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Digitalization Online Exam Cards in the Era of Disruption 5.0 using the DevOps Method

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Abstract. In the current 5.0 era, almost all documents are digitally packaged, and the university needs to adapt to ever-evolving technology. For students, the test card is essential as proof of the contest to carry out the final exam. However, in practice, some University Student Exam Card sheets still adopt the traditional nature of queues. This will cause problems if the exam card can be lost or damaged. Digitalization can disruption the world of education, especially Exam Cards that are digital and systematically stored on the website page. SiS + is a Student iLearning Services that can make it easier for Raharja University students to access all their lecture needs by digitizing them. The YII Framework-based SiS + website's development uses the DevOps method to get online exam cards because applicable regulations fulfill student attendance. This research is expected to transform the student management system efficiency, reduce queues, and implement physical distancing during a pandemic.

Keywords: SiS+, Digitalization, Student Examination Cards, DevOps

INTRODUCTION:

Digitalization is the most developing element in the communication industry, one of which is learning for students in preserving an archive (Untung Rahardja et al., 2020; Wicaksono & Al-Rizki, 2018). The era of digitalization, which is currently developing rapidly, dramatically affects human life performance (U Rahardja et al., 2020). A change is needed in various aspects, such as presenting information, so that information is conveyed effectively and efficiently (Aini, Budiarto, et al., 2021)(Mucshini & Siswandari, 2020). Moreover, digitalization can now be used in various fields, such as teaching and learning activities (Putra et al., 2018). As a solution, iLearning learning has the advantage of being cheaper, more effective, and efficient, and digitized. The digital learning method does not require participants in teaching and learning activities to attend a specific room as a meeting room and space where the teaching

and learning process occurs (Hairida & Setyaningrum, 2020)(Syarif et al., 2020). Along with the digitalization era, now online websites are also widely used as information systems (Maulani et al., 2020; Widyaningrum & Putri, 2020). One of them is developing a web as a supporting platform to improve the quality of an information system (Guustaaf et al., 2020). In paper-based archive management practices, many problems are encountered so that electronic media can be an alternative in archiving management (Asriadi & Istiyono, 2020)(Amarulloh & Surahman, 2019).

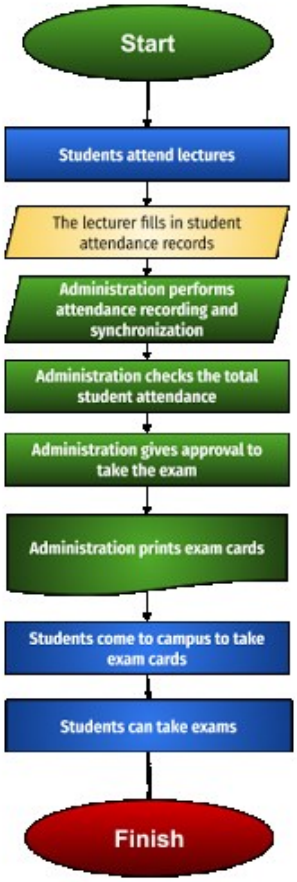

Figure 1. Problem Analysis

The problem that occurs is the appearance of a management system that is still traditional in issuing evidence of a student exam card. The exam card can be accepted if the student meets the requirements with a class attendance of more than 10, which is recapitulated by the lecturer manually. Then the recapitulation results will be accepted by the administrative staff to issue evidence of student exam cards in the form of paper. The ineffectiveness makes students have to attend the University in order to know the final exam schedule. Of course, the queuing activity was quite long after the announcement of taking the exam card took a very long time. Paper exam cards make students worry about loss or damage so that the final exam can be hampered. As a superior university, it is necessary to encourage the development and quality improvement of the system (Anoesyirwan et al., 2020; Herlina et al., 2020; Muhidin et al., 2016) The solution is the development of the Students iLearning Services + system or commonly known as SiS +, which is a superior service system for Raharja University students in accessing all lecture needs. The breakthrough in the SiS + system with the presence of an online exam card menu is essential for the University to improve the quality of service in easy access to lectures to meet the expectations of more students. The SiS + (Students iLearning Services +) user interface using SSO (Single Sign-On / Out) can log in with the Magic Key Rinfo. An integrated SiS + system where information and data processing are presented according to user needs, database, source code, and design models represent a series of information system designs that are useful for simplifying development and maintenance (Fauziah et al., 2020; Firman et al., 2016). In technological engineering, the same but different elements can be integrated to see the effectiveness and the user interface needs to be considered (Handrio et al., 2016). The existence of innovation, namely, SiS+ (Students iLearning Services+), which integrates with administrative staff, will provide effectiveness and accuracy of information to students in scheduling final exams. There is direct integration by lecturers who have automatically recorded student attendance into the administrative staff system so that student exam cards can automatically be accessed and used by students as a condition for taking exams. Testing the system's reliability with a student questionnaire resulted in the feasibility of the system with Cronbach's Alpha 0.96 results. Besides, the advantage of this pandemic has been the implementation of Physical Distancing, where students can access online anywhere and anytime without having to go to campus. The online exam card system is very significant for universities and students in the 5.0 era and during the Covid-19 pandemic(Faridah et al., 2020; Mustofa Kamil et al., 2021).

The state of the art section systematically

reviews the schema of the digitalized online exam. The first research was conducted by Susi Susilowati, proposed how to minimize cheating in the implementation and processing of exam data for students by designing an online exam application using the PHP programming language and MySQL database software from Oracle and connected via the internet (Susilowati & Hidayat, 2018). The second research, conducted by Said about the online exam card retrieval system, was developed using Codeigniter (CI), one of the frameworks used to build a website (Setyaningsih, 2017). Research by Cheetah Savana Putri discusses taking Student Exam Cards (KUM), which is still done traditionally which is still widely applied in State and Private Universities with the development of a web-based system for taking student exam cards (Sudarto et al., 2018). Furthermore, the research is to find out how much the use of the website at UMP and what factors affect the use of the website and the main reasons for students accessing the website, namely to view KHS, KRS entries, print exam cards, view class schedules and register using a combination method (Yusliani & Mustafidah, 2020). The research is a study card information system that was built using the PHP programming language and using the MySQL database online (Umagapi & Nurdiyani, 2019). The sixth study, conducted by Kerryn Butler-Henderson of the Academic Division, discussed a brief background on online examinations, followed by the results of a systematic review of the topic to explore challenges and opportunities with explanations of 36 papers (Butler-Henderson & Crawford, 2020). The seventh research, conducted by Michael Ryan, obtained information from a citizen, where several business sectors need the information contained in the KTP to carry out the registration process. In general, the registration process still uses a form until it is filled in according to the data on the KTP, which will then be converted into digital data using experiments including several testing of the grayscale algorithm, binarization, and segmentation, as well as a combination of algorithms (Ryan & Hanafiah, 2015). Another study was on an online test tryout application that was able to help students learn UNBK independently and on a computer basis (Ritonga & Bangun, 2020). The ninth study states that it collects data from online graduate-level economics courses, where proctored final exams are required, and then empirically examines differences in exam performance between students taking final exams using remote online surveillance services and students taking final exams using supervisor services traditional in place (Wuthisatian, 2020). Andrew J. Gawron conducted a recent study by examining the measurement and reporting of problematic colonoscopy quality by developing and validating accurate data sources and workflows to measure colonoscopy quality for integrated health care through an open-source Java (Gawron et al., 2018).

METHOD

This research methodology uses DevOps (development and operations) because DevOps is proven to reduce several stages of development that exist in the old method and can shorten the time between development and operation of software without reducing the quality of the software itself. DevOps is responsible for designing and delivering new products to users and flexibility, analysis, and overall communication with new software(Mohammad, 2017).

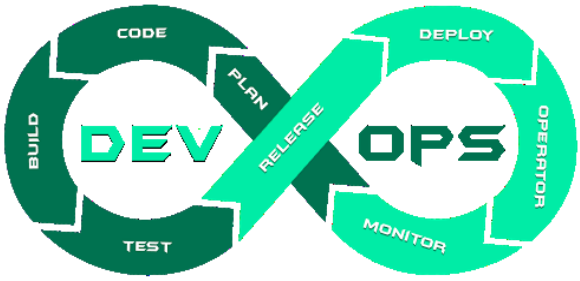

Figure 2. DevOps research method

First, planning making an online test card system, where the data researcher needs the data from the data then prepares the online exam card program design, the database structure, the algorithm used, and the user interface. After the design has been successfully created, it continues the coding process, transforming the existing design into a code that can run according to planning using the PHP programming language Yii Framework 2, Javascript MySQL with the required libraries. It continues until the program development process is refined according to the initial planning. All they need for feature features will be built at this stage and become a unified system that students can use. After the system is successfully created, it enters the initial testing phase to determine that the program made is by the existing design. All features will be tested so

that when you find bugs can be fixed quickly. The next process is to convert it into a package in the first version; programs that have passed the testing test will be given a version. After the package that has the version is ready, this online exam card system can be used by students. Researchers will operate the system that has been released to provide updates to the system based on input from users, and the monitoring stage will run with the operation so as to create a system that avoids problems and answers student needs for easy online exam cards.

RESULTS AND DISCUSSION

Result

This study has determined specific social phenomena, which are referred to as research variables. Using a Likert scale, the variables produce indicators that can be measured and become the starting point for making instrument items in the form of questions or statements that respondents need to answer. The following are research instruments:

Table 1. Research instrument grid

No.	Variable	Dimensions	Indicator
1	System Quality	*Accurate*	*Assist* Convenient Properly
		Readiness	*Assist* Convenient Performance Properly
		Timeliness	*Communication* Convenient Performance
2	Efficiency	*Accurate*	*Performance* Properly
		Readiness	*Assist* Convenient Performance Properly
		Timeliness	*Communication* Communication Convenient Performance

In this study, SPSS is used to calculate the instrument's reliability with Cronbach's Alpha. It can be said that it is a reliable instrument if the number of Cronbach Alpha is> 0.6. After calculating using the Slovin formula, it was found that the number of samples was 250 people. Furthermore, a questionnaire of 36 questions based on the research instrument's points was distributed to 250 respondents who had used the SIS + online exam card system via email online.

Table 2. Timeliness Performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less satisfied	7	2.8	2.8	2.8
	Quite satisfied	29	11.6	11.6	14.4
	Satisfied	88	35.2	35.2	49.6
	Very Satisfied	126	50.4	50.4	100.0
	Total	250.0	100.0	100.0	

Table 3. Accurate Performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less satisfied	1	.4	.4	.4
	Quite satisfied	10	4.0	4.0	4.4
	Satisfied	55	22.0	22.0	26.4
	Very Satisfied	184	73.6	73.6	100.0
	Total	250.0	100.0	100.0	

Table 3. Readiness Performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less satisfied	7	2.8	2.8	2.8
	Quite satisfied	56	22.4	22.4	25.2
	Satisfied	55	22.0	22.0	26.4
	Very Satisfied	187	74.8	74.8	100.0
	Total	250.0	100.0	100.0	

After distributing questionnaires to 250 respondents and getting a statement on the questionnaire that has been given, it is recalculated to see the performance based on 2 variables, 6 dimensions and 20 indicators. Researchers get the combined average results which are attached to the statistical tables in Table 2, Table 3 and Table 4 in which there are performance results for Timeliness, Accurate, and Readiness. Of course, these statistics will assess the results of the online exam card evaluation.

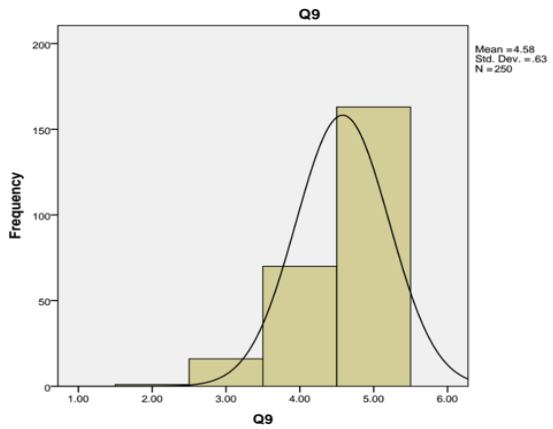

Figure 3. The histogram of Q9

The data from each indicator can be described in the form of a histogram in Figure 3. The results obtained are a mean of 4.58 with a standard deviation of 0.63 from 250 respondents, that the online exam card system provides satisfaction for students, this proves with the online exam card system makes it easier for students without the need to get conventional exam cards.

Table 4. Case Processing Summary

		N	%
Cases	Valid	250	100.0
	Excluded*	0	0
	Total	250	100.0

Table 5. Reliability Statistic

Cronbach's Alpha	N of Items
.963	36

Based on 36 questions and statements from 250 respondents, it can be calculated using the Cronbach's Alpha formula, after calculating it produces a value of .963. This can prove that an online exam card system's existence brings many benefits for students and provides efficiency for academics in distributing exam cards during the Covid-19 pandemic (Ichwana et al., 2019; M Kamil et al., 2020)

This section discusses the system implementation and displays on SiS + (Students iLearning Services +) integrated with Rinfo +. The SiS + system already uses the SSO system (Single Sign-On / Out) with a Magic Key, namely, email Rinfo. When you successfully enter the SiS + home, there is a menu to display the test card. This can make it easy for students to access exam cards without queuing and taking them conventionally.

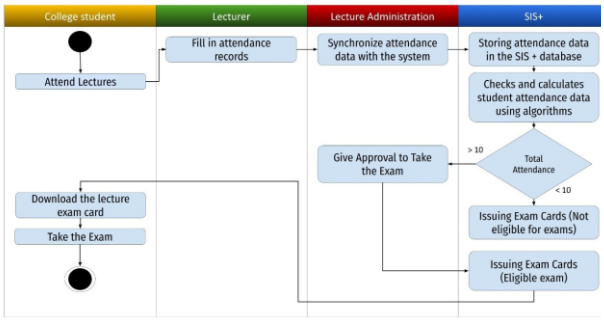

Figure 4. Sequence diagram of the online exam card

In Figure 4 above, there are 4 (four) actors, namely students, lecturers, lecture administration, and the SiS + system. Starting from students attending online lectures so that they are declared present by the lecturer, then the lecturer will record student attendance from each class meeting during the lecture period. The lecturer will provide a recap of student attendance to the lecture administration department in the next stage. After receiving attendance data from the lecturer, synchronization will be carried out with existing data in the data database received and will be entered and stored. After all data has been successfully synchronized, the SIS + system will check automatically using an algorithm that can find out which students are eligible to take the exam, and the lecture administration will verify the results of the checking to provide a final decision for students to be able to take the exam. If the lecture administration decision agrees, the student has the right to take the exam and can access the online exam card on the SIS + system and download it to prove that the student is declared worthy of taking the exam. However, if it is declared unfit to take the exam, the student can still see the exam card with a note not worthy of taking the exam.

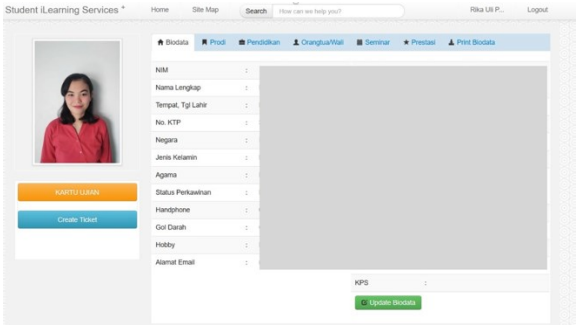

Figure 5. Menu SiS+

In Figure 5, is the SiS + viewboard. Students can print exam cards online on the EXAM CARD menu. Then the SiS + page will display the student exam card sheet.

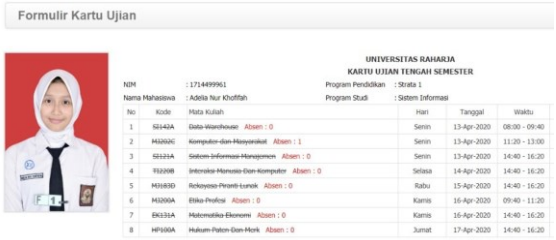

Figure 6. Student Exam Card Forms who are not eligible to take the exam

Then in Figure 6, is a display of student exam cards who are not eligible to take the exam. There is a description of the number of attendances for each course. If the statement shows student attendance of more than> 10 attendance, the student can take the exam in that course. However, if student attendance is less than <10, it is not eligible to take the exam.

Figure 7. Form of Student Card that is eligible to take the exam

Display student cards in figure x that have met the course attendance requirements to take the exam. Students can print student exam cards on the print option on the SiS+ system.

DISCUSSION

The development of the SiS + system results from digitizing student exam cards online to eliminate ineffectiveness. This is proven in the Cronbach's Alpha test, which resulted in a value of .963, which means that SiS + is Reliable. This means that students also feel comfortable and really want this system because it can be accessed anywhere and anytime. Of course, there is no need to queue anymore where previously you must queue quite long. From 10 (ten) literature reviews until the state of the art that have been described in this study, it also has an important impact on the presence of digitalization in the world of education. The DevOps method used is also in line with the current digitization flow in building a sizeable accurate system in online exam cards in education. DevOps also creates more innovative services at lower costs and higher quality (Airaj, 2017). Further research can be followed up carefully using the blockchain system into SiS + so that transparency is visible and avoids fraudulent access to online exam cards (Aini, Rahardja, et al., 2021).

CONCLUSION

The era of digitalization requires the education sector to participate in technology's role to increase the quality of education. The problem that continues to be faced is indeed the traditional nature of making it difficult for the University to progress, causing unrest for both lecturers and students. This study discusses problems that occur by students in getting final exam scheduling, which still uses paper and taking it on campus. Of course, this is neither effective nor efficient, especially during the Covid-19 pandemic, it is hazardous if it does not implement Physical Distancing. So, the findings of this study with the development of the SiS + system, the existence of an online exam card that students can access online anywhere and anytime. You do not need to come to campus, and you only need to access it with the internet. Students already know the real-time final exam scheduling. Another significant result in this era of disruption is digital and more effective documents and cost savings on-campus expenses compared to traditional techniques. With the development of online exam cards, it can eliminate queues, and physical contact does not occur and supports Social Distancing during the Covid-19 pandemic. The DevOps method is a SiS + development, which makes it easy for students to access online exam cards or information about lectures on the SiS + website. Besides, it makes it easier for students to access SiS + and the SSO feature that provides security at login in the user interface. Analysis of research trials with surveys and questionnaires by 95 students showed a Cronbach Alpha result of 0.96, which means that the online exam card was very significant and declared reliable. In the next research stage, the online exam card system can be developed with advanced technology, namely blockchain. Blockchain is now starting to enter the world of education in supporting cheating of any kind. The existence of blockchain makes education activities transparent and well distributed.

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