Development of Chatbot Learning Media C4 Integrated Retail Business Material to Improve Learning Outcomes

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ABSTRACT

The retail business is an important industrial sector but requires a strong understanding of its concepts and strategies within the scope of formal vocational high school education. Innovative and effective learning media technology is needed to improve learning and improve student learning outcomes. The purpose of this study is to produce interactive Chatbot-based learning media on C4 integrated retail business material, determine the feasibility level of learning media, and determine the level of effectiveness of student learning outcomes. The method used is the Borg and Gall research and development model. The field trial subjects were 33 class XII BDP students at SMKN 1 Boyolangu. The results of the analysis of the validity of the media expert obtained a score of 92% and the results of the analysis of the validity of the material expert obtained a figure of 86.5% with a very valid category. The results of the analysis of student responses obtained 88% in the very easy category. The results of the effectiveness test show the value of Sig. 0.000 < 0.05 then H0 is rejected and Ha is accepted. This shows that the use of Chatbot as an effective learning medium for improving student learning outcomes. Effectiveness is achieved through the application of the C4 learning model which links knowledge and skills to improve students' understanding and mastery of the material. Recommendations for further research are wider trials involving more students and different educational institutions.

Keywords: Development, Learning, C4, Chatbot

1. INTRODUCTION

Education is a fundamental aspect in the development of a country. High-quality and responsive education to the evolving times can serve as a significant investment in human resources for a nation. The educational framework is designed to bridge the transfer of knowledge and skills. Education is expected to produce an exceptional generation that is prepared to face unforeseen challenges in the future. In the context of globalization, where the rapid dissemination of information, extreme competition, and massive technological advancements are focal issues, these become major challenges for the younger generation [1]. Today, education in Indonesia has undergone a transformation through the digitalization of learning, reflected in the blending of material and technology. The integration of educational material with technology illustrates the growing incorporation of computers and technological applications into the educational curriculum. The idea of integrating learning material and technology emerged due to the increasing complexity of students' needs for practical application and learning through technology [2].

The digital transformation of Indonesia's educational system, aimed at preparing future generations of high-performing students, necessitates the use of cutting-edge instructional tools [3]. Moreover, digital teaching resources are instrumental in successfully digitizing Indonesia's educational landscape [4]. Focusing on the fusion of tech-savvy instructional media with key 21st-century skills like communication, critical thinking, creativity, and teamwork is vital for cultivating well-rounded students [5]. The modern educational reforms are encapsulated by the C4 methodology, emphasizing critical thinking, creativity, collaboration, and communication as cornerstones for the holistic development of future

learners. This C4 framework highlights the essential pillars of a forward-thinking, communicative, collaborative, and creative educational environment.

To successfully implement the C4 framework, which prioritizes critical thinking, creativity, collaboration, and communication, several steps are advisable. First, clearly outline the learning goals; this clarity streamlines the integration of the C4 principles into the curriculum. Next, provide targeted educational resources designed to meet students' needs while stimulating their critical thought processes, communicative abilities, teamwork, and creative talents. Lastly, foster a problem-solving environment to spur students into critical thought and innovative idea development. By adeptly applying the C4 framework, you enable students to engage more fully in the learning process, thereby enhancing their ability to absorb new concepts effectively. This, in turn, equips them with the vital skills needed for success in the ever-evolving 21st-century landscape [6]. It's worth noting that in today's educational paradigm, the yardstick for student success extends beyond academic grades to encompass acquired competencies such as teamwork, problem-solving skills, and creativity [1].

Based on observations conducted at SMKN 1 Boyolangu, particularly in the Business and Marketing department, it's evident that the full implementation of digital learning media has not yet been realized. Teachers continue to rely on traditional educational tools like PowerPoint and videos, which they occasionally blend with the school's existing digital resources. Although the school does have some digital learning platforms, these tools are often considered uninspiring, lacking in interactivity, and not sufficiently diverse to engage students or meet the requirements of 21st-century competencies. However, the research also uncovered opportunities to advance the digitization of learning media at SMKN 1 Boyolangu. For instance, students are allowed to bring hardware devices such as smartphones and laptops to support their learning activities. This is further facilitated by the availability of Wi-Fi, enabling students to access the internet at school. The introduction of Chatbots as learning aids offers an opportunity to infuse competency-based education with innovative digital resources. Chatbots, which are artificial intelligence programs designed for human interaction, can provide immediate information based on user requests [7]. In an educational context, Chatbots can be tailored to deliver course material and quizzes through automated conversations.

Based on a literature review, the researcher identified ten relevant studies on the use of Chatbots as educational media. These include research conducted by [8]; [9]; [10]; [11]; [12]; [13]; [7]. These studies generally found that Chatbots are both suitable and effective for enhancing student learning outcomes. This research and development project distinguishes itself from previous work in several ways: (1) The educational media developed is a Chatbot focused on Retail Business material designed for 12th-grade students in the Business and Marketing department of a vocational high school; (2) The implementation of this Chatbot-based learning media takes place in the 12th-grade Business and Marketing classes at SMKN 1 Boyolangu; (3) The platform used for programming the Chatbot in this research and development project is smojo.ai.

Consequently, the primary objectives of this research and development project are to create an interactive educational platform using Chatbots, specifically tailored for retail business education and incorporating the C4 elements of critical thinking, creativity, collaboration, and communication. The study also seeks to evaluate the suitability of this Chatbot-based educational medium for retail business coursework and to assess its effectiveness in improving student performance in this subject area.

2. LITERATURE REVIEW

Chatbots are digital assistants powered by artificial intelligence that can automatically interact with users using natural human language [14]. Essentially, a Chatbot consists of two main components: 'chat,' representing conversation, and 'bot,' denoting a program that contains a data set designed to automatically provide feedback when prompted. As such, Chatbots can respond to queries by interpreting the text typed by users [15]. Chatbots, which are artificial intelligence programs designed for human interaction, can provide immediate information based on user requests [16]. As educational tools, Chatbots present a viable, convenient, and efficient medium for enhancing student comprehension. They are practical for both learners and educators to use during instructional activities. Moreover, Chatbots offer a more responsive approach to answering user queries, thereby aiding teachers in time-efficient feedback delivery to students [10].

3. RESEARCH METHODS

This paper is research and development using Borg and Gall Research and Development (R&D) model, which traditionally comprises ten steps. However, the scope of this particular project necessitated only seven steps, as it was solely focused on the development of a Chatbot-based educational tool for retail business coursework aimed at enhancing the academic outcomes of twelfth-grade students in the Business and Marketing Department at SMKN 1 Boyolangu. Steps related to field testing, refinement based on user experience, and wider product dissemination and implementation were deemed inapplicable for this study. Therefore, the adapted research and development procedure included the following phases: identification of potentials and challenges, data collection, product design, product trial, design revision, design validation, and amendments based on product trial outcomes.

4. RESULT AND DISCUSSIONS

4.1 Flowcart Chatbot

The process of product development commences with the formulation of a design for the Chatbot product, outlining the Chatbot system's flow, and detailing the visual representation of the Chatbot. These aspects are presented in the format of a flowchart. The devised flowchart illustrates the system's algorithm or the progression of steps that have been developed, along with the learning pathway integrated within the Chatbot. The visual representation of the Chatbot's flow can be observed in Figure 1.
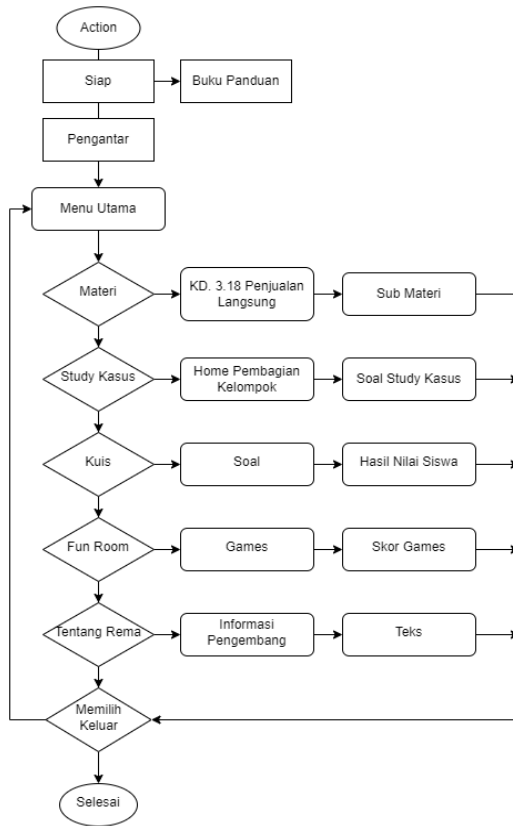
Figure 1 Flowcart Chatbot

4.2 Media Visualization

The resulting product is an integrated interactive Chatbot learning media with C4 capabilities that encompasses content related to the subject of Retail Business Management, specifically focusing on the fundamental competence of direct sales in the 12th grade Vocational High School curriculum. This learning media takes the form of a website, compatible with the lowest Android version, 6.0 Marshmallow, as well as a minimum iOS version of 14 and a minimum Windows version of 8.1. It operates seamlessly when connected to an internet network. Below is the visualization of the media:
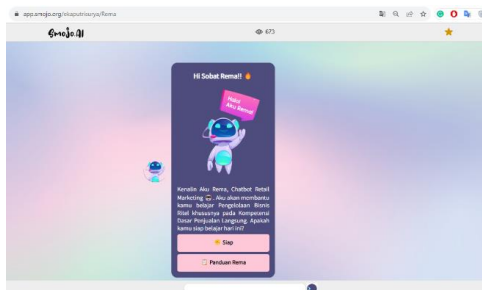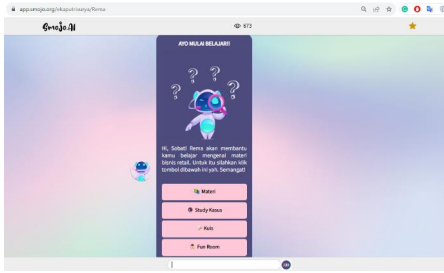

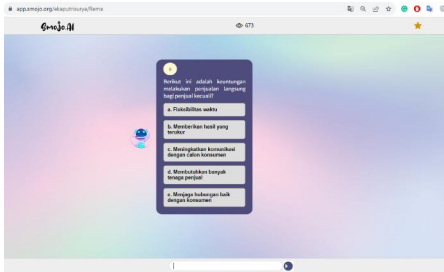**Figure 2** Homepage Chatbot

Figure 3 Main Menu
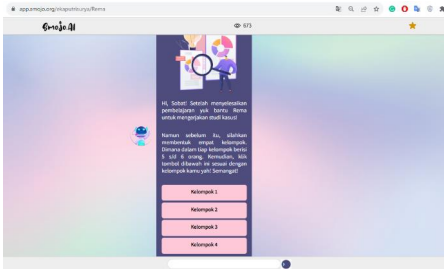

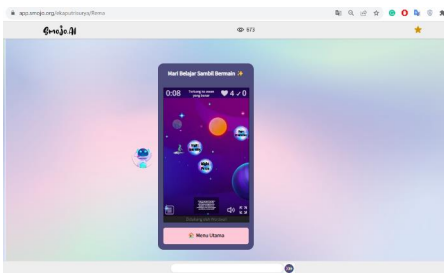**Figure 4** Chatbot Quiz

Figure 5 Case Study

Figure 6 Fun Room

4.3 Integration of C4 in Media

The development concept of

instructional media revolves around achieving fundamental competencies. The attainment process of competencies is derived from exploration outcomes and the cognitive abilities of learners. This approach serves as a means to promote heightened levels of independent learning engagement among students. Consequently, during the learning process, students are prompted to engage in critical and creative thinking, collaborate effectively, and proficiently articulate opinions and ideas acquired through learning experiences. In connection with this, the integration of a Chatbot-based instructional media in the context of retail business studies aligns with the incorporation of 21st-century skills (C4). Presented below is the integration matrix of the C4 within the domain of retail business studies, particularly focusing on the core competency of direct sales.

4.4 Results of Data Analysis

4.4.1 Validation Test
The validation test for media experts was carried out by professionals in the field. The data analysis outcomes revealed an empirical validity score of 90 out of an anticipated 100, indicating a 90% value when expressed as a percentage. This signifies a high level of validity, suitability, and attractiveness for practical application. The summary of data analysis is presented in Table 2.

Table 1. Validation Media Experts Results

No	Aspects	Empirical Score	Expected Score	%
1	Introduction to Media	12	15	80%
2	User Control	51	55	93%
3	Principles of Multimedia Design	29	30	97%
	Average			**90 %**

(Source: Researcher, 2023)

The results of the data analysis for content expert validation, carried out by two experienced subject-matter experts, produced an empirical score of 173 out of an expected score of 200. Drawing from these findings, it can be deduced that the content expert validity stands at 86%, falling into the classification of being highly valid, appropriate, and captivating for utilization in educational contexts. The summary of the content expert validation results can be found in Table 6, illustrating the analysis outcomes for each assessment aspect. Based on the recapitulation of the content expert validation results, it is apparent that the interactive Chatbot-based learning media, integrated with C4, demonstrates strong validity, suitability, and its potential for effective and efficient educational delivery.

Table 2. Content Expert Validation Results

No	Aspects	Empirical Score	Expected Score	%
1	Media Appearance	872	990	88%
2	Content Presentation	432	395	87%
3	Engagement	148	165	89%
	Average			**88%**

(Source: Researcher, 2023)

4.4.2 Student Responses

According to the analysis of student feedback on the use of interactive Chatbot-based learning media in the context of retail business with integrated critical thinking, creativity, collaboration, and communication (C4), the overall percentage score reached 88%. This places it in the 'highly enjoyable' category and deems it appropriate for instructional use. The detailed assessment results for each aspect of student responses can be found in Table 4.

Table 3. Student Responses

No	Aspects	Empirical Score	Expected Score	%
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	Average			**88%**

(Source: Researcher, 2023)

4.4.3 Testing the Effectiveness of Student Learning Outcome Improvement

The effectiveness test using a paired t-test yielded the following output: (1) Paired Samples Statistics, which indicates that the average score of 33 students in class XII BDP 2 at SMKN 1 Boyolangu before using interactive Chatbot-based learning media integrated with C4 was 64.76, while the average score after using interactive Chatbot integrated with C4 as a learning medium was 91.52

Table 5. *Paired Samples Statistic*

Paired Samples Statistics		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	SB	64.76	33	8.280	1.441
	SS	91.52	33	9.056	1.576

(Source: Researcher, 2023)

Based on the statistical analysis results, it can be concluded that there is an improvement in student learning outcomes after using interactive Chatbot-based learning media integrated with C4. The results of the paired samples statistic can be seen in Table 5.

The effectiveness test using paired t-test indicates that the Sig. value (2-tailed) is 0.000, which is smaller than 0.05 or $0.000 < 0.05$. Therefore, H0 is rejected, and Ha is accepted. Based on the statistical analysis results, it is evident that there is a significant difference in the relevant

Basic Competence scores before using interactive Chatbot-based learning media and the Basic Competence scores for Direct Sales after using interactive Chatbot-based learning media.

4.2 Discussion

The development of an interactive Chatbot-based learning media integrated with C4 for the retail business subject in the 12th-grade Business and Marketing program at SMKN 1 Boyolangu, Tulungagung, resulted in the creation of a Chatbot as a learning medium for the retail business content, specifically focusing on the fundamental competence of direct sales. This Chatbot-based learning medium is accessible through a website. The Chatbot-based learning medium incorporates components that support students' learning activities. In the sub-menu for content, there is a discussion of the material accompanied by images to facilitate students in visualizing the content they are studying. Furthermore, there is a sub-menu for case studies, where students are encouraged to form groups and solve case study questions. The purpose of case studies is to promote critical thinking and encourage creative problem-solving discussions in front of the class. Additionally, the quiz sub-menu contains multiple-choice quizzes that users can access, automatically displaying their scores.

Based on the assessment of the media's validity by media experts, the following observations were made: (1) The introduction to the Chatbot-based learning media is presented clearly. (2) User control aspects in the interactive Chatbot-based learning media are user-friendly and not complex. The choice of background and background color is considered very appropriate. The font type and size are suitable and easily readable. Icons and navigation buttons are relatively clear, with only a few improvements needed to add previous material buttons in the sub-materials. The selection of images, videos, and language used in the Chatbot-based learning media is good. (3) Aspects of Multimedia Design Principles prove to be supportive for learning activities. This is evident from the media expert's assessment, awarding a score of 5 in the indicator "Presentation of material using Chatbot-based learning media that supports learning." The use of Chatbot as a learning medium can enhance students' learning experiences as it can be accessed anytime and anywhere [17].

Based on the assessment of student responses as users of interactive Chatbot-based learning media integrated with C4, several positive aspects were highlighted. In terms of media appearance, students found the text easy to read, the images attractive, and the user interface intuitive. The content presentation was engaging and effective, with quiz questions providing valuable feedback. Moreover, the Chatbot-based learning media greatly aided students in comprehending the retail business material. Overall, students expressed genuine interest and enjoyment in using this learning tool. During the implementation, the media was closely monitored by a team of facilitators, including the homeroom teacher, subject teacher, peers, and the researcher. This feedback underscores the positive impact of integrating interactive Chatbot-based learning media with C4 on students learning experiences in the retail business subject.

Based on the statistical analysis conducted to assess the effectiveness of student learning outcomes, it is evident that there is a notable improvement in students learning outcomes after using the interactive Chatbot-based learning media integrated with C4. This analysis underscores that the learning media effectively supports students in understanding the material and enhances their learning outcomes. Therefore, it can be concluded that the interactive Chatbot-based learning media integrated with C4 serves as a valuable and effective alternative in assisting students in achieving better learning outcomes.

This learning media presents retail business material in a real-life context, sparking students curiosity to explore the subject further and apply it in both assignments and their daily lives. The Chatbot-based learning media represents a significant innovation in the digitalization of education, offering visual aids and modern technology to help students comprehend the retail business material. Additionally, the interactive Chatbot learning platform motivates students to engage with and understand the material, while also aiding in the development of critical skills and competencies (C4) through challenging and enjoyable learning activities encompassing material discussions, case studies, quizzes, and fun interactive sessions.

The empowerment of C4 competencies in 21st-century learning, synonymous with modern technology, one of which is Chatbot, can create a diverse learning environment and encourage the attainment of outcomes aligned with 21st-century skills. Similar views have been presented by [18], emphasizing that integrating technology into 21st-century learning enables students to develop a different perspective and mindset regarding environmental issues through the acquisition of 21st-century skills. This, in turn, influences their contribution to environmental preservation in society and fosters the development of high-quality students.

The use of Chatbot-based learning media provides students with a more enjoyable, engaging, and interactive learning experience. Chatbot, as a digital-based learning medium, offers several advantages as a supportive tool in the learning process: (1) Chatbot facilitates students access to relevant materials anytime and anywhere. (2) It enables real-time two-way communication, enhancing educators efficiency in meeting students' needs. (3) The use of Chatbot as a learning medium simplifies the process of measuring specific learning outcomes, allowing teachers to provide effective and efficient interventions. However, there is a limitation in the implementation of Chatbot-based learning media, as it relies on internet connectivity for access.

The implications of using Chatbot in education are the creation of interactive learning experiences for students, resembling one-on-one interactions with teachers [19]. Chatbot enhances student engagement and fosters comprehensive interaction within the classroom through group-based project-oriented case studies [20]. Additionally, Chatbot allows users to adapt their learning style to individual preferences [21], providing direct real-time interactions that make learning more enjoyable. As an interactive learning medium, Chatbot can automatically evaluate the effectiveness of learning outcomes and provide feedback for improvement in subsequent lessons. Learning outcomes are essential for assessing and evaluating the goals of education, reflecting the level of achievement by students, teachers, and educational institutions [22]. With Chatbot-based learning media providing direct feedback on the effectiveness of student learning outcomes, it can assist teachers in evaluating classroom teaching activities.

Chatbot-based learning media offers a flexible, interactive, and efficient solution to meet the needs of 21st-century students in acquiring knowledge, skills, and technology. Chatbot, as a learning medium, provides easy access for students, offering quick and accurate information, facilitating interactive learning, assisting with task management, and facilitating communication and collaboration with teachers and fellow students [23]. Consequently, Chatbot is well-suited to the needs of 21st-century students, synonymous with C4 competencies, as it helps them learn interactively, personally, and connectedly while enhancing critical, creative, communicative, and collaborative thinking skills.

The researcher recommends that Chatbot-based learning media can serve as an alternative and supplementary learning tool in the educational process. Future research and development should include broader implementations of Chatbot-based learning media in the retail business subject, involving a more extensive range of students and educational institutions. Additionally, there is room for the development of more advanced and interactive Chatbot models by integrating AI (Artificial Intelligence) or machine learning technology to provide more personalized and adaptive responses to students' needs.

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