

Cloud-Based Online Tutoring Information System (BIMBELOL)

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Abstrak

Bimbingan belajar merupakan suatu kegiatan bimbingan dalam hal menemukan cara-cara belajar yang tepat dan mengatasi kesukaran belajar. Umumnya setiap proses bimbingan belajar dilakukan pada tempat bimbingan belajar. Proses bimbingan belajar yang umum dapat memberikan dampak yang kurang efektif dan efisien ketika terjadinya cuaca ekstrim dan pandemi. Cuaca ekstrim dan pandemi mengakibatkan tertunda hingga berhentinya proses bimbingan belajar. Permasalahan yang timbul dapat diatasi dengan perancangan sebuah sistem yang dapat membuat proses bimbingan belajar menjadi lebih efisien dan efektif ketika terjadinya cuaca ekstrim dan pandemi. Sistem informasi bimbingan belajar online berbasis cloud (BIMBELOL) merupakan sistem yang dapat membantu setiap proses bimbingan belajar menjadi lebih efisien dan efektif. Penggunaan teknologi cloud dalam pembuatan sistem dapat membantu setiap proses bimbingan belajar dilakukan secara online. Pengujian terhadap 40 responden dan black-box testing yang dilakukan pada sistem menunjukkan bahwa setiap proses bimbingan belajar telah berhasil diimplementasikan.

Kata kunci: *Bimbel, Bimbingan Belajar, Bimbingan Belajar Online, Sistem Informasi Bimbingan Belajar Online, Sistem Informasi Bimbingan Belajar Online Berbasis Cloud.*

Abstract

Tutoring is a guidance activity in terms of finding appropriate learning methods and overcoming learning difficulties. Generally, every tutoring process is carried out at the tutoring place. The general tutoring process can have a less effective and efficient impact during extreme weather and pandemics. Extreme weather and pandemic have resulted in delays to the end of the tutoring process. Problems that arise can be overcome by designing a system that can make the tutoring process more efficient and effective during extreme weather and pandemics. A cloud-based online tutoring information system (BIMBELOL) is a system that can help any tutoring process to be more efficient and effective. The use of cloud technology in making the system can help every tutoring process be carried out online. Testing of 40 respondents and black-box testing carried out on the system shows that each tutoring process has been successfully implemented.

Keywords: *Tutoring, Online Tutoring, Online Tutoring Information Systems, A Cloud-Based Online Tutoring Information System.*

1. Introduction

The government faces various obstacles to improve the quality of education. The success of the quality of education is highly dependent on the success of the teaching and learning process, which is a synergy of educational components, both the curriculum and education personnel, infrastructure, management systems, as well as natural environmental and social environmental factors, with students as subjects. The learning process as a system is influenced by various factors. One of them is a teacher who is the main implementer of education in the field. Another factor that is no less important in determining the success of teaching and learning activities is learning resources. To improve the quality of learning programs, it is necessary to be based on a systematic view of teaching and learning activities which must also be supported by efforts to utilize learning resources including tutoring [8].

Tutoring is a process of assistance given to individuals to achieve optimal self-development [2]. Tutoring also means a form of activity in the learning process carried out by someone who has more ability in many ways to be given to others with the aim that other people can find new knowledge that they do not have and can be applied in their life [7]. As well

as tutoring is also guidance in finding appropriate learning methods, choosing the appropriate study program, and overcoming the difficulties that arise related to the demands of learning in an educational institution [9].

The development of the education level of Indonesian society which is getting higher and higher and the lack of knowledge that can be absorbed by students in schools causes students to choose to take part in tutoring programs that have various solutions to help follow lessons in their respective schools [4]. One of the tutoring programs that students are interested in is private tutoring. Private tutoring is carried out by approaching students individually so that students can focus more on and understand the subject matter that they do not understand or want to learn. Private tutoring is usually done by first agreeing with the student and the tutor before the teaching and learning process begins.

The search for tutoring service providers is mostly carried out by students through contact with fellow students, recommendations from previous tutoring service users, brochures, broadcasts via social media, to accessing information directly from the website. The information obtained by students is still general, such as contacts, fees, and tutoring services. The registration and learning processes used are generally also conventional, which means that students and tutors must come to the place designated by the tutoring service provider to register for registration and provide course material. The problem that then arises is the difficulty of knowing information about the competencies and track records of tutors who provide tutoring so that students who have an interest in tutoring services take a long time to choose the available tutoring services and when the weather is bad or there an outbreak of disease that has occurred makes it difficult for students and tutors to come to the registration and learning places that have been provided by tutoring service providers. The above problems can be overcome by designing an information system that can provide detailed information about tutors who provide learning and make the registration and learning process between students and tutors more effective and efficient with online registration and online learning media.

Designing information systems that can help each process in tutoring services be more effective and efficient is to apply cloud-based technology. Cloud-based technology is a technology that utilizes the internet to be able to access an information system using various devices from various locations. The application of cloud-based technology can increase the effectiveness and efficiency of all existing processes in the information system because each existing process can be done online from various locations with internet-connected devices. The problem of each process that exists in tutoring services can be overcome by designing a cloud-based online tutoring information system (BIMBELOL).

Similar research related to the tutoring information system was carried out by Miwan Kurniawan Hidayat and Siti Fatimah Fatmawati with the research title "Design of Academic Information System for Tutoring (SIBIJAR)" which was designed to assist in providing information on tutoring schedules and online registration media [13]. This research is used as a reference for implementing online registration media features. The difference between the system and this research is that the system already uses online payments, while this research still uses conventional payments. Research conducted by Ferry Yudhitama Putra, I Made Arsa Suyadnya and IGA Putu Raka Agung with the research title "Private Tutoring Application at Easyspeak Denpasar Web and Android Based" which is designed to help students make time bookings and tutors, tutors in knowing whom students taught, operators are easier to manage private tutoring bookings and reminders on the android application side [8]. This research is used as a reference for implementing the tutor booking feature through the subject matter. The difference between the system and this research is that the booking process in the system leads to the subject matter, while the booking process in this research directly leads to the tutor. Research conducted by Andri Nediato, Elmayati, and Lukman Hakim with the research title "Application of Administration and Learning of the Wahid's College Web Mobile-based Tutoring Institute" which is designed to help facilitate storage and search of teacher data, student data, class data, registration payment data monthly payment data, schedule data and download course materials [3]. This research is used as a reference for implementing the features of booking data history storage, payment data history, online class data history, review data history, balance top-up data history, and balance withdrawal data history. There is no difference between the system and this research except for the use of technology in making the system. Research conducted by Wawan Mahendra Ginting and Helmi Kurniawan with the research title "Designing Tutoring and Examination Applications by Implementing Web-Based Online

Streaming and Android" which was designed to help learners with teachers via online streaming, conduct online exams, and download e-books through the system online [16]. This research is used as a reference for implementing the features of online learning and online exams. The difference between the system and this research is that the exams process in the system is carried out by giving all questions, while the exams process in this research is carried out by giving a question one by one.

2. Research Method

The research method used on the system includes several process stages which include literature study, system design, system creation, system testing and analysis of test results, and conclusions.

2.1 Literature Study

The emphasis of the literature study stage is to determine the method used to design the system and to find references in supporting system design.

2.2 System Design

The system design stage is system modeling as outlined in the form of an overview of the system, DFD, and ERD.

2.2.1 System Overview

The cloud-based online tutoring information system (BIMBELOL) is an information system aimed at tutors and students in the tutoring process. The system is made to make it easier for students to find subject matter that they want to be better understood in the tutoring process, assist tutors in providing free or paid subject matter for student needs and make the tutoring process between students and tutors more practical and efficient by using online classes. The benefits received by the user can make the system the center of the online tutoring process throughout Indonesia because it can be accessed from various places with an internet-connected platform. An overview of the system can be seen in the following figure.

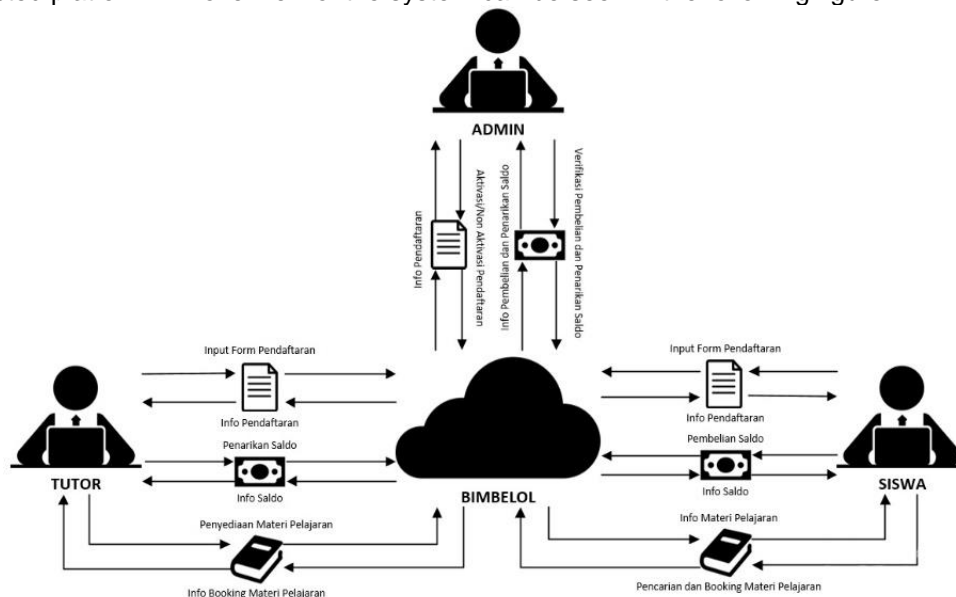


Figure 1. System Overview

Figure 1 shows an overview of the system owned by the system. 3 main entities play a role in the system, namely admin, tutors, and students. The admin acts as a verifier of the data entered by tutors and students. The data that the admin needs to verify is registration data, top-up data, and withdrawal data. The tutor acts as a provider of subject matter which contains sub of the subject matter in the tutoring process. Tutors get paid for subject matter booked by students. Payment from students will go into the tutor's balance. Tutor can make a balanced withdrawal if the balance withdrawal threshold is sufficient. Students act as students in the tutoring process. Students can top up their balance to be able to book subject matter through the search filters that have been provided. Students and tutors are directed to enter an online

class if the booking process has been successfully carried out to carry out the online tutoring process.

2.2.2 Data Flow Diagram

The design of data flow diagrams carried out on a cloud-based online tutoring information system (BIMBELOL) can be seen in the following figure.

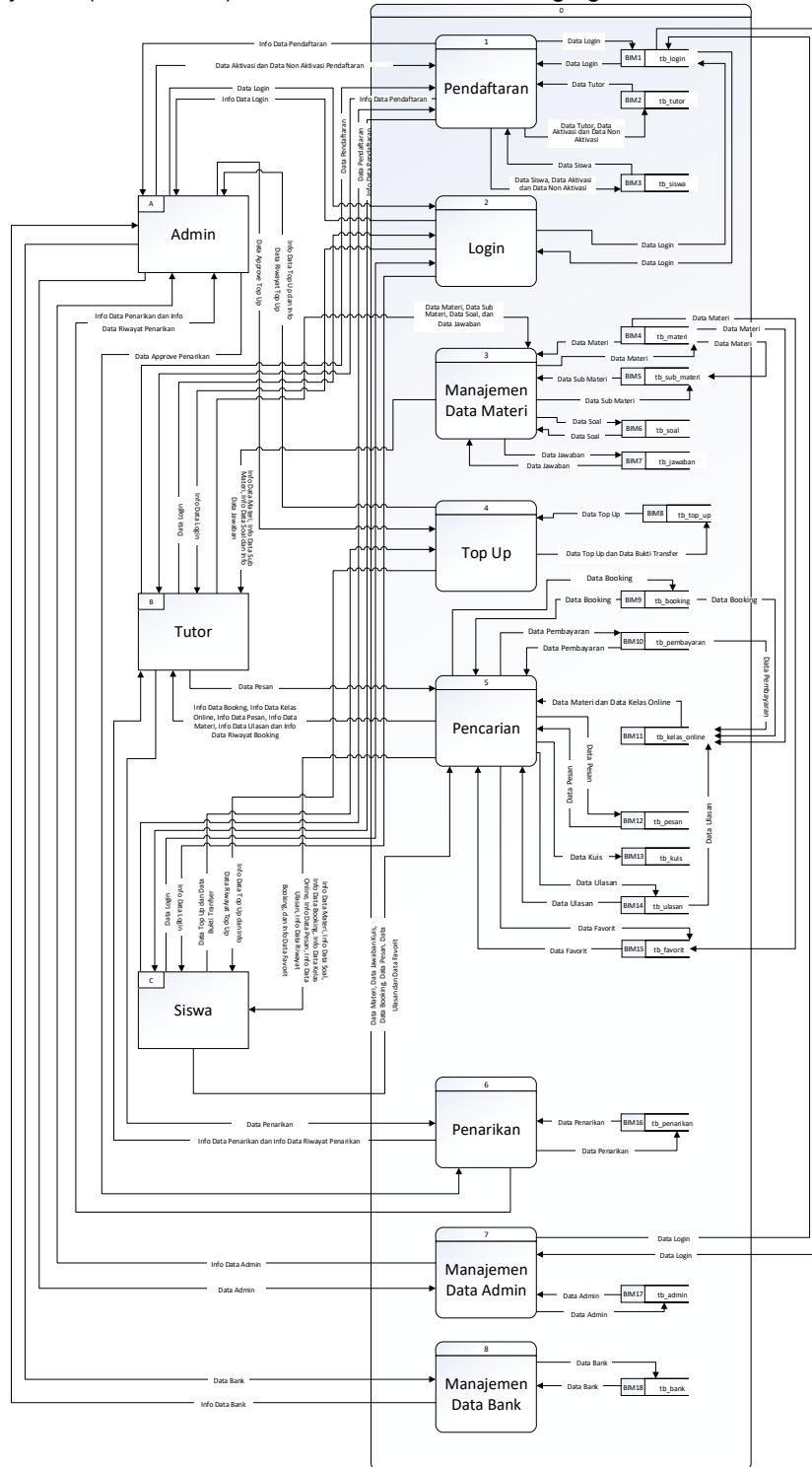


Figure 2. Data Flow Diagram

Figure 3 shows 21 sets of entities, namely admin, tutor, students, login, teaching schedule, booking, online class, payment, reviews, subject matter, sub-subject matter, questions, answers, messages, message details, quizzes, quiz details, details quiz answers, withdrawals, top-up, and favorites.

2.3 System Creation

The system creation stage is creating a database, creating interfaces and program code in accordance with the workflow of the system to be used.

2.4 System Testing and Analysis of Test Results

The system testing and the analysis of the test results stage carried out are entering the sample data into the system followed by system testing carried out by several tutors and students who carry out online tutoring activities. The results of the system testing are then analyzed for improvement.

2.5 Conclusions

The conclusions stage contains a system that has been implemented to tutors and students, which then concludes by what has been implemented and makes suggestions containing future system development.

3. Literature Study

The literature study contains material that related to information systems, tutoring, and cloud computing.

3.1 Tutoring

Tutoring is a process of assistance given to individuals (students) to overcome the problems they face in learning so that after going through the learning change process they can achieve optimal learning outcomes according to their abilities, talents, and interests. In other words, the teacher's job here is to help students recognize, grow and develop themselves, good learning attitudes and habits to master knowledge and skills, and to prepare for continuing education to a higher level. [6].

3.2 Online Tutoring

Tutoring or private tutoring can be done in person and can also be done online [7]. Online tutoring is designed to enable distance learning via the internet without having to meet face to face with the instructor. Online tutoring can provide a choice for students who have internet network access to obtain learning assistance services that are effective, efficient, and interactive optimally. Furthermore, Enterprise [7] explained that in addition to preparing for exams, students can take this online tutoring just to learn more about certain fields of study outside of what their teacher has taught them. Communication between students and tutors (teachers) is also done online via video, audio, or e-mail.

3.3 Difference Between Conventional and Online Tutoring

The differences that exist in conventional and online tutoring are as follows [5].

1. Time flexibility using online tutoring is better than using conventional tutoring.
2. Ease of understanding the material using online tutoring is considered more difficult in delivering material than conventional tutoring.
3. Assignments using online tutoring are superior to conventional tutoring.
4. Ease of interaction with teachers on online tutoring is still not good when compared to conventional tutoring.

3.4 Information Systems

According to Nurlaela [9], to understand the meaning of information systems, it is necessary to remember the relationship between data and information as an important entity that forms information systems. Data are values, circumstances, or properties that are independent of any context. Information is data that has been processed into a meaningful form for the recipient. An information system is a system that provides information in such a way that it is useful for the recipient. The information system is also a collection of organizational procedures which when used can provide information for decision-makers or control the

organization. A good information system has clear, concise, simple systematics, and easy to understand. Entering data, processing data with certain procedures, presenting accurate information, and clear distribution can facilitate decision making. Information systems are also required to be complete, concise, and orderly so as not to confuse users of the information system [15].

3.5 Cloud Computing

NIST defines Cloud Computing as “a model for convenient, on-demand network access for unified configuration settings for computing resources (eg, networks, servers, storage media, applications, and services) that can be quickly assigned and released with minimal management effort. or interactions with service providers. Cloud computing can also mean access to computer facilities together through the internet from various locations. In other words, cloud computing can mean access to computer facilities together via the internet from various locations. For example, a large bank uses cloud computing for online transaction operations, and unconsciously some of us use cloud computing facilities in the form of email and the World Wide Web (WWW) [1].

4. Result and Discussion

Results and discussion of the system, including the results of the system interface, test results and black-box testing.

4.1 Result of System Interface

The results of several system interface include student and tutor registration interface, search and booking of subject matter interface, and learning interface.

4.1.1 Results of the Student and Tutor Registration Interface

The student and tutor registration interface is a page for users who wish to register as students or tutors on the system. The appearance of student and tutor registration can be seen in the following figure.

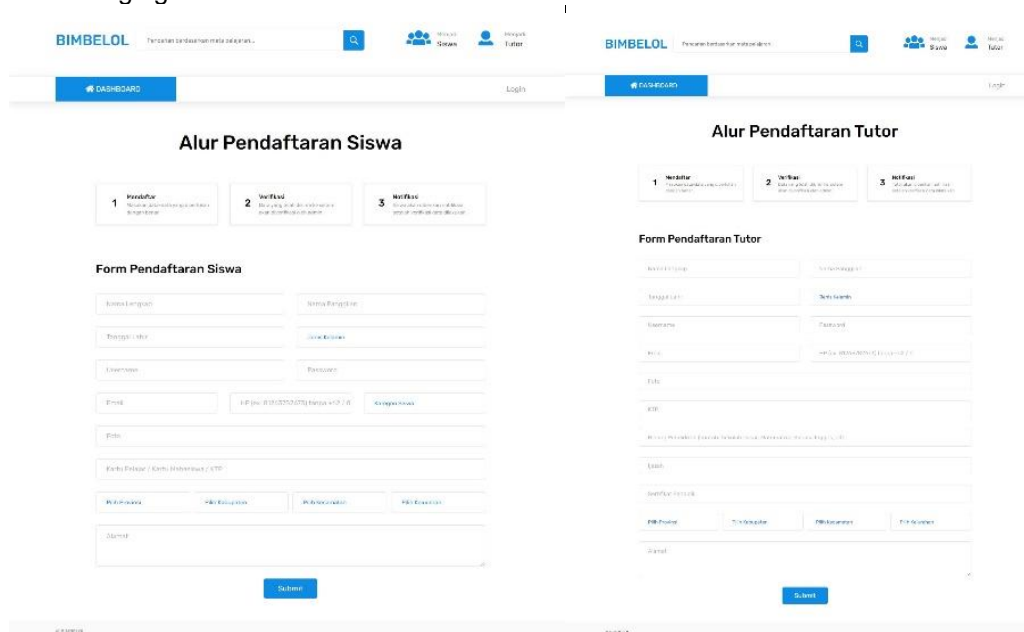


Figure 4. Student and Tutor Registration Interface

Figure 4. shows the student and tutor registration page addressed to the user. There is information for users about the registration flow to become a student or tutor in the system. Users can fill out a form that is available to register as a student or tutor.

4.1.2 Result of the Search And Booking of Subject Matter Interface

The search and booking of subject matter interface is a page for students who want to search for a subject matter to be booked. The search and booking of subject matter interface can be seen in the following figure.

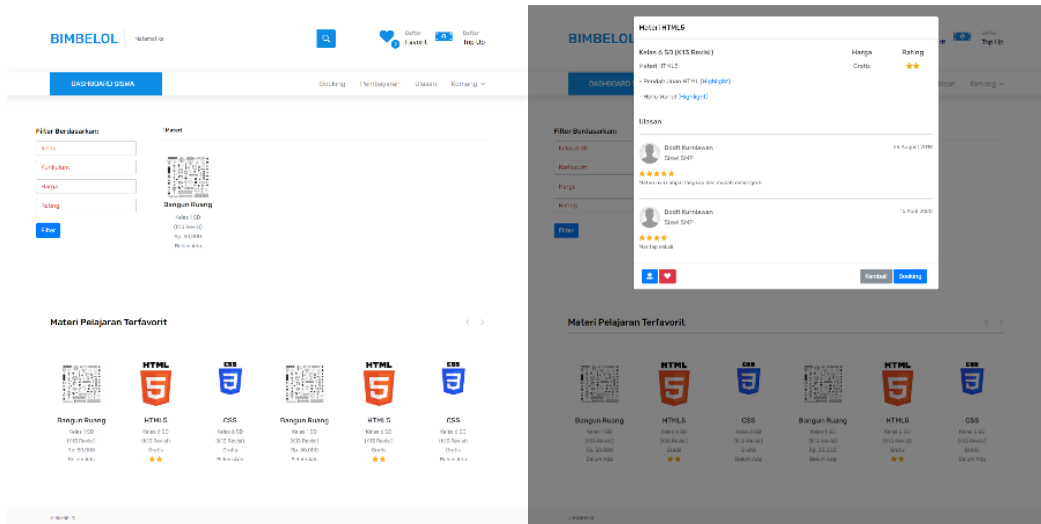


Figure 5. Search And Booking of Subject Matter Interface

Figure 5 shows the material search and booking of subject matter interface that aimed at students. Students can search for subject matter by selecting subjects in the search column. Students can book tutors by clicking the booking button inside the subject matter.

4.1.3 Result of the Learning Interface

The learning interface is the page used by students to carry out the learning process in an online class. The learning interface can be seen in the following figure.

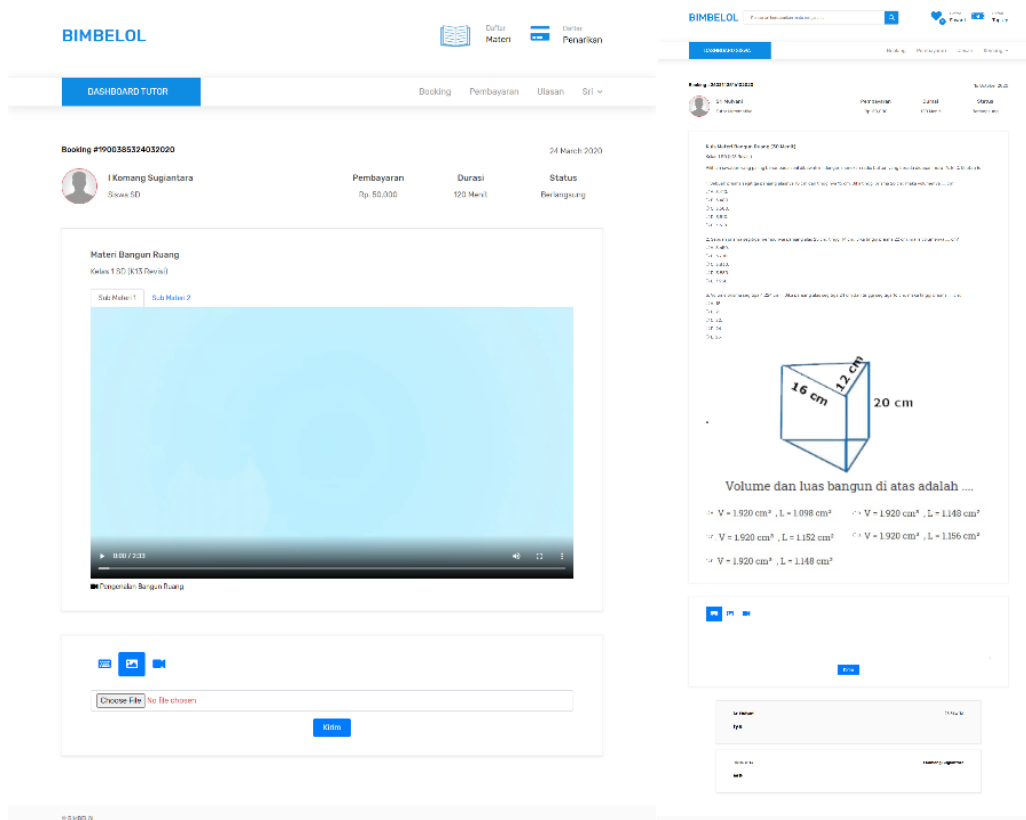


Figure 6. Learning Interface

Figure 6 shows the learning interface aimed at students. Students will be accompanied by a tutor in an online class. Students will learn with the subject matter provided by the tutor. The subject matter provided by the tutor is in the form of a video. Students also get quiz questions in learning. The quiz questions provided by the tutor are in the form of text and images. The total duration of learning carried out in the online class is 120 minutes.

4.1.4 Result of the Purchase and Withdrawal of Balance Interface

The purchase and withdrawal of balance is the page used by students and tutors to make purchases and withdrawals of balance. The purchase and withdrawal of balance interface can be seen in the following figure.

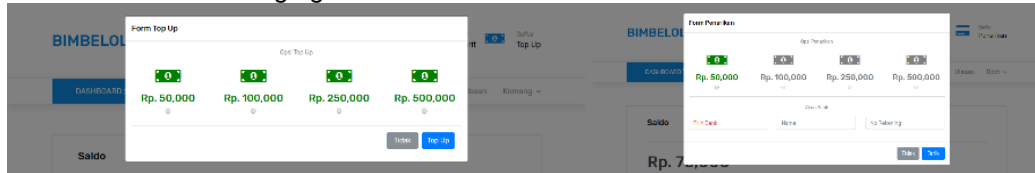


Figure 7. Purchase and Withdrawal of Balance Interface

Figure 7 shows the learning interface aimed at students and tutors. Students can add to the balance by filling out the top-up form. The top-up form contains 50,000 to 500,000 options. Students can choose the top-up option according to their required balance requirements. Tutors can withdraw balances by filling out the withdrawal form. The withdrawal form contains a minimum of 50,000 to a maximum of 500,000 options. A balance withdrawal can be made if the balance meets the withdrawal options. Tutors are also expected to enter account information for the transfer process.

4.2 Test Result

System testing was carried out on 40 respondents using a questionnaire covering aspects of novelty, design, and usability. System Testing was given to 30 students from the levels of elementary school, junior high school, high school to the general public, and 10 tutors who know how the tutoring process. Black box testing is also used in the system testing.

4.2.1 Test Results of Novelty Aspects

The test results of 40 respondent’s regarding the novelty aspects of the system can be seen in the following table.

Table 1. Respondent’s Assessment of Novelty Aspects

Question	Never	Rarely	Often	Always
Have you ever heard of / used a website-based system regarding the online tutoring process?	16	4	16	4
Have you ever attended/provided tutoring services? (especially online tutoring)	21	8	6	5
Have you ever known about online tutoring?	10	11	14	5
Percentage %	39%	19%	30%	12%

Table 1 is a table of respondent’s assessment of the novelty aspects which shows the percentage of 40 respondents. 39% of respondents responded never, 19% responded rarely, 30% responded often and 12% responded always. This shows that there are still many minority respondent’s who have never used or heard of online tutoring based on websites, while the majority of respondent’s have used or heard about online tutoring based on websites.

4.2.2 Test Results of Design Aspects

The test results of 40 respondent’s regarding the design aspects of the system can be seen in the following table.

Table 2. Respondent’s Assessment of Design Aspects

Question	Strongly Disagree	Disagree	Enough	Agree	Strongly Agree
Visual (menu display design, layout, and color selection on the system).	0	0	3	24	13
Selection of letters and languages presented on the system.	0	0	4	24	12
Information that is easy to understand in using the system.	0	0	1	23	16
The level of ease of use of the system (interface mobility).	0	2	4	22	12

Match the features required on the system.	0	1	5	23	11
Percentage %	0%	1%	9%	58%	32%

Table 2 is a table of respondent's assessment of design aspects which shows the percentage of 40 respondents. 0% of respondents responded strongly to disagree, 1% responded disagree, 9% responded fairly, 58% responded agreed and 32% responded strongly agreed. This shows that the majority of respondents feel that the layout, color selection, font selection, and features on the system are what users expect. Assessment of the design aspect is an aspect that cannot be equated between one respondent and another respondent because the respondent's assessment in terms of the system design is based on the perceptions of each respondent.

4.2.3 Test Results of Usability Aspects

The test results of 40 respondent's regarding the usability aspects of the system can be seen in the following table.

Table 3. Respondent's Assessment of Usability Aspects

Question	Strongly Disagree	Disagree	Enough	Agree	Strongly Agree
This system can facilitate the registration process to attend or provide tutoring services.	0	1	3	28	8
This system can make it easier to find or provide subject matter to be studied.	0	2	5	24	9
This system can facilitate the tutoring process.	0	0	7	27	6
This system can simplify the payment process to attend or provide tutoring services.	0	4	6	24	6
This system can make it easier to understand the subject matter presented.	0	0	7	25	8
This system can make the subject matter presented more interesting and less boring.	0	0	7	26	7
This system can increase interest and enthusiasm for learning.	0	2	11	20	7
Percentage %	0%	3%	17%	62%	18%

Table 3 is a table of respondent's assessment of design aspects which shows the percentage of 40 respondents. 0% of respondents responded strongly on disagree, 3% responded on disagreeing, 17% responded fairly, 62% responded agreed and 18% responded strongly agreed. This shows that the majority of respondents feel that the usefulness of the system is by the existing processes in tutoring services in general and the system can help tutoring services become more effective and efficient.

4.3 Black-Box Testing

The results of the black-box testing carried out on the system can be seen in the following table.

Table 4. Result of Black-Box Testing

Testing	Expected Results	Test Result
Login Form	The system can accept and deny login access.	According to Expectations
Admin Addition Form	The system can accept and reject admin additions.	According to Expectations
Bank Addition Form	The system can accept and reject bank	According to

	additions.	Expectations
Tutor Registration Form	The system can accept and reject tutor registrations.	According to Expectations
Subject Matter Addition Form	The system can accept and reject additional subject matter.	According to Expectations
Sub Subject Matter Addition Form	The system can accept and reject the addition of sub subject matter.	According to Expectations
Questions and Answers Additions Form	The system can accept and reject the addition of questions and answers.	According to Expectations
Pictorial Questions and Answers Additions Form	The system can accept and reject the addition of questions and answers along with pictorial.	According to Expectations
Withdrawal of Balance Form	The system can accept balance withdrawals.	According to Expectations
Student Registration Form	The system can accept and reject student registrations.	According to Expectations
Top Up Balance Form	The system can accept and reject top-up balances.	According to Expectations
Transfer Proof Form	The system can receive proof of transfer.	According to Expectations
Search Form	The system can accept and reject searches.	According to Expectations
Message Form	The system can accept and reject messages.	According to Expectations
Picture Message Form	The system can accept and reject picture messages.	According to Expectations

Table 4 is a table of the results of black-box testing performed on the system. The system has been able to accept and reject various inputs from each implemented tutoring process. The results of black-box testing on each tutoring process on the system are in line with expectations.

5. Conclusion

The conclusion that can be drawn from the research and design of cloud-based online tutoring information systems (BIMBELOL) is the system can help each tutoring process to be more efficient and effective when there are extreme weather and a pandemic, such as the registration process, the learning process, the subject matter search process, the tutor booking process through subject matter, the tutoring payment process and other data management. Each process becomes more efficient and effective because it can be done online with any internet-connected device. The stages in designing and building the system are carried out by making an overview of the system, data flow diagrams, and entity relational diagrams. The implementation of each tutoring feature on the system is carried out by implementing the HTML, PHP, and Javascript programming languages. The test result of the tutoring features was carried out on 40 respondents, including students and tutors. Testing is also carried out by black-box testing to find the correct input results. The overall results of the test show that the tutoring features have been successfully implemented in the system. The suggestion that can be given after conducting research and design of the system is that it is expected that there will be similar research with implementing the framework as the basis for making the system. It is expected that similar research will be carried out on mobile platforms, such as iOS and Android so that the system is not limited to websites only. It is expected that there will be additional features in booking subject matter that does not only focus on the tutor's teaching schedule so that students can book tutor subject matter according to the schedule desired by the students.

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