence and Capsule Networks*, Vol. 2, No. 3, 185–193. doi:10.36548//jaicn.2020.3.006
- Sutton, R. T.; Pincock, D.; Baumgart, D. C.; Sadowski, D. C.; Fedorak, R. N.; Kroeker, K. I. (2020). An overview of clinical decision support systems: benefits, risks, and strategies for success, *Npj Digital Medicine*, Vol. 3, No. 1, 1–10. doi:10.1038/s41746-020-0221-y
- Schoonderwoerd, T. A. J.; Jorritsma, W.; Neerinx, M. A.; van den Bosch, K. (2021). Human-centered XAI: Developing design patterns for explanations of clinical decision support systems, *International Journal of Human Computer Studies*, Vol. 154, 102684. doi:10.1016/j.ijhcs.2021.102684
- Villegas, A. M.; Lucas, T. (2002). Preparing culturally responsive teachers rethinking the curriculum, *Journal of Teacher Education*, Vol. 53, No. 1, 20–32. doi:10.1177/0022487102053001003
- Shanahan, T.; Shanahan, C. (2008). Teaching disciplinary literacy to adolescents: Rethinking content-area literacy, *Harvard Educational Review*, Vol. 78, No. 1, 40–59. doi:10.17763/haer.78.1.v62444321p602101
- Piyatrong, T.; Derrick, J.; Nyamapfene, A. (2021). Technology-mediated higher education provision during the COVID-19 pandemic: A qualitative assessment of engineering student experiences and sentiments, *Journal of Engineering Education Transformations*, Vol. 34, No. Special Issue, 290–297. doi:10.16920/jeet/2021/v34i0/157158
- Reim, W.; Åström, J.; Eriksson, O. (2020). Implementation of Artificial Intelligence (AI): A Roadmap for Business Model Innovation, *Ai*, Vol. 1, No. 2, 180–191. doi:10.3390/ai1020011
- Wamba-Taguimdje, S. L.; Fosso Wamba, S.; Kala Kamdjoug, J. R.; Tchatchouang Wanko, C. E. (2020). Influence of artificial intelligence (AI) on firm performance: the business value of AI-based transformation projects, *Business Process Management Journal*, Vol. 26, No. 7, 1893–1924. doi:10.1108/BPMJ-10-2019-0411



- Dwivedi, Y. K.; Hughes, L.; Ismagilova, E.; Aarts, G.; Coombs, C.; Crick, T.; Duan, Y.; Dwivedi, R.; Edwards, J.; Eirug, A.; Galanos, V.; Ilavarasan, P. V.; Janssen, M.; Jones, P.; Kar, A. K.; Kizgin, H.; Kronemann, B.; Lal, B.; Lucini, B.; Medaglia, R.; Le Meunier-FitzHugh, K.; Le Meunier-FitzHugh, L. C.; Misra, S.; Mogaji, E.; Sharma, S. K.; Singh, J. B.; Raghavan, V.; Raman, R.; Rana, N. P.; Samothrakis, S.; Spencer, J.; Tamilmani, K.; Tubadji, A.; Walton, P.; Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy, *International Journal of Information Management*, Vol. 57, No. August 2019, 101994. doi:10.1016/j.ijinfomgt.2019.08.002
- Wincana, G.; Rahmat, W.; Tatalia, R. G. (2022). Linguistic Tendencies of Anorexia Nervosa on Social Media Users, *Journal of Pragmatics and Discourse Research*, Vol. 2, No. 1, 1–9. doi:10.51817/jpdr/v2i1.185
- Mhlanga, D. (2023). Open AI in Education, the Responsible and Ethical Use of ChatGPT Towards Lifelong Learning, *SSRN Electronic Journal*, No. February. doi:10.2139/ssrn.4354422
- Dimiduk, D. M.; Holm, E. A.; Niezgodna, S. R. (2018). Perspectives on the Impact of Machine Learning, Deep Learning, and Artificial Intelligence on Materials, Processes, and Structures Engineering, *Integrating Materials and Manufacturing Innovation*, Vol. 7, No. 3, 157–172. doi:10.1007/s40192-018-0117-8
- Ma, L.; Sun, B. (2020). Machine learning and AI in marketing – Connecting computing power to human insights, *International Journal of Research in Marketing*, Vol. 37, No. 3, 481–504. doi:10.1016/j.ijresmar.2020.04.005
- Zuo, C.; Qian, J.; Feng, S.; Yin, W.; Li, Y.; Fan, P.; Han, J.; Qian, K.; Chen, Q. (2022). *Deep Learning in Optical Metrology: A Review, Light: Science and Applications* (Vol. 11), Springer US. doi:10.1038/s41377-022-00714-x
- Chang, H. Y.; Jung, C. K.; Woo, J. I.; Lee, S.; Cho, J.; Kim, S. W.; Kwak, T. Y. (2019). Artificial intelligence in pathology, *Journal of Pathology and Translational Medicine*, Vol. 53, No. 1, 1–12. doi:10.4132/jptm.2018.12.16
- Haenlein, M.; Kaplan, A. (2019). A brief history of artificial intelligence: On the past, present, and future of artificial intelligence, *California Management Review*, Vol. 61, No. 4, 5–14. doi:10.1177/0008125619864925
- Confalonieri, R.; Coba, L.; Wagner, B.; Besold, T. R. (2021). A historical perspective of explainable Artificial Intelligence, *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, Vol. 11, No. 1, 1–21. doi:10.1002/widm.1391
- Rosda, R.; Wali, M.; Imilda, I. (2023). Evaluation of the Successful Implementation of the SIMARDI Using the Technology Acceptance Model (TAM), *SAGA: Journal of Technology and Information System*, Vol. 1, No. 2, 56–63. doi:10.58905/SAGA.V1I2.67
- Yusupa, A.; Manullang, J.; Marbun, N.; Bill, S.; Ginting, F. (2023). Decision Support System for Determining the Best PAUD Teacher Using the MOORA Method, *SAGA: Journal of Technology and Information System*, Vol. 1, No. 2, 50–55. doi:10.58905/SAGA.V1I2.101
- Mardiana, H. (2023). Lecturers' Reasoning in Using Digital Technology: A Cognitive Approach in Learning Process, *Athena: Journal of Social, Culture and Society*, Vol. 1, No. 2, 33–42. doi:10.58905/ATHENA.V1I2.27
- Faisol, Y.; Fitriyah, R.; Fakhurrasy, R.; Fauzy, R. (2022). Pragmatic Cyber Analysis In The Middle East Conflict News Text Views, *Journal of Pragmatics and Discourse Research*, Vol. 2, No. 1, 20–30. doi:10.51817/jpdr/v2i1.198
- Yendra, Y.; Satria, W.; Rahmat, W.; Kemal, E.; Kusumaningsih, D.; Sudiyan, B.; Miji Lestari, P.; Susanti, R.; Agung Ayu Dian Andriyani, A.; Susylowati, E.; Budi San-toso, A.; Bambang Putut Setiyadi, D.; Yulianti, W.; Widhayani, A.; Nur Kholidah, N.; Saddhono, K.; PGRI Sumatera Barat, S. (2018). Introduction Blended Learning Designs on Introduction to Linguistics at West Indonesian Journal of Engineering & Technology, Vol. 7, 310–313. doi:10.14419/ijet.v7i3.4.20121
- Babina, T.; Fedyk, A.; He, A. X.; Hodson, J. (2020). Artificial Intelligence, Firm Growth, and Industry Concentration, *SSRN Electronic Journal*. doi:10.2139/ssrn.3651052
- Tschang, F. T.; Almirall, E. (2021). Artificial intelligence as augmenting automation: Implications for employment, *Academy of Management Perspectives*, Vol. 35, No. 4, 642–659. doi:10.5465/amp.2019.0062
- Andronie, M.; George, L.; Iatagan, M.; Ut, C.; Roxana, S. (2021). Internet of Things Sensing Networks , and Deep Learning-Assisted Smart Process Management in, *Electronics*, Vol. 10. doi:https://doi.org/10.3390/electronics10202497
- Aly, H. (2022). Digital transformation, development and productivity in developing countries: is artificial intelligence a curse or a blessing?, *Review of Economics and Political Science*, Vol. 7, No. 4, 238–256. doi:10.1108/REPS-11-2019-0145
- Anggara, A. D., Roemintoyo, & Rejekiningsih, T. (2023). Optimization of mobile learning in land surveying material for vocational high school students: A preliminary study . *International Journal of Education and Practice*, 11(2), 244–254. https://doi.org/10.18488/61.v11i2.3332
- Santhanam, P. (2020). Quality Management of Machine Learning Systems, *Communications in Computer and Information Science*, Vol. 1272, 1–13. doi:10.1007/978-3-030-62144-5\_1
- Tay, C. (2021). The Impact of Artificial Intelligence on International Trade, *Journal of Technological Advancements*, Vol. 1, No. 1, 1–20. doi:10.4018/jta.20210101.0a6
- Tiawati, R. L.; Rahmat, W.; Kemal, E.; Chen, W. (2022). The Importance of Guidance In Understanding Cultural Discourse In Thinking and Speaking For Foreign Students In BIPA Program, *Journal of Pragmatics and Discourse Research*, Vol. 2, No. 1, 39–47. doi:10.51817/jpdr/v2i1.203
- Sollosy, M.; McInerney, M. (2022). Artificial intelligence and business education: What should be taught, *International Journal of Management Education*, Vol. 20, No. 3, 100720. doi:10.1016/j.ijme.2022.100720
- Shneiderman, B. (2020). Human-Centered Artificial Intelligence: Reliable, Safe & Trustworthy, *International Journal of Human-Computer Interaction*, Vol. 36, No. 6, 495–504. doi:https://doi.org/10.1080/10447318.2020.1741118



- Yang, S. J. H.; Ogata, H.; Matsui, T.; Chen, N. S. (2021). Human-centered artificial intelligence in education: Seeing the invisible through the visible, *Computers and Education: Artificial Intelligence*, Vol. 2, No. January, 100008. doi:10.1016/j.caeai.2021.100008
- Fügener, A.; Grahl, J.; Gupta, A.; Ketter, W. (2022). Cognitive Challenges in Human–Artificial Intelligence Collaboration: Investigating the Path Toward Productive Delegation, *Information Systems Research*, Vol. 33, No. 2, 678–696. doi:10.1287/isre.2021.1079
- Mulyaningsih, I.; Rahmat, W.; Maknun, D.; Firdaus, W. (2022). How Competence of Production , Attention , Retention , Motivation , and Innovation Can Improve Students ’ Scientific Writing Skills, *International Journal of Language Education*, Vol. 6, No. 4, 368–385. doi:https://doi.org/10.26858/ijole.v6i4.34360
- Dara Tafazoli; Abril, D. C. A. H.; Parra, D. M. . E. G. (2019). Technology-Based Review on Computer-Assisted Language Learning: A Chronological Perspective, *Pixel-BIT Revista de Medios y Educación*, Vol. 54, No. 2. doi:https://doi.org/10.12795/pixelbit.2019.i54.02
- Ottman, O.; Rahmad, H. A.; Yuhendri, R. (2023). Healthy Snacks : Multimodal Critical Discourse Analysis of Traditional Food Brand Corporate Storytelling, *Journal of Pragmatics and Discourse Research*, Vol. 03, No. 01, 19–27. doi:https://doi.org/10.51817/jpdr.v3i1.322
- Grewal, D.; Hulland, J.; Kopalle, P. K.; Karahanna, E. (2020). The future of technology and marketing: a multidisciplinary perspective, *Journal of the Academy of Marketing Science*, Vol. 48, No. 1, 1–8. doi:10.1007/s11747-019-00711-4
- Gorski, P. C. (2006). Complicity with conservatism: the de-politicizing of multicultural and intercultural education, *Intercultural Education*, Vol. 17, No. 2, 163–177. doi:10.1080/14675980600693830
- Yusri, R.; Musparidi, M.; Kemal, E.; Rahmat, W. (2019). Effectiveness of national qualification framework Indonesia based curriculum and higher education national standard behaviour assesment rubric, *Journal of Physics: Conference Series*, Vol. 1157, No. 4. doi:10.1088/1742-6596/1157/4/042129
- de Wit, H.; Altbach, P. G. (2021). Internationalization in higher education: global trends and recommendations for its future, *Policy Reviews in Higher Education*, Vol. 5, No. 1, 28–46. doi:10.1080/23322969.2020.1820898
- Sobirin. (2015). Pengembangan Aplikasi M-learning sebagai Media Alternatif Persiapan Ujian Nasional Siswa Sekolah Menengah Atas (SMA), *Jurnal Pendidikan Teknik Informatika*, Vol. 4, No. 4
- Sari, R. F. (2021). Pengembangan Mobile Learning Berbasis Android Menggunakan Adobe Flash CS6 Pada Mata Pelajaran Sejarah Materi Situs Gua Harimau Di Kelas X SMA Negeri 1 Tanjung Raja, Universitas Sriwijaya
- Christensen, R.; Knezek, G. (2016). Relationship of mobile learning readiness to teacher proficiency in classroom technology integration, *Proceedings of the 13th International Conference on Cognition and Exploratory Learning in the Digital Age, CELDA 2016*, No. Celda, 303–306
- Mariam, S. (2015). Pengembangan Media pembelajaran CD Interaktif Multimedia Di Masa Pandemi Covid-19 Di MAN se-Kota Mataram, [Http://Etheses.Uinmataram.Ac.Id/1858/](http://Etheses.Uinmataram.Ac.Id/1858/), Vol. 3, No. April, 49–58
- Yuvers, E.; T, B.; Hendri, M. (2019). Meningkatkan Aktivitas dan Hasil Belajar Fisika Siswa Menggunakan Media CD Program Dengan Pendekatan Tutorial Di SMP, *Jurnal Ilmu Fisika Dan Pembelajarannya (JIFP)*, Vol. 3, No. 1, 1–10. doi:10.19109/jifp.v3i1.3386
- Richey, R. C.; Klein, J. D.; Nelson, W. A. (2013). Developmental Research: Studies Instructional Design and Development, *Handbook of Research on Educational Communications and Technology*, 141–150. doi:10.1201/9781439832080.ch6
- Nussenbaum, K.; Scheuplein, M.; Phaneuf, C. V.; Evans, M. D.; Hartley, C. A. (2020). Moving developmental research online: Comparing in-lab and web-based studies of model-based reinforcement learning, *Collabra: Psychology*, Vol. 6, No. 1. doi:10.1525/collabra.17213
- Mortelmans, D. (2019). Analyzing Qualitative Data Using NVivo, *The Palgrave Handbook of Methods for Media Policy Research*, 2022. doi:10.1007/978-3-030-16065-4
- Rahmat, W.; Revita, I.; Fitriyah, R. (2019). Psychopragmatic Analysis in Language Learning and Teaching Processes, *Curricula*, Vol. 4, No. 2, 92. doi:10.22216/jcc.2019.v4i2.4218
- Iordanou, K.; Kuhn, D.; Matos, F.; Shi, Y.; Hemberger, L. (2019). Article Learning by Arguing, *Learning and Instruction*, Vol. 63, No. Oktober. doi:https://doi.org/10.1016/j.learninstruc.2019.05.004
- Bernardez. (2007). Should we have a Universal Model for HPT, *Performance Improvement*, Vol. 46, No. 9, 9–16. doi:10.1002/pfi
- Ganesan, M.; Muruganatham, G. (2015). Developing of E-content package by using ADDIE model, *International Journal of Applied Research*, Vol. 1, No. 3, 52–54
- Setiyowati, Z. K.; Ahmad, J.; Rizki, S. (2020). Pengembangan Multimedia Interaktif Berbasis Realistic Matematics Education Pada Materi Persamaan Dan Pertidaksamaan Nilai Mutlak, *EMTEKA: Jurnal Pendidikan Matematika*, Vol. 1, No. 2, 147–161
- Ulfah, M. (2021). The Development of Teaching Materials Based on Contextual to Improve English Vocabulary Mastery, *JTPM (Jurnal Teknologi Pendidikan Dan Pembelajaran) : Edutech and Intructional Research Journal*, Vol. 8, No. 1, 42–57
- Elvarita, A.; Iriani, T.; Handoyo, S. S. (2020). Pengembangan Bahan Ajar Mekanika Tanah Berbasis E-Modul Pada Program Studi Pendidikan Teknik Bangunan, *Universitas Negeri Jakarta, Jurnal Pendidikan Teknik Sipil*, Vol. 9, No. 1, 1–7. doi:10.21009/jpensil.v9i1.11987