Utilization of Construct 2-Based Interactive Digital Media for Enhancing Effective Communication Course in PG PAUD FIP Unimed Education Program

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Abstract. The objective of this study is to create interactive digital media utilizing Construct 2 for the Effective Communication course within the PG PAUD FIP UNIMED Study Program. The motivation behind this research stems from the need for innovative digital media specifically tailored for educational purposes. Employing a developmental research approach, the study involves initial analysis, material identification, product preparation, and testing stages. Upon the development of the product, an evaluation is conducted to assess the feasibility of Construct 2 interactive digital media as a learning tool for Effective Communication in Education. The assessment encompasses factors such as the media's suitability as a learning medium, its design, and its appeal to users. Following the ADDIE model, the research involves four primary stages: analysis, design, development, and implementation. However, the study concludes at the implementation stage. Validation is carried out by teams of media and material expert lecturers, along with testing on 60 students from the Early Childhood Education Teacher Education program at Medan State University. Data collection involves the use of questionnaires. The overall assessment of the media aspect is classified as "Very Good," with a total score of 93 and an average rating of 4.65. The results of the evaluation for the material aspect reveal a categorization of "Good," achieving a total score of 88. This implies that the interactive digital media crafted for the Effective Communication course in education stands as a suitable An educational tool and autonomous learning resource for students. during their learning journey.

Keywords: Effective Communication Education, Construct 2, Interactive Digital Media

1   Introduction

The rapid advancement of science and information technology characterizes the current era, often referred to as the era of globalization and information and communication technology (ICT). In the field of education, there is a growing emphasis on utilizing multimedia learning applications to facilitate the learning process. These applications, especially interactive learning media development tools, play a crucial role in delivering information and fostering communication among learners [12]. The utilization of learning media represents a systematic, creative, and innovative endeavor aimed at crafting experiences that effectively facilitate student learning, ultimately leading to the production of high-quality graduates by educational institutions [16].

Yaumi [19] emphasizes that choosing suitable media for educational purposes requires a thorough examination of multiple factors, including students' anticipated capabilities, individual traits, preferred learning methods, and the educational and developmental settings. Learning media serves as a vital tool for educators in effectively communicating concepts, particularly when students can actively engage with the media. In this regard, computer technology plays a central role in enabling the development and dissemination of learning materials, while the adoption of Android platforms presents opportunities for deploying educational media to students [15].

Learning activities are inherently interconnected, functioning as a communication process wherein messages are conveyed between educators as communicators and learners as communicants. Educators' methods of message delivery through media are integral to this communication process. As such, a systems approach to learning underscores the interrelation between various components. With the advent of information technology, media has emerged as a compelling area of study, garnering significant interest across diverse scientific disciplines. Clark, referenced in Hastings and Tracey [7], suggests that media acts as a catalyst for learning, underscoring its essential function in educational contexts. Consequently, recognizing the constraints of traditional media, there arises a pressing need to elevate their quality or explore alternatives that offer greater innovation and interactivity. Leveraging computer-based design applications to develop learning media emerges as a promising approach to address this challenge.

The attainment of success in the learning process is contingent upon the harmonious integration of several indispensable components, as underscored by Cepi Riyana [3], including well-defined learning objectives, meticulously curated learning materials, strategic implementation of learning strategies, judicious utilization of learning media, and comprehensive evaluation mechanisms. Additionally, Ramli Abdullah [10] highlights the pivotal role of educators' discernment and precision in selecting appropriate methods and media for knowledge dissemination, thus significantly influencing the effectiveness of the learning process.

In the current landscape of teaching and learning activities, the effective and efficient utilization of learning media assumes paramount importance, as it holds the potential to instill enthusiasm, motivation, and cultivate a keen interest in learning endeavors. Elevating the caliber of the learning process necessitates concerted endeavors towards the development of interactive learning media. This entails the fusion of diverse media formats to engender a learning environment that is not only interactive but also effective, efficient, captivating, and enjoyable. By integrating various media types, the learning experience can be augmented, making it more immersive and conducive to knowledge acquisition.[11]

Moreover, the utilization of learning media that resonates with students and captivates their interest can significantly enhance the efficacy of educational initiatives, particularly when students are empowered to interact with the media themselves. Therefore, the deployment of learning media that is both engaging and interactive holds immense potential in fostering an enriching and impactful learning journey for students.

While students increasingly favor the integration of information and communication technology (ICT) in learning methods, its adoption within teaching practices remains constrained. Consequently, students often exhibit reduced enthusiasm and interest in the learning process. Learning media plays a pivotal role in education as it serves as a conduit for information transmission from educators to learners [2]. These media encompass various materials, methodologies, instructional guidelines, and activities systematically designed to enhance competencies and promote independent learning [6]. Without such media, learning

tends to be monotonous, relying heavily on conventional methods like reading, listening, note-taking, and rote memorization, with instructors predominantly relying on textbooks. Therefore, to enhance the quality of learning in the Effective Communication in Education course, there is a pressing need for more engaging, effective, and efficient learning media.

The exploration and integration of interactive learning media using the Construct 2 application will be led by an expert researcher with a focus on "Eye-Studying Effective Communication in Education." Notably, "Eye-Studying" is a term unique to the Bachelor's program in Early Childhood Education at the Faculty of Education, Medan State University. This course presents an extensive range of subjects, delving into the core principles of effective communication. These encompass a thorough examination of its scope, a comprehensive understanding of its constituent elements, an appreciation of its diverse functions, an exploration of its underlying principles, and a classification of its various types. Moreover, the course explores theories elucidating effective communication within educational contexts, delves into the practical aspects of educational communication, including an in-depth analysis of the communication process. It also addresses challenges relevant to communication effectiveness within early childhood education institutions and explores interpersonal and cross-cultural communication dynamics within educational settings. Furthermore, the course encompasses an exploration of communication media, ranging from visual to audio and audio-visual tools, as well as the integration of communication technology into educational practices. Linguistic analysis, logical reasoning, codes, and symbols in communication are also examined, alongside the nuances of verbal and non-verbal communication. Additionally, ethical considerations and etiquette in communication within the learning environment are discussed comprehensively.[8]

Based on the explanation provided, the author expresses a keen interest in conducting research and development on the topic of **"Utilization Of Construct 2-Based Interactive Digital Media For Enhancing Effective Communication Course In PG PAUD FIP UNIMED Education Program"**. The aim is to create learning media that can facilitate students' learning process, enabling them to study optimally and comprehend course material independently, thereby enhancing their understanding of effective communication in education. The envisioned interactive learning media is expected to serve as a valuable tool in assisting students in navigating through the complexities of the subject matter and fostering their ability to grasp key concepts effectively. Ultimately, the goal is to contribute to the improvement of students' learning outcomes and overall educational experience in the field of communication studies.

2   Research Method

In this study, the researcher has opted to utilize the Research and Development (RnD) method, a systematic approach that is commonly employed to generate targeted products and assess their efficacy, as articulated by Sugiyono [18]. . Research and Development (RnD) serves as a methodological framework geared towards the creation of specific products intended for application within the educational realm, while also encompassing an evaluation component to gauge their effectiveness, as highlighted by Sugiyono [18]. . Essentially, RnD serves as a structured process designed to facilitate the development and appraisal of learning materials to ensure their appropriateness and efficacy within educational contexts.

In this research, The integration of interactive learning media follows the structured framework of the ADDIE Research and Development (RnD) development model. This model, outlined by Sugiyono (2014), consists of five sequential stages: analysis, design, development, implementation, and evaluation. Furthermore, Hishamudin explained delineates the research design stages, which encompass: 1) Analysis, entailing the scrutiny of curriculum and materials, as well as media analysis and a comprehensive understanding of target user characteristics; 2) Design, which revolves around the creation of material components, the preparation of textual materials, and the structuring of material delivery mechanisms utilizing flowcharts; 3) Development, encapsulating the creation of media utilizing articulate storyline software, expert assessments, validation, and subsequent revisions; 4) Implementation, which involves a preliminary trial phase; and 5) Evaluation, integrating media refinements based on feedback and commentary post initial trials. This research constitutes an applied study, wherein learning methodologies utilizing interactive digital media with Construct 2 are implemented [9].

The research methodology employed for constructing the ADDIE model involves a structured approach comprising five sequential stages: analysis, design, development, implementation, and evaluation. Similarly, the developmental process of Construct 2-based interactive learning media within the Effective Communication in Education course unfolds across five distinct phases, encapsulating : a) the analysis stage, entailing comprehensive needs assessment, student profiling, and material examination; b) the design stage, which concentrates on the creation of flowcharts and storyboards; c) the development stage, encompassing the creation of learning media and the conduct of validation tests by expert evaluators; d) The implementation phase, a pivotal stage involving the distribution and utilization of interactive learning media, marks a significant stride in the research journey. Here, the researchers delve into the practical application of interactive learning media within the context of the Effective Communication in Education course, harnessing the capabilities of the Construct 2 application.[5]

3 Results and Discussion

Research and development endeavors to create interactive digital media utilizing Construct 2, accessible on both Android devices and laptops, to facilitate students' self-directed learning. This process commences with data gathering, literature review, and user needs analysis. Subsequently, it progresses to the design phase of interactive digital media tailored for student use[20], considering hardware and software specifications. This includes crafting a navigational flowchart to illustrate system operation.

In digital media applications, the menu typically comprises several sections that organize the various features and functionalities of the software. Here's an explanation of common sections you might find in such menus:

a. Home
   This section serves as the main landing page of the application, providing access to essential features, recent content, or important notifications.
b. Content Library or Media Library
   This section allows users to browse and access the available digital media content, such as images, videos, audio files, documents, or interactive materials. Users may be able to search, filter, or organize the content based on different criteria.

c. Creation Tools or Editor

This section provides tools and features for creating or editing digital media content. It may include options for editing images, videos, audio files, or documents, as well as tools for adding effects, text, annotations, or interactive elements.

d. Activities or Interactive Features

This section offers various interactive features or activities that users can engage with, such as quizzes, polls, surveys, games, or simulations. These activities are designed to enhance user engagement and learning outcomes[13].

e. Assessment or Evaluation

This section allows users to assess their knowledge, skills, or progress through quizzes, tests, assessments, or surveys. Users may receive feedback or results to track their performance and identify areas for improvement.

f. Collaboration or Sharing

This section facilitates collaboration and sharing among users, allowing them to collaborate on projects, share content, or provide feedback to each other. It may include features for sharing files, inviting collaborators, or commenting on content.

g. Settings or Preferences

This section enables users to customize their experience by adjusting settings or preferences, such as language, notifications, privacy settings, or accessibility options.

h. Help or Support

This section provides users with access to help resources, such as user guides, FAQs, tutorials, or customer support channels. Users can seek assistance or find answers to their questions related to using the application.

These sections was designed in this research to simplify navigation and improve user experience by organizing various features and functions of the digital media application into logical categories.

The developed product comprises interactive digital media tailored for Effective Communication in Education, seamlessly compatible with laptops, computers, and Android devices. The content, meticulously curated within the Construct 2 application, encompasses various components, including but not limited to: (1) Installation Menu Display, (2) Loading Display, (3) Introduction Menu Display, (4) Main Menu Display, (5) Material Menu Display, (6) General Instructions for Questions, (7) Practice Questions Display, and (8) Practice Question Scores Display. These digital modules, engineered with a comprehensive system, are meticulously implemented utilizing programming languages, thereby emulating an application-like experience for users [21].
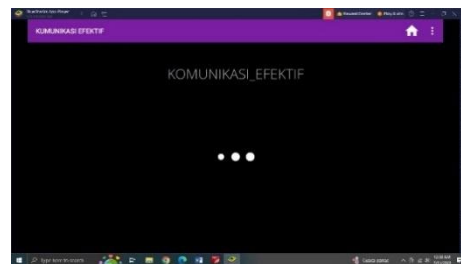

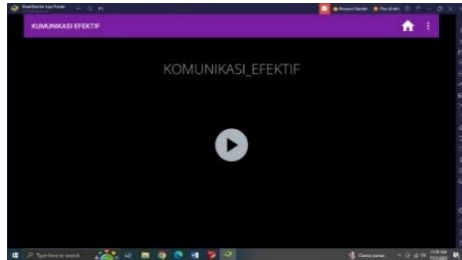**Fig. 1.** Installation Menu Display   **Fig. 2.** Loading Display

Fig. 3. Introduction Menu Display

Fig. 4. Main Menu Display

Fig. 5. Material Menu Display

Fig. 6. General Instructions for Questions

Fig. 7. Practice Questions Display

Fig. 8. Practice Question Scores Display

Following the development phase, the research media product is introduced to its intended users, namely students, initiating with the installation process to enable autonomous utilization within the learning environment. Subsequently, The Construct 2-based learning media application tailored for the Effective Communication in Education course undergoes thorough scrutiny and validation processes facilitated by both Material Experts and Media Experts. Valuable feedback and insights gleaned from these experts, in conjunction with input from users, are methodically integrated into subsequent revisions of the media product application [1]. This iterative process ensures that the final product aligns with the desired learning objectives and effectively meets the needs and preferences of its target audience.
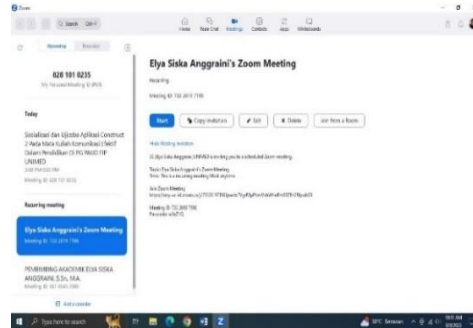
Fig. 9. Trial Attendance List
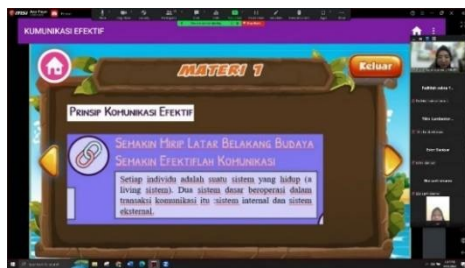

Fig. 10. Trial Zoom Invitation

Fig. 11. Implementation of Online Testing

Implementation of online testing refers to the process of conducting assessments, examinations, or quizzes using digital platforms and technologies over the internet. This approach offers several advantages such as flexibility, accessibility, and scalability. Here are some key components and considerations for implementing online testing: (a) Selection of Online Testing Platform: Choose a reliable and secure online testing platform that meets the requirements of your educational institution or organization. Consider factors such as user interface, features, security measures, technical support, and compatibility with various devices and browsers, (b) Creation of Test Content: Develop test content including questions, instructions, multimedia elements (if necessary), and any additional resources. Ensure that the content is clear, well-organized, and aligned with the learning objectives and curriculum, (c) Setting Up Assessments: Use the online testing platform to create and configure assessments according to your requirements. Specify parameters such as test duration, availability, format (e.g., multiple choice, essay, fill-in-the-blank), randomization of questions, and grading options, (d) To safeguard the integrity of the testing process and mitigate the risk of cheating, it is imperative to incorporate a robust set of security measures. These measures encompass a variety of features designed to deter dishonest practices and uphold the fairness and accuracy of assessments. Key components of these security measures may include the introduction of randomized question orders, imposition of time limits on tests, enforcement of password protection for access, implementation of IP restrictions to control entry into the testing environment, and utilization of plagiarism detection tools to identify any instances of unauthorized use of external sources. By incorporating these comprehensive security features, testing administrators can fortify the testing environment, thereby ensuring a reliable and trustworthy evaluation process that accurately reflects the knowledge and capabilities of the test-takers, (e) Accessibility and Accommodations: Consider the needs of diverse learners and

provide accommodations as necessary. Ensure that the online testing platform supports accessibility standards and features such as screen reader compatibility, adjustable font sizes, and alternative formats for multimedia content, (f) Communication and Instructions: Clearly communicate the testing procedures, guidelines, and expectations to students or test-takers. Provide instructions on how to access the online testing platform, navigate the interface, submit responses, and seek assistance if needed, (g) Monitoring and Proctoring: Implement measures for monitoring test-takers during online assessments to maintain academic integrity. This may involve real-time proctoring, remote monitoring, or automated monitoring features to detect suspicious behavior or irregularities, (h) Data Privacy and Confidentiality: Ensure compliance with data privacy regulations and maintain the confidentiality of test-taker information and results. Use encryption, secure authentication methods, and data encryption protocols to protect sensitive data transmitted during online testing, (i) Technical Support and Troubleshooting: Provide adequate technical support and assistance to test-takers in case of technical issues or difficulties accessing the online testing platform. Offer resources, tutorials, and helpdesk services to address common problems and troubleshoot issues efficiently, (j) Evaluation and Feedback: Evaluate the effectiveness of online testing implementation through feedback from stakeholders, including students, instructors, and administrators. Collect data on test performance, user experience, and satisfaction to identify areas for improvement and inform future decision-making, (k) By carefully planning and implementing online testing strategies, educational institutions and organizations can effectively assess learning outcomes, enhance student engagement, and adapt to the evolving landscape of digital education.

Table 1. Presents the Outcomes of the Validation Process Overseen by Material Experts

Aspect Which assessed	Score
Learning	
1. Suitability of material to competency base	4
2. The clarity in formulating learning objectives	4
3 . The suitability of the educational materials in relation to the achievement of competency indicators.	4
4 . The alignment and correlation among Learning Objectives (K.D.), Indicators, Educational Materials, and Evaluation Components.	4
5 . The clarity of the language used in the material.	5
6 . Presentation systematic material	5
7 . The material presented is interesting	4
8 . Appropriateness of the comprehensiveness of the material flow.	5
9 . Concept compatibility practice questions with the material	4
Clarity of instructions for working on questions	5
1 . The clarity and comprehensibility of the material flow facilitated by language use.	4
2. The efficacy of the media in enhancing students' motivation and eagerness for learning.	5
3. The capacity of the media to augment students' knowledge acquisition.	5
Contents	
1. Suitability learning materials with basic competencies	4
2. Suitability material with Indicator	4

3. Suitability of material to learning objectives	4
4. Clarity material Which be delivered	5
5. Systematics delivery of material	4
6. Suitability question variations with material	4
7. Suitability visual display with material	5
Amount Score Max	100
Amount Score	88
Average evaluation = $\frac{\text{number of aspects obtained}}{\text{number of aspects}}$	4.4

According to the findings presented in Table 5.1, Validators' evaluation of the material extracted from The interactive digital module developed for effective communication in education demonstrates its quality, being classified as "Good" with an impressive overall score of 88 out of 100. Subsequently, the average score, when translated into a Likert scale ranging from 1 to 5, yields a highly respectable rating of 4.4 out of 5. Hence, based on these robust validation outcomes, it is evident that the material developed within the realm of interactive digital media garners a "Good" classification. This underscores its suitability for further testing and implementation with students enrolled in the PG PAUD FIP UNIMED study program, thus highlighting its potential efficacy in enhancing the learning experience within the educational context.

Table 2. Expert Media Validation Results

Aspect Which assessed	Score
Quality Content/Material	
1. The adherence to truthfulness and accuracy.	5
2. Precision and correctness.	5
3. Balance presentation of ideas	4
4. Suitability with details level (*Appropriate Levels of Details*)	4
Learning	
1. Activity (Activities)	5
2. Clarity objective learning (Alignment among learning goals)	4
3. Characteristics participant educate	4
4. Evaluation (Assessment)	4
Bait come back And Adaptation	
The learning content model allows for diverse feedback and adaptability, catering to the unique preferences and progress of individual students.	5
Motivation	
Ability _ _ Stimulate student curiosity and inquisitiveness.	5
The capacity of media to contribute to the augmentation of students' knowledge.	5

The ability of media to enhance student motivation and thereby increase their understanding.	5
Design Presentation	
design presented is attractive and available information visual And audio For increase learning	5
Interaction Use	
1. Seamless functionality for effortless touch and drag interactions.	5
2. Can be easily managed and maintained.	5
3. The user-friendliness and ease of operation of learning media.	5
Accessibility	
1. Convenience of access interactive digital media applications	5
2. Design format and control presentation accommodate student	4
Reusability	
The capabilities of interactive digital media allow for diverse and varied learning experiences, accessible to students with different preferences and needs.	5
Fulfil Standard	
Compliance with international standards and specifications.	4
Total Score Maximum	100
Total Score	93
The mean assessment score = $^{\text{total score}/}_{\text{number of aspects}}$	4, 65

$$\text{Average Evaluation (AE)} = (\sum (j * h * s * k * o * r)) / \partial$$

Where:
- j represents a variable,
- *h* denotes another variable,
- s stands for a different variable,
- k represents yet another variable,
- o is a variable,
- r signifies a variable,
- ∂ is a constant or divisor.

This equation seems to calculate the average evaluation based on multiple variables j, *h*, s, k, o, and
r, with a divisor ∂.

As depicted in Table 5.2 above, the validation outcomes for the interactive digital media, specifically targeting effective communication in S-based education utilizing Construct 2, have been meticulously evaluated by the media validator, yielding an impressive categorization of "Very Good" with a notable total score of 93 out of 100. Furthermore, upon conversion of the average scores into a Likert scale spanning from 1 to 5, an exemplary rating of 4.65 out of 5 is attained. These compelling findings unequivocally indicate the validity of the developed interactive digital media, thus warranting its further exploration and testing among users, particularly students, as a viable learning medium. Such validation underscores the potential effectiveness and suitability of the interactive digital media in facilitating

enhanced learning experiences within educational contexts, thereby advocating for its integration into pedagogical practices[22] .

4   Conclusion

The proficient creation of the interactive digital media application for the Effective Communication in Education lecture in the Program Studies PG PAUD FIP UNIMED is attributed to the effective utilization of the Construct 2 application [23][17]. The evaluation conducted by material expert validators has garnered an impressive total score of 88, translating to a rating of 4.4 and categorizing the application as "Good." Similarly, the appraisal by media experts has resulted in an outstanding a total score of 93, coupled with an average rating of 4.65, elevating it to the esteemed "Very Good" category. Consequently, this application, founded on Construct 2, emerges as a valuable and effective educational tool, promoting heightened student engagement and fostering autonomy in the learning journey.

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