Jurnal Pendidikan Multimedia (EDSENCE)

Journal homepage: https://ejournal.upi.edu/index.php/Edsence

Exploring Research Approaches and Methodologies in Multimedia: Digital Media, Game Development, Visual Communication Design, Broadcasting, and Animation

Agus Juhana[1], Laura Anggelika[2], and Farhan Abdul Azis[3]

[1,2,3] Multimedia Education Department, Universitas Pendidikan Indonesia, Bandung, Indonesia
Correspondence: E-mail: agus.juhana@upi.edu

ABSTRACT

Research methods are structured procedures designed to address research problems and provide effective solutions. In the multimedia field, researchers often rely on standardized methods, regardless of the specific sub-discipline under investigation. For example, the Multimedia Development Life Cycle (MDLC) is among the most commonly used methodologies. However, the diversity of research areas within multimedia—spanning Digital Media, Game Development, Visual Communication Design, Broadcasting, and Animation—requires tailored and specialized approaches to ensure that research outcomes are precise, impactful, and contextually relevant. This study systematically reviews various research methodologies in the multimedia field by analyzing relevant articles and literature. The results present a comprehensive mapping of diverse approaches and methodologies, categorized according to specific subfields within multimedia. This analysis aims to assist academics, researchers, and professionals in selecting methodologies that align with their research objectives, thereby enhancing the quality and specificity of research outputs.

ARTICLE INFO

Article History:
Submitted/Received 25 Nov 2024
First Revised 01 Dec 2024
Accepted 01 Dec 2024
First Available online 17 Dec 2024
Publication Date 17 Dec 2024

Keyword:
Research Methods,
Multimedia Studies,
Methodological Approaches,
Multimedia Research Framework

1. INTRODUCTION

Research methods refer to specific techniques or procedures employed to collect and analyze data, serving as tools and strategies in the research process. Examples include quantitative methods such as surveys, experiments, and statistical analyses aimed at measuring and analyzing causal relationships between variables (Iyamu, 2009; Lázaro & Marcos, 2006; Salmon, 2017). Qualitative methods, such as interviews, focus group discussions, ethnography, and thematic analysis, seek to understand meanings and experiences (Lázaro & Marcos, 2006; Petty et al., 2012; Salmon, 2017), Mixed methods combine qualitative and quantitative techniques to leverage the strengths of both approaches (Divan et al., 2017; Huan-Niemi et al., 2016; Lázaro & Marcos, 2006).

Research approaches, on the other hand, represent broader strategies that guide the research process, including philosophical assumptions and methodological choices. For example, the positivist approach, often linked to quantitative methods, focuses on objective measurement and observable phenomena (Iyamu, 2009; Lopes, 2015). In contrast, the interpretive approach, associated with qualitative methods, emphasizes subjective interpretations of social phenomena and meaning-making (Azhar et al., 2010; Iyamu, 2009). Pragmatism integrates qualitative and quantitative methods to address research questions from multiple perspectives, blending diverse data types (Divan et al., 2017; Mulisa, 2022).

It can be concluded that research methods are specific tools used to collect and analyze data, while research approaches represent broader strategies that guide the selection and application of these methods, shaped by philosophical assumptions and research objectives. (Abutabenjeh & Jaradat, 2018; Iyamu, 2009; Lázaro & Marcos, 2006; Salmon, 2017).

In multimedia research, various methods and approaches are often combined to address diverse challenges and requirements. For instance, Research and Development (R&D) methods such as the ADDIE model are widely used to design and evaluate multimedia tools (Hikmi et al., 2020). Systematic Literature Reviews (SLR) analyze existing methodologies and frameworks in multimedia systems development (Peláez et al., 2019). Tools like bibliographic mapping and computational analysis further identify trends and research patterns, particularly in educational contexts (Sari et al., 2023; Taswadi et al., 2025).

The field of multimedia is rapidly evolving, spanning disciplines such as virtual reality (VR), augmented reality (AR), gaming, animation, broadcasting, film, and design. Emerging trends highlight the integration of VR and AR into everyday life, driven by advances in computer vision, advanced sensors, and mobile computing (Chang & Chen, 2017; Jiang et al., 2023; Mattila et al., 2021). These technologies find applications across sectors such as healthcare, education, engineering, and entertainment, with a primary focus on creating immersive and interactive user experiences (Kale et al., 2024; Rashid et al., 2021).

In gaming, VR development has spurred the growth of immersive experiences, though stronger narratives are needed to fully realize its potential (Salihbegovic, 2020). In animation and film, immersive media integration has transformed online learning into more interactive formats, with VR Non-Fiction emerging as a novel medium blending traditional documentaries with immersive theater (Bevan & Green, 2018). Multimedia education programs are increasingly tailored to industry demands, covering graphic design, audiovisual

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

production, and web development (Pabón-Leal et al., 2024). Furthermore, the intersection of artificial intelligence (AI) and multimedia is driving advancements in explainable AI models and sophisticated multimedia processing techniques, enhancing both fields (Zhu et al., 2020).

These trends underscore the dynamic and interdisciplinary nature of multimedia research, fueled by technological innovation to meet sector-specific needs. Therefore, researchers must adopt tailored methods to align with their specific areas of inquiry. This study examines the global methods employed in multimedia research, detailing the foundational procedures of each method and approach while offering insights into their applications.

2. METHODS

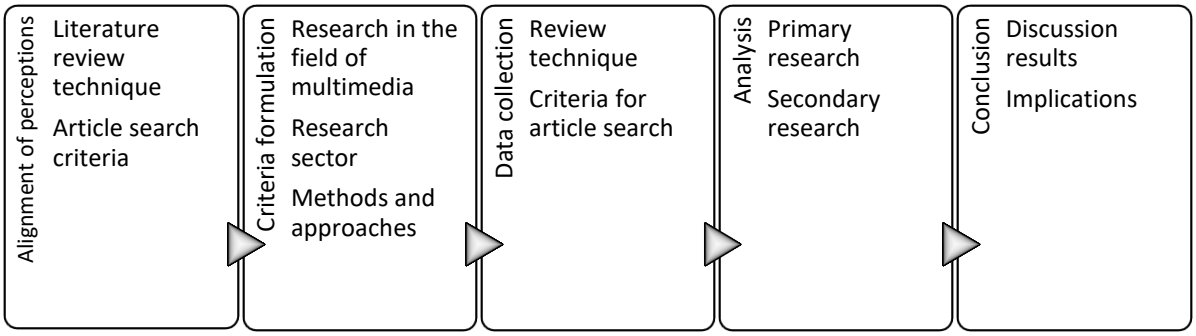

Figure 1. Research procedure

This study employed several methods for data collection, as illustrated in Figure 1, including the following steps:

1) Aligning Perceptions: A consensus-building process was conducted among data collectors to standardize criteria for identifying articles from reputable digital libraries, both national and international.
2) Group Division: Data collectors were divided into 10 search groups, each consisting of 4–5 members. Each group was tasked with identifying at least 20 relevant articles.
3) Article Selection Criteria: Articles were required to meet the following criteria:
   a) Research in the field of multimedia, such as Digital Media, Game Development, Visual Communication Design, Broadcasting, and Animation.
   b) Applications of the multimedia products in sectors such as education, healthcare, engineering, and entertainment.
   c) Inclusion of specific methods or approaches employed in the research.
4) Method Analysis and Validation: Identified methods were analyzed and cross-referenced with sources from journals and books to ensure validity.
5) Data Compilation and Classification: A comprehensive list of methods and research approaches in the field of multimedia was compiled. Identical methods and approaches were consolidated, and all were classified into primary and secondary research categories.

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

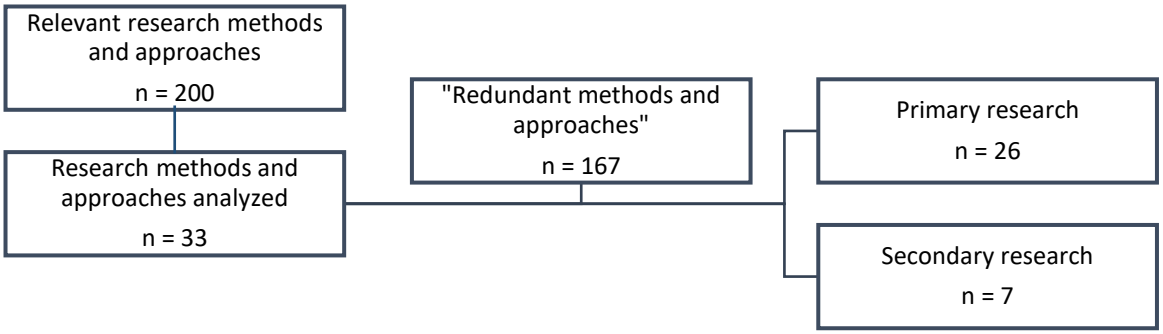

Figure 2. Filtering data process

The data collection process was carried out over 14 days, starting from the article search phase to the analysis of each method conducted by the data collection groups. Subsequently, a more comprehensive discussion was held to interpret and synthesize the findings, culminating in the conclusions drawn from this study.

3. RESULTS AND DISCUSSION

Using relevant keywords related to multimedia research, such as (multimedia OR "augmented reality" OR "virtual reality " OR game OR gamification OR "digital media" OR "interactive media" OR animation OR "film production") AND PUBYEAR > 2012 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp")) AND (LIMIT-TO (LANGUAGE , "English")) from Scopus database, we observed that research trends in the multimedia field have continuously increased over the past decade, as shown in Figure 3. The distribution of research across various subject areas within this field is presented in Figure 4, illustrating the spread of studies according to their respective subject areas.

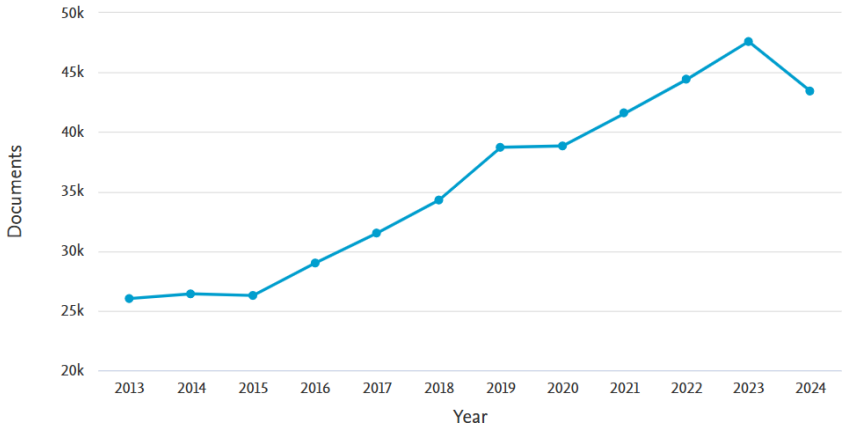

Figure 3. Number of Scopus articles on multimedia research from 2013 to 2024

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

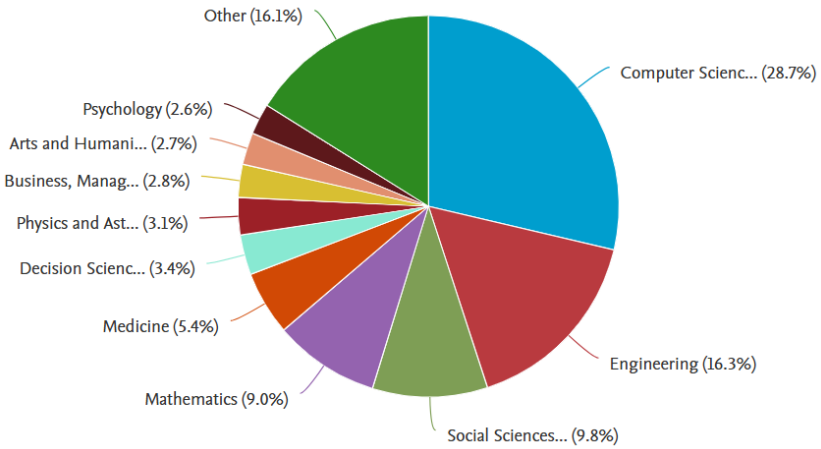

Figure 4. Distribution of multimedia research across various subject areas

In this study, based on the data analysis we conducted, we decided to categorize the research methods and approaches based on the sources of data or activities obtained during the research process. These categories include primary and secondary research. Primary research involves the direct collection of new data by the researcher to answer specific research questions. Data is gathered through various methods such as interviews, surveys, direct observation, or experiments (Boaduo, 2011; Sacks, 2005; Torales & Barrios, 2023). This approach allows researchers to obtain relevant and specific data aligned with the research objectives, providing full control over the data collection process. However, primary research is often time-consuming and costly compared to other methods.

On the other hand, secondary research involves the analysis of existing data, typically collected by others, such as journal articles, government reports, statistical databases, or archival documents (Bookstaver, 2021; Choi & Kwag, 2014; Torales & Barrios, 2023). This approach is faster and more cost-effective, as the data is already available, and it allows for historical trend analysis that might be difficult to achieve with primary research. However, secondary research has its limitations, such as data that may not be fully relevant or of sufficient quality for specific research purposes. Researchers often combine both methods to achieve more comprehensive and in-depth results.

Tables 1 and 2 will display various research methods and approaches in the multimedia field, which we successfully gathered from relevant sources.

Table 1. Research methods and approaches in the multimedia field for primary research

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
1	Research and Development (R&D) approach (Maydiantoro et al., 2023)	1. Collection data that includes needs measurements, literature studies , small-scale research, and value considerations.	Research on entrepreneurship learning that includes ethnopreneurship and uses Virtual Reality media. This study aims to develop an entrepreneurship learning module based on	Virtual Reality Technology in Entrepreneurship Learning

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
		2. Based on the data collection that has been carried out, the next step is to select the material to be developed and develop the learning module.	ethnopreneurship with the help of Virtual Reality.	
2	Method Quasi-Experiment/ experiment quasi (quasi) experimental design) (Rasyida et al., 2023)	1. Select a problem 2. Preliminary study, 3. Formulating the problem 4. Formulate basic assumptions and formulate hypotheses, 5. Choosing an approach, 6. Determine variables and data sources, 7. Determine and arrange instruments, 8. Collecting data 9. Data analysis, 10. Draw a conclusion, 11. Writing a report.	Development of learning media based on metaverse technology - virtual reality using spatial.io on subjects Informatics on students' interests and understanding.	Metaverse technology as a learning medium
3	Method Test Randomized controlled trial (randomized controlled trial) (Schipper-Kramer Freher et al., 2022)	1. Participant Selection 2. Random Group Division 3. Providing intervention or direction 4. Outcome Measurement Before and After Intervention 5. Analyzing Data 6. Draw a conclusion	This research focuses on the use of VR to educate people who experience depression regarding self-stigma. This study aims to see whether VR can be an effective method in helping them reduce the stigma against themselves. By using VR, participants can experience the experience Which more immersive to understand and overcome self-stigma, which may be more effective than simply listening to traditional explanations.	Metaverse technology in mental health
4	Prototype Testing Methods (Cannavo et al., 2019)	1. Prototype Design and Development 2. Test Subject Selection 3. VR Interface Testing 4. Data collection 5. Performance Evaluation and User Experience 6. Test Result Analysis 7. Prototype Refinement	This study discusses the use of virtual reality (VR) based interface for character animation . Objective the main thing is to develop a prototype for interaction more immersive in character animation using VR technology.	Virtual Reality interface for character animation

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
5	Evaluation methods/program evaluation methods (Kurnia Nurhayati et al., 2023)	1. Collection data through Survey and interviews with SME actors from various industry Which participate in the program training Language VR done to assess the reaction participants, their perceptions, and the relevance of the training to language learning. 2. Model evaluation to measure learning outcomes, such as language and language skills improvement trust self in use	This study evaluates Integration of virtual reality (VR) technology in foreign language training for SMEs in Indonesia using the Kirkpatrick Model.	Evaluation of Virtual Reality in foreign language training
6	ADDIE model approach (Analyze, Design, Develop, Implement, and Evaluate) .	1. Analysis 2. Design 3. Development 4. Implementation 5. Evaluation	Development of interactive learning media using Smart Apps Creator (SAC) learning physics of hydrostatic pressure material	Mobile app development for learning media
7	Orthogonal Experimental Methods (Luo et al., 2024)	Orthogonal Experiment Method: Used to test various factors that influence participants' anxiety in VR-based job interviews, with balanced analysis for each factor. 1. Types of VR Immersion 2. Question Categories 3. Interviewer Attitude 4. Time Condition 5. Participant Preparation	This study explores the effectiveness of a Virtual Reality Interview Simulator (VRIS) tool to help nervous interview participants by providing safe and realistic VR practice support. VRIS is examined to see whether it is effective in helping participants improve interview skills, reduce fear, increase confidence, and save costs and time compared to traditional interview preparation.	Virtual Reality Interview Simulator (VRIS)
8	User-Centered Design (UCD) Method (Ramos-Aguiar & Alvarez-Rodriguez, 2021)	1. Requirements (identify the scope, purpose, and type of gamification of the application) 2. Design 3. Implementation 4. Evaluation	This study developed an application that can help children with Autism Spectrum Disorder (ASD) in recognizing and expressing emotions. The application combines real-world interfaces and gamification to create a more natural and effective method of	Gamification, applications, interfaces

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
			interaction in learning emotions. The study also explores how this technique can improve communication skills, social integration, and behavior in children with ASD.	
9	StoryTube Method (Das et al., 2023)	Using the StoryTube method, where this method is equipped with Natural Language Processing (NLP), PyGame and audio dialogue to produce 2D animations from short story texts. The process involves extracting subjects and verbs from the text, as well as creating audio for dialogue. Steps: 1. Natural Language Processing (NLP) Phase 2. Video Generation Phase 3. Audio Generation Phase 4. Output Animation	This research explains how to create a simple animation from a short story that has audio dialogue. This process is designed to make it easier to understand for users who prefer watching rather than reading.	Animated Films
10	Game Development Life Cycle (GDLC) Method (Triatmaja et al., 2022)	The method used in this study is the Game Development Life Cycle (GDLC), which is a framework for developing games in stages, from initial planning to the release of the final product. Steps: 1. Initiation (Initiation) 2. Pre-Production 3. Production 4. Testing Phase (Testing Phase) 5. Beta Stage 6. Release (Release)	This study discusses the application of gamification in electronic learning (e-learning) systems for children of playgroup or pre-school age. The aim is to develop a game-based e-learning application that can support children's cognitive and motor development through play activities. This application is made in the form of a mini game that combines gamification elements such as challenges, scores, and feedback designed to improve children's learning skills and motivation.	Gamification in e-learning
11	Mixed Methods (Qualitative and quantitative research methods in parallel) (Götzl et al., 2022)	The study was conducted through semi-structured interviews involving the target population (young people aged between 12 and 25 years), key stakeholders including	To investigate the subjective perspectives of young people and key stakeholders, regarding their concerns, needs and preferences in AI-informed mHealth applications.	AI-based health mobile application

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
		school psychologists, psychological counselors, media experts, and representatives of the digital industry as well as interdisciplinary research groups. Qualitative and quantitative data were analyzed separately, the results were combined to obtain results of general perceptions.		
12	Technology Acceptance Model (TAM) and Information System Success Model (ISS) (Wang & Wu, 2024)	The research was conducted by conducting a survey using Questionnaire Star, and successfully collected 1,026 valid responses from users of the short video shopping platform. The data contained in this article has been analyzed using Structural Equation Modeling (SEM-AMOS) to test the proposed hypothesis.	This study was conducted to explore the extent to which views on usefulness, information quality, and ease of use affect purchase intention, level of involvement, and level of user satisfaction. From the results of the study, it can be seen that a positive view of the benefits of the product has a good impact on people's interest in getting involved and buying, and at the same time the quality of information also increases purchase intention.	Short Video
13	Experimental method (Lin et al., 2020)	This experimental study compared two groups, namely the experimental group and the control group, to evaluate the effects of using augmented reality (AR)-based board games on students' learning outcomes and emotions.	This study aims to investigate the effects of using augmented reality (AR) in board games for health education, with a focus on improving students' learning outcomes and emotions during the learning process.	Board game based on Augmented Reality
14	*User Experience (UX)* Principles (Jones et al., 2023)	Researchers evaluated patient experiences by applying UX principles to understand users' views and needs regarding the food distribution system. This assessment included the application of ten UX heuristics involving important aspects such as usability, privacy respect, user value, and interaction variation.	This study aims to improve patient experience by considering the psychological needs of nursing home residents related to aspects of autonomy, competence, and connectedness. Some recommendations are to provide a variety of food choices according to each individual's culture and taste, encourage social interaction during meals,	UI/UX of Food Distribution System Application

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
			and maintain user privacy and security.	
15	Educational Design Research (Ozcakir & Cakiroglu, 2021)	This research was conducted in two parts, as a preliminary research and a prototyping phase. The findings guided the characteristics for designing an augmented reality learning device with a series of spatial tasks aimed at high school students.	The main objective of this research is to design and develop an AR learning device to foster spatial abilities in secondary school students using mobile devices.	Augmented reality in education
16	Non-equivalent control group pre-test and post-test design. (Jeon et al., 2021)	1. Research Design 2. Subject 3. Experimental Group 4. Control Group 5. Training Duration 6. Measurement 7. Analysis	Augmented reality (AR)-based tooth brushing training using a smart toothbrush is more effective than training using visual materials in improving tooth brushing performance and oral hygiene in individuals with intellectual disabilities.	Augmented reality in education
17	Partial Least Square (PLS) (Chen & Lai, 2021)	This study uses a questionnaire as a research tool. The questionnaire was distributed to museum visitors who have experience using augmented reality technology. A total of 299 respondents were surveyed, with 275 valid questionnaires analyzed. Data analysis used the Partial Least Square (PLS) method to test reliability, validity, and research models. SmartPLS software was used as an analysis tool.	This study aims to identify the effectiveness of education by using augmented reality in museums and conduct research and analysis on related theories and empirical evidence. Furthermore, integrating them into a prototype and functional research framework to recognize the positive influence between visitor acceptance, using augmented reality in museums, and increasing learning motivation.	Augmented reality in education
18	(Murodillaevich et al., 2020)	Visual servoing is a technique that uses visual information from a camera to control the movement of an object in a virtual or physical environment. This research develops interactive virtual reality (VR) and augmented reality (AR) interfaces, and uses 3D models and software applications to create virtual learning environments.	This study attempts to use Virtual Reality (VR) and Augmented Reality (AR) technologies to improve the old 3D learning and teaching methods. The study shows that combining virtual and physical worlds can make learning more interactive and engaging.	Virtual reality and augmented reality in learning

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
19	Qualitative Survey (Segaran et al., 2021)	Researchers gathered 200 diploma students of Computer Graphics studies from five different multimedia colleges, where each group consisted of 40 students with similar characteristics. Then each college group will play an educational game with their own avatar design. Finally, data will be collected quantitatively with One-Way Anova.	In creating avatar designs in educational games, researchers want to know whether this will influence students in terms of understanding and interest.	Educational games
20	2x2 Factorial Design (Hu et al., 2024)	1. Identify Goals 2. Achievement Purpose Instruction Design 3. Select GBL Tools and Materials 4. Experiment Setup 5. Pre-Test and Post-Test Data Collection 6. Measurement of Mental Effort and Emotion 7. Data analysis 8. Evaluation of Instruction Effectiveness	Achievement goal instruction in game-based learning (GBL) on students' achievement goals, performance, and emotions. This study focuses on two types of achievement goal instruction: mastery-approach goals, which emphasize understanding and mastery of material, and performance-approach goals, which emphasize competition and outperforming others.	Learning Games
21	PANAS-X & Forced Choice Paradigm (Plass et al., 2019)	Researchers collected several participant studies. The first study involved adult participants aged 35 years. The second study involved junior high and high school students. Both studies were relatively similar in their research procedures, namely by answering several questions accompanied by showing pictures of game characters with various emotions (happy, sad, and neutral).	The influence of color, shape, expression of educational game characters on a person's emotions.	Game Characters
22	Structural Equation Modeling (SEM) (Zhang, 2024)	The analysis process began with data collection from 872 college students in Southern China, which included sociodemographic information and responses to various questionnaires	Examining the effect of game-based learning on students' academic outcomes, by examining how technology acceptance model (TAM) and self-regulation strategies affect	Learning Games

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
		related to the research focus. After the data were collected, processing was carried out to check for missing values and outliers, followed by descriptive statistics calculations to understand the general characteristics of the data.	the effectiveness of distance learning. This study used Structural Equation Modeling (SEM) to analyze data from 872 college students in Southern China. The focus was on the relationship between academic self-efficacy, game-based self-regulation strategies, and three dimensions of TAM (perceived usefulness, perceived ease of use, and attitudes toward use) on learning and academic performance.	
23	Mobile App Development Life Cycle (MADLC) (Nasruddin et al., 2023)	Mobile App Development Life Cycle (MADLC), consists of seven phases: identification, design, development, prototyping, testing, deployment, and maintenance. However, this study only covers the testing phase. This method facilitates mobile application development with a structured and orderly approach.	Development of AR mobile application "MYbody" for physical boundaries education and prevention of sexual abuse for children.	Augmented reality for education
24	Model of Multimedia Learning Validation and Evaluation (MMVM) (Baranowski et al., 2011)	Identifying fundamental research needs in the development of effective serious video games to change children's dietary and physical activity behaviors.	Knowing the effects of desired behavior changes and how to achieve better health outcomes, such as reduced obesity.	Video games
25	Agile Method (Extreme programming) (Rahayu et al., 2019)	1. Exploration: the author writes the most basic system requirements. 2. Planning: estimating user needs and determining a schedule for developing the system. 3. Analyzing systems, system design, and system testing 4. Releasing the system that has been created	Creating e-commerce applications for promotional media, communication and information for producers and consumers.	E-commerce applications

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method / Approach Name	Research Procedure / Steps	Research Content	Products Researched
26	Glass Box (Vergiawan Aldrianto Putra & Hendra Afriwan, 2023)	The Design Method used to create this picture book is the Glass Box method. The Glass Box method has 4 stages consisting of: 1. Preparation stage 2. Incubation 3. Lumination 4. Verification	Visual communication media in the form of illustrated story books are proposed to preserve and convey the legend of Goa Putri. This media aims to increase knowledge about local culture through illustrated stories. The design concept for this illustrated story book will use the Paper Cut Digital style featuring shading, silhouette elements, depth perception, and details. The Glass Box method is used to guide the design process,	Story Book Design

Table 1 specifically presents various research methods and approaches commonly used by researchers in the field of multimedia. These methods and approaches are applied according to the multimedia product being developed or studied. Not all the studies in Table 1 focus on product development or creation, but also encompass a wide range of research that utilizes multimedia tools across various fields such as education, health, culture, and many more.

Table 2. Research methods and approaches in the multimedia field for secondary research

No.	Method Name	Research Procedures / Steps	Research Content	Products Researched
1	Narrative Method Systematic Review (Ma et al., 2023)	1. Determining the Topic 2. Formulating Research Questions 3. Searching for Literature 4. Establishing Inclusion and Exclusion Criteria 5. Assessing Study Quality 6. Collecting and Analyzing Data 7. Summarizing Findings and Providing Recommendations	This study explores how VR-based mindfulness training can help improve mental health in adults. As VR technology advances, many researchers are interested in the potential of VR to provide a more immersive mindfulness experience. This experience is believed to help reduce stress, anxiety, and other symptoms of mental health disorders.	Metaverse Virtual Reality Technology in Health
2	Review Method (*Scoping Review*) (Kouijzer et al., 2023)	1. Determining Goals 2. Developing Inclusion and Exclusion Criteria 3. Literature Search 4. Selecting Studies 5. Data collection 6. Data Synthesis 7. Conclusion and Recommendations	This research discusses the implementation of Virtual Reality (VR) technology in various health. The main focus of the review This library is to see how VR is applied in different health *settings* , such as hospitals, physical therapy, rehabilitation, and medical	Application of Virtual Reality in the health sector

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method Name	Research Procedures / Steps	Research Content	Products Researched
			treatment. mental. This study tries to understand the implementation process VR, the challenges faced during its implementation, as well as benefit Which obtained from its use.	
3	T review Critical (critical review) (du Plessis & Jordaan, 2024)	1. Determining Research Objectives and Focus 2. Collecting Relevant Literature 3. Establishing Criteria for Selecting and Eliminating Studies 4. - depth Analysis of Selected Studies 5. Identifying Patterns and Key Findings 6. Assessment of the Quality of Evidence 7. conclusions and recommendations	This study examines the impact of virtual reality (VR) technology on the psychological well-being of hospitalized patients. Lots hospital patients experience stress, anxiety, or feelings uncomfortable due to the less pleasant medical environment. By implementing VR, several hospitals have try provide experience virtual which can help reduce these negative feelings and improve the patient's psychological well-being.	Virtual reality technology in mental health
4	Thematic analysis (Alqahtani & Orji, 2020)	The study recorded 13,549 user reviews of 106 mental health apps across the App Store and Google Play. The reviews were analyzed thematically to identify key themes related to the apps' strengths, weaknesses, and user needs.	This study assessed aspects such as user interface, feature variety, adaptive functionality, and security aspects of mental health apps. The main findings showed that apps with user-friendly interfaces and adaptive functionality received good ratings. In contrast, issues with usability, security, and lack of variety and personalization have caused users to stop using the apps.	Application Interface
5	Document review and questionnaire analysis (Nair et al., 2019)	The research method in this journal involves two main approaches: document review and questionnaire analysis. Document review was conducted to evaluate the obesity rate in Malaysia and the health benefits of physical activity. Furthermore, a questionnaire was distributed online through social media platforms to collect data on respondents' fitness habits	The "Endure" app effectively increases users' motivation to exercise by leveraging gamification and augmented reality. The survey indicated that many respondents lack discipline in exercising, with almost half being inactive regularly. Features such as distance calculation and countdown timers proved important, suggesting that fun elements in fitness apps	Gamification, Augmented Reality

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

No.	Method Name	Research Procedures / Steps	Research Content	Products Researched
		and perceptions. The questionnaire included demographic questions, frequency of physical activity, and views on existing fitness apps in the market.	can increase user engagement and help them achieve their health goals.	
6	Content Analysis (Quesenberry & Coolsen, 2019)	1. A random sample of 2,000 viral advertising videos was taken from platforms such as YouTube and Facebook in English. 2. These videos are classified based on the number of acts or story chapters developed in the video (0 to 5 chapters). 3. Data on the number of shares and views for each video was collected during the first 23 days since launch.	This study aims to identify the influence of story development on the success of viral advertising videos. The results showed that videos with full story development had higher shares and views. The study also found that drama elements such as exposition, climax, and resolution helped increase emotional appeal and increased the likelihood of videos being shared by viewers.	Video advertisement
7	Conceptualization Method (Eckler & Rodgers, 2014)	1. Defining Viral Marketing and Viral Advertising: The article begins by distinguishing between viral marketing and viral advertising, which are often used interchangeably in literature and business practice. 2. Literature Analysis and Industry Examples: The author reviews relevant literature and examples of viral advertising such as advertising campaigns from John West, Dove, Burger King, and others to identify the key characteristics and elements of viral advertising.	This study explores the unique characteristics of viral advertising, including elements such as the persuasive nature of the content, the presence of an identifiable sponsor, and how these advertising messages spread among users through digital platforms without direct distribution costs. The article also provides historical examples of viral campaigns to demonstrate how viral advertising can impact brand awareness, consumer perception, and sometimes directly increase product sales.	Video advertisement

In Table 2, more specific research methods and approaches in the field of education are presented, which utilize primary research or examine and analyze existing research findings. Various methods and approaches can be employed depending on the procedure followed. These secondary research studies provide us with extensive insights into the implementation and effectiveness of multimedia tools used across different fields. By collecting more data,

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

we can compare the results obtained by researchers worldwide who are conducting studies in the multimedia field.

The collection of research methods and approaches above indicates that each study has a different approach. For instance, in AR and VR research, there are many methods that can be used depending on the research objectives, whether for development or implementation. In game development research, there are actually many methods and approaches that can be used. Furthermore, from various secondary studies, we can identify a wide range of multimedia products that are currently trending. This research is still ongoing due to several limitations. One of the limitations is the limited sources, short research timeframe, and limited resources. Hopefully, in the next study, we will be able to add more references and use more appropriate methods for each field of study in multimedia.

4. CONCLUSION

From the results obtained, we can see that each area of study in multimedia has different specifications, requiring different methods and approaches in its application. This is done to ensure that each study produces targeted outcomes, avoiding being too general and resulting in biases. The research flow for each method and approach has been successfully collected and presented in the table above. Therefore, this outcome can serve as a glossary or dictionary of methods for future researchers when deciding on the appropriate research method according to the field of study they are investigating.

AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

REFERENCES

Abutabenjeh, S., & Jaradat, R. (2018). Clarification of research design, research methods, and research methodology: A guide for public administration researchers and practitioners. *Teaching Public Administration*, *36*(3), 237–258. https://doi.org/10.1177/0144739418775787

Alqahtani, F., & Orji, R. (2020). Insights from user reviews to improve mental health apps. *Health Informatics Journal*, *26*(3), 2042–2066. https://doi.org/10.1177/1460458219896492

Azhar, S., Ahmad, I., & Sein, M. K. (2010). Action Research as a Proactive Research Method for Construction Engineering and Management. *Journal of Construction Engineering and Management*, *136*(1), 87–98. https://doi.org/10.1061/(asce)co.1943-7862.0000081

Bevan, C., & Green, D. (2018). A mediography of virtual reality non fiction: Insights and future directions. *TVX 2018 - Proceedings of the 2018 ACM International Conference on Interactive Experiences for TV and Online Video*, 161–166. https://doi.org/10.1145/3210825.3213557

Boaduo, N. A.-P. (2011). Systematic analysis and interpretation of collected data for a research study: A practical methodological framework for writing research report. *Educational Research and Reviews*, *6*(2), 140–146. https://www.scopus.com/inward/record.uri?eid=2-s2.0-79955964180&partnerID=40&md5=51c84cbc6afb111d045f650b71891ba9

Bookstaver, M. (2021). Secondary Data Analysis. In *The Encyclopedia of Research Methods in Criminology and Criminal Justice: Volume II: Parts 5-8* (pp. 531–534). wiley. https://doi.org/10.1002/9781119111931.ch107

Cannavo, A., Demartini, C., Morra, L., & Lamberti, F. (2019). Immersive Virtual Reality-Based Interfaces for Character Animation. *IEEE Access*, *7*, 125463–125480. https://doi.org/10.1109/ACCESS.2019.2939427

Chang, S. N., & Chen, W. L. (2017). Does visualize industries matter? A technology foresight of global Virtual Reality and Augmented Reality Industry. In M. T.-H., L. A.D.K.-T., & P. S.D. (Eds.), *Proceedings of the 2017 IEEE International Conference on Applied System Innovation: Applied System Innovation for Modern Technology, ICASI 2017* (pp. 382–385). Institute of Electrical and Electronics Engineers Inc. https://doi.org/10.1109/ICASI.2017.7988432

Chen, C. A., & Lai, H. I. (2021). Application of augmented reality in museums – Factors influencing the learning motivation and effectiveness. *Science Progress*, *104*(3), 1–16. https://doi.org/10.1177/00368504211059045

Choi, K., & Kwag, H. (2014). Comparing urban public service using super-efficiency model and statistical testing: Cases using secondary data. *International Journal of Applied Engineering Research*, *9*(22), 14795–14802. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84925426493&partnerID=40&md5=e1933503991cac38b4e1fbe5c136101c

Das, S., Kumar, S. N., Yepuri, S., Ujwal, Y. K., & Srinath, R. (2023). StoryTube-Generating 2D Animation for a Short Story. *Proceedings of 3rd IEEE International Conference on Computational Intelligence and Knowledge Economy, ICCIKE 2023*, 91–96. https://doi.org/10.1109/ICCIKE58312.2023.10131811

Divan, A., Ludwig, L. O., Matthews, K. E., Motley, P. M., & Tomljenovic-Berube, A. M. (2017). Survey of research approaches utilised in the scholarship of teaching and learning publications. *Teaching and Learning Inquiry*, *5*(2), 16–29. https://doi.org/10.20343/teachlearninqu.5.2.3

du Plessis, J., & Jordaan, J. (2024). The impact of virtual reality on the psychological well-being of hospitalised patients: A critical review. *Heliyon*, *10*(2), e24831. https://doi.org/10.1016/j.heliyon.2024.e24831

Götzl, C., Hiller, S., Rauschenberg, C., Schick, A., Fechtelpeter, J., Fischer Abaigar, U., Koppe, G., Durstewitz, D., Reininghaus, U., & Krumm, S. (2022). Artificial intelligence-informed mobile mental health apps for young people: a mixed-methods approach on users' and stakeholders' perspectives. *Child and Adolescent Psychiatry and Mental Health*, *16*(1), 1–

19. https://doi.org/10.1186/s13034-022-00522-6

Hikmi, R., Simorangkir, M., & Sudrajat, A. (2020). Development of interactive multimedia lectora inspire problem based on science. In S. B. & R. J. (Eds.), *Journal of Physics: Conference Series* (Vol. 1485, Issue 1). Institute of Physics Publishing. https://doi.org/10.1088/1742-6596/1485/1/012036

Huan-Niemi, E., Rikkonen, P., Niemi, J., Wuori, O., & Niemi, J. (2016). Combining quantitative and qualitative research methods to foresee the changes in the Finnish agri-food sector. *Futures*, *83*, 88–99. https://doi.org/10.1016/j.futures.2016.03.007

Iyamu, T. (2009). The challenges of qualitative case study research approach in the field of information systems. *International Conference on Enterprise Information Systems and Web Technologies 2009, EISWT 2009*, 100–107. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84878161513&partnerID=40&md5=a9b9d9f3a3736e635f3e3da9de7c7438

Jeon, B., Oh, J., & Son, S. (2021). Effects of tooth brushing training, based on augmented reality using a smart toothbrush, on oral hygiene care among people with intellectual disability in Korea. In *Healthcare (Switzerland)* (Vol. 9, Issue 3). mdpi.com. https://doi.org/10.3390/healthcare9030348

Jiang, J., Zhou, G., Duffy, B. M., & Duffy, V. G. (2023). AR and VR – A Review on Recent Progress and Applications. In C. J.Y.C., F. G., & F. X. (Eds.), *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* (Vol. 14058, pp. 46–63). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-3-031-48050-8_4

Jones, R., Montalvo, F., Sasser, J., Smither, J. A., & McConnell, D. S. (2023). Applying user Experience Principles to Food Distribution in Nursing Homes. *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care*, *12*(1), 151–155. https://doi.org/10.1177/2327857923121035

Kale, P. S., Deshmukh, T. K., & Bhoite, S. (2024). Virtual Reality: Emerging Technologies and Future Directions. In S. J., S. P., C. Y., A. K.U., A. P.K., M. N., T. G., & S. S. (Eds.), *15th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2024* (Vol. 2, pp. 761–767). Grenze Scientific Society. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85209077070&partnerID=40&md5=ff6bb3bce51dbf07a8a78c9620c7327d

Kouijzer, M. M. T. E., Kip, H., Bouman, Y. H. A., & Kelders, S. M. (2023). Implementation of virtual reality in healthcare: a scoping review on the implementation process of virtual reality in various healthcare settings. *Implementation Science Communications*, *4*(1), 1–29. https://doi.org/10.1186/s43058-023-00442-2

Kurnia Nurhayati, I., Noor Prawita, H., Kurniasih, N., & Nurhasanah, Y. (2023). Virtual Reality (VR) Technology in Foreign Language Training for Indonesia's SMEs Actors Teknologi Realitas Virtual (RV) dalam Pelatihan Bahasa Asing untuk Pelaku UMKM Indonesia. *Jurnal Sosioteknologi*, *22*(3).

Lázaro, M., & Marcos, E. (2006). An approach to the integration of qualitative and quantitative research methods in software engineering research. *CEUR Workshop Proceedings*, *240*, 757–764. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84878347075&partnerID=40&md5=820c21dce3693e35e25571c282a1d5dc

Lin, H. C. K., Lin, Y. H., Huang, Y. M., Wang, T. H., & Su, L. K. (2020). Effects of incorporating ar into a board game on learning outcomes and emotions in health education. *Electronics (Switzerland)*, *9*(11), 1–15. https://doi.org/10.3390/electronics9111752

Lopes, I. T. (2015). Research methods and methodology towards knowledge creation in accounting. *Contaduria y Administracion*, *60*, 9–30. https://doi.org/10.1016/j.cya.2015.08.006

Luo, X., Wang, Y., Lee, L. H., Xing, Z., Jin, S., Dong, B., Hu, Y., Chen, Z., Yan, J., & Hui, P. (2024). Using a virtual reality interview simulator to explore factors influencing people's behavior. *Virtual Reality*, *28*(1), 1–20. https://doi.org/10.1007/s10055-023-00934-5

Ma, J., Zhao, D., Xu, N., & Yang, J. (2023). The effectiveness of immersive virtual reality (VR) based mindfulness training on improvement mental-health in adults: A narrative systematic review. *Explore*, *19*(3), 310–318. https://doi.org/10.1016/j.explore.2022.08.001

Mattila, O., Hamari, J., Holopainen, J., & Pöyry, E. (2021). Mixed, augmented, and virtual reality: Services and applications. In B. T.X. (Ed.), *Proceedings of the Annual Hawaii International Conference on System Sciences* (Vols. 2020-January, pp. 1611–1612). IEEE Computer Society. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85108144306&partnerID=40&md5=ca0df6982d371689e674232b5b4eb0c1

Maydiantoro, A., Haenilah, E. Y., Hariri, H., Firdaus, R., Sunyono, & Sudjarwo. (2023). Development of Virtual Reality Technology in Entrepreneurial Learning Containing Ethnopreneurship. *WSEAS Transactions on Environment and Development*, *19*(July), 645–654. https://doi.org/10.37394/232015.2023.19.63

Mulisa, F. (2022). When Does a Researcher Choose a Quantitative, Qualitative, or Mixed Research Approach? *Interchange*, *53*(1), 113–131. https://doi.org/10.1007/s10780-021-09447-z

Murodillaevich, N. F., Eshpulatovich, G. U., & Kuvondik, K. (2020). Improve teaching and learning approach 3D primitives with virtual and augmented reality. *2020 International Conference on Information Science and Communications Technologies, ICISCT 2020*. https://doi.org/10.1109/ICISCT50599.2020.9351418

Nair, Y. N. I., Azman, F., Rahim, F. A., & Cheng, L. K. (2019). Endure: Augmented reality fitness mobile application. *2019 IEEE 4th International Conference on Computer and Communication Systems, ICCCS 2019*, 419–424. https://doi.org/10.1109/CCOMS.2019.8821640

Ozcakir, B., & Cakiroglu, E. (2021). An augmented reality learning toolkit for fostering spatial ability in mathematics lesson: Design and development. *European Journal of Science and Mathematics Education*, *9*(4), 145–167. https://doi.org/10.30935/SCIMATH/11204

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

Pabón-Leal, J. L., Rodríguez-Ibáñez, R. E., & Mendoza-Gafaro, R. E. (2024). Trends in multimedia engineering: a glocal view from the educational sector. *Aibi, Revista de Investigacion Administracion e Ingenierias*, *12*(2), 155–165. https://doi.org/10.15649/2346030X.3828

Peláez, C. A., Solano, A., Granollers, T., & Collazos, C. (2019). Methodologies and Trends in Multimedia Systems: A Systematic Literature Review. In M. G. (Ed.), *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 11578 LNCS* (pp. 109–127). Springer Verlag. https://doi.org/10.1007/978-3-030-21902-4_9

Petty, N. J., Thomson, O. P., & Stew, G. (2012). Ready for a paradigm shift? Part 2: Introducing qualitative research methodologies and methods. *Manual Therapy*, *17*(5), 378–384. https://doi.org/10.1016/j.math.2012.03.004

Rahayu, S., Fitriani, L., Kurniawati, R., & Bustomi, Y. (2019). E-commerce based on the Marketplace in efforts to sell agricultural products using Xtreme programming approach. *Journal of Physics: Conference Series*, *1402*(6). https://doi.org/10.1088/1742-6596/1402/6/066108

Ramos-Aguiar, L. R., & Alvarez-Rodriguez, F. J. (2021). Teaching Emotions in Children with Autism Spectrum Disorder Through a Computer Program with Tangible Interfaces. *Revista Iberoamericana de Tecnologias Del Aprendizaje*, *16*(4), 365–371. https://doi.org/10.1109/RITA.2021.3125901

Rashid, S., Khattak, A., Ashiq, M., Rehman, S. U., & Rasool, M. R. (2021). Educational landscape of virtual reality in higher education: Bibliometric evidences of publishing patterns and emerging trends. *Publications*, *9*(2). https://doi.org/10.3390/publications9020017

Rasyida, R., Ali Nurdin, E., & Rasim. (2023). Pembelajaran Berbasis Metaverse – Virtual Reality Menggunakan Spatial.io dengan Model Discovery Learning untuk Meningkatkan Pemahaman dan Minat Siswa . *Jurnal Pendidikan Tambusai*, *7*(2), 15875–15883.

Sacks, R. (2005). Anatomy of a phone search: Primary research using the original "online." *Searcher:Magazine for Database Professionals*, *13*(3), 42–47. https://www.scopus.com/inward/record.uri?eid=2-s2.0-15244341703&partnerID=40&md5=c32db57db54f082d733a741066a5a825

Salihbegovic, F. (2020). The encounter with the real: What can complicite's theatre performance the encounter teach us about the future of VR narratives? *Body, Space and Technology*, *19*(1), 125–152. https://doi.org/10.16995/BST.336

Salmon, J. (2017). Quantitative or qualitative research: Methods, ethical issues and future directions. In *Data Collection: Methods, Ethical Issues and Future Directions* (pp. 3–14). Nova Science Publishers, Inc. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85016744108&partnerID=40&md5=872e608adf99b5f5b1623aa3aa186de0

Sari, I. P., Juhana, A., & Nurhidayatulloh, N. (2023). Global trends in the study of projection mapping technology using bibliometric analysis. *Journal of Print and Media Technology Research*, *12*(4), 219–229. https://doi.org/10.14622/JPMTR-2309

Schipper-Kramer Freher, N., Bexkens, A., van Bennekom, M., Veling, W., & Bockting, C. L. H. (2022). Virtual reality for psycho-education on self-stigma in depression: Design of a randomised controlled trial. *Psychiatry Research Communications*, *2*(4), 100086. https://doi.org/10.1016/j.psycom.2022.100086

Taswadi, Kurnia, G. J., & Pawitan, Z. (2025). Analysis of Computational Bibliometric Mapping in Multimedia for Art Learning Media Publications using VOSviewer. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, *52*(1), 163–179. https://doi.org/10.37934/araset.52.1.163179

Torales, J., & Barrios, I. (2023). Research design: Classification algorithm and essential features. *Medicina Clinica y Social*, *7*(3), 210–235. https://doi.org/10.52379/mcs.v7i3.349

Triatmaja, Y. K., Aryotejo, G., Nugraheni, D. M. K., & Noranita, B. (2022). Gamification In E-Learning For Playgroup. *Proceedings - International Conference on Informatics and Computational Sciences*, *2022-September*, 146–151. https://doi.org/10.1109/ICICoS56336.2022.9930568

Vergiawan Aldrianto Putra, & Hendra Afriwan. (2023). Perancangan Cerita Bergambar Legenda Objek Wisata Goa Putri Menggunakan Gaya Paper Cut Digital. *Jurnal Riset Rumpun Seni, Desain Dan Media*, *2*(1), 112–122. https://doi.org/10.55606/jurrsendem.v2i1.1305

Wang, W., & Wu, S. (2024). Analyzing User Psychology and Behavior in Short-Form Video Shopping Platforms: An Integrated TAM and ISS Model Approach. *SAGE Open*, *14*(4), 1–17. https://doi.org/10.1177/21582440241287076

Zhu, W., Wang, X., & Gao, W. (2020). Multimedia Intelligence: When Multimedia Meets Artificial Intelligence. *IEEE Transactions on Multimedia*, *22*(7), 1823–1835. https://doi.org/10.1109/TMM.2020.2969791

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535

DOI: https://doi.org/10.17509/edsence.v6i2.76393
p-ISSN:2685-2489 | e-ISSN:2685-2535