Development of an Airlines Check-In Simulator System as a Medium for Student Practice at The Bali State Polytechnic Travel Lab

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Abstract. Bali State Polytechnic offers vocational education, emphasizing practical skills to prepare students for real-world work. The Tourism Travel Business Study Program (UPW) at BSP aims to equip students with expertise in the airline industry, especially through the Airport Ground Operations course. In this course, students practice handling passengers, from check-in to boarding. However, the current practice in BSP's Travel Lab still relies on manual, paper-based check-in processes, while the airline industry has shifted to computer-based systems. This creates a gap between the skills taught at the university and the actual industry requirements. To address this issue, a check-in simulator was developed to provide students with a more accurate, system-based training experience. This simulator narrows the gap between campus learning and industry practices, enhancing students' competencies. The simulator development followed the System Development Life Cycle (SDLC) method, which includes system engineering, analysis, design, coding, testing, and maintenance. The output of this research is the airline check-in simulator as a student practice medium at the Bali State Polytechnic Travel Lab, scientific publications in international seminars, namely the International Conference on Sustainable Green Tourism Applied Science (ICoSTAS), Intellectual Property Rights (HKI) in the form of Copyright and enrichment of teaching materials for the Airport Ground Operations course. The TKT of this research is TKT 6.

Keywords: Simulator System, Practice, Check-in

1 Introduction

Vocational education is education where the practical portion is greater than theory (Baitullah & Wagiran, 2019). Vocational education is education at the higher education level which aims to prepare personnel who have expertise and skills in their fields, so that they have more work readiness (Sukoco et al., 2019). The teaching load in vocational education is structured by prioritizing more skill or practical courses compared to theory courses (Fajar & Hartanto, 2019). The difference between vocational education and academic education is that for the vocational level, the ratio

A. A. N. G. Sapteka et al. (eds.), *Proceedings of the International Conference on Sustainable Green Tourism Applied Science - Social Applied Science 2024 (ICoSTAS-SAS 2024)*,
Advances in Economics, Business and Management Research 308,
https://doi.org/10.2991/978-94-6463-622-2_88

of practicum to theory is 70 percent to 30 percent, while for the undergraduate level, it is the opposite (Wahyuni, 2022). Bali State Polytechnic is one of the universities in Bali that provides vocational education. The output of this vocational education is graduates who are ready to work in the business and industrial world. The lecture process at the Bali State Polytechnic is also more about practice which students can use as preparation when going into the field. The Tourism Travel Business Study Program is one of the study programs in the Bali State Polytechnic Tourism Department. One of the skills that graduates from the UPW Study Program must have is having expertise and abilities in the airline sector. To support these competencies, UPW Study Program students are facilitated by carrying out airline-related practices at the Bali State Polytechnic Travel Lab. Students get practice related to airlines from one of the practical courses, namely Airport Ground Operations. In the Airport Ground Operations course, students practice directly how to handle passengers, from passenger check-in to boarding, which is adjusted based on the type of passenger. The current practical conditions used by students when handling check-in at the travel lab are still done manually using paper even though in reality in the industry all airlines already use the system. This is a problem and a gap between the practices obtained in lectures and real conditions in the industrial world because in the industrial world, the check-in and baggage process at check-in counters already uses a computer-based system.

Simulators are learning media that have been developed for specific purposes and can be used to facilitate understanding of the subject matter (Ni'mah & Anistyasari, 2021). Check-in is one of the services that passengers receive at the airport where passengers are given a boarding pass, and a baggage tag for their checked baggage (Koloay & Pandowo, 2018). The check-in counter is a service or services provided to passengers at check-in where ticket checking and baggage inspection are carried out, and also labels to passenger baggage, boarding passes, and information regarding airport tax payments, gate locations, and the departure schedule for the aircraft to be boarded, the check-in handling process (Aufa & Istiyani, 2023). The check-in simulator is an application developed to facilitate the check-in process at the airport.

Research related to simulator development has been carried out by Perboli et al., (2014) by developing a simulator called AirSIM which has been tested in a real case study at Bologna airport. Another research was conducted by Trakoonsanti (2016) regarding a check-in system simulation trial carried out using Simquick for NokAir passengers. Another research by Obetta et al. (2021) developed a simulator model for the international tourist check-in process for the MMIA international terminal, Ikeja. Research by Shakur et al. (2019) developed two simulation models that have been developed for one domestic and one international airline and have been run using ARENA simulation software for Osmani International Airport, Sylhet.

Based on the problems and gaps that exist in practice on campus and in the industrial world, a check-in simulator is needed that makes it easier for students to learn the process at the check-in counter to narrow the gap between the knowledge provided on campus and in industry. Apart from that, it can also increase the competency of graduates so they can compete in the industrial world.

2 Methodology

This section will explain the stages in the research that will be carried out. The method approach used is research and development. The procedure used in developing this application uses the system development life cycle (SDLC) method approach. This method consists of six stages which include: (1) system engineering, (2) analysis, (3) design, (4) coding, (5) testing, and (6) maintenance (Gurung et al., 2020; Ehmer Khan et al., 2020). This system development life cycle is also known as the waterfall model (Acharya & Sahu, 2020):

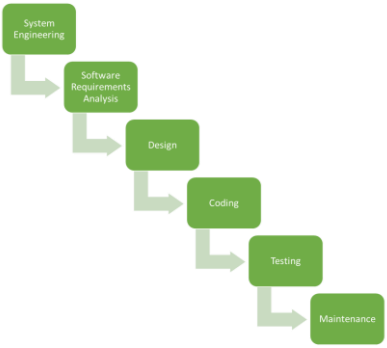

Figure 1. Research methodology

Systems Engineering: Systems engineering is the initial stage in application development. At this stage, information needs are identified by all elements of the organization. This stage is expected to collect the general content of the database from the organization as a whole. At this stage, information is collected regarding the Airport Ground Operations course and the airline's check-in process.

Software Requirements Analysis: At this stage, software requirements are collected. To understand the program to be built, a system analyst must understand the information domain required by the organization, especially the functions required, system performance, and system interfaces. At this stage, an analysis of the functional and non-functional requirements of the Airlines Check-in Simulator System is carried out.

Design: The design process translates the results of the requirements analysis into a software representation that can be assessed for quality before coding begins. Software design is a process that consists of several stages, namely: data structure design, software architecture, detailed procedures, and interface characteristics.

Coding: The design results must be translated into a form that can be read by a computer. If the design is carried out in detail, the coding process can be carried out systematically. At this stage, coding is carried out from the Airlines Check-in Simulator System.

Testing: After coding is complete, it continues with program testing. The testing process focuses on the internal logic of the software, to ensure that all statements have been tested. Externally, namely carrying out tests to reveal errors and ensure that the specified input will provide actual results as required. Testing is carried out using the black box testing method.

Maintenance: Software will inevitably change once it is delivered to customers. Changes will occur after errors are discovered, or because the software must be adjusted to accommodate changes in the external environment.

3 Result and Discussion

3.1 Result

Systems Engineering: In this sub-chapter, information is collected related to the needs of this stage of the Airport Ground Operations course and the airline check-in process, where in practice the process is still carried out manually, even though in reality in the industry all check-in processes use a system, so a system needs to be created to simulate it.

Software Requirements Analysis: In this sub-chapter, an analysis of the functional and non-functional requirements of the Airlines Check-in Simulator System is carried out. Based on the results of observations and interviews conducted, two main users are required for the system who have different access rights, namely admin and students.

Admin: Admin is a user who can manipulate student data from input, edit, and delete student data which will later use the simulation system.

Students: Students are users who can carry out the main features of this simulation system, namely flight data manipulation, booking data manipulation, passenger data manipulation, and seat data.

Design: This sub-chapter explains the results of the design stage in the form of database and infrastructure design using UML (Unified Modeling Language). The database design is made in the form of an ERD (Entity Relationship Diagram) which can be seen in Figure 2.

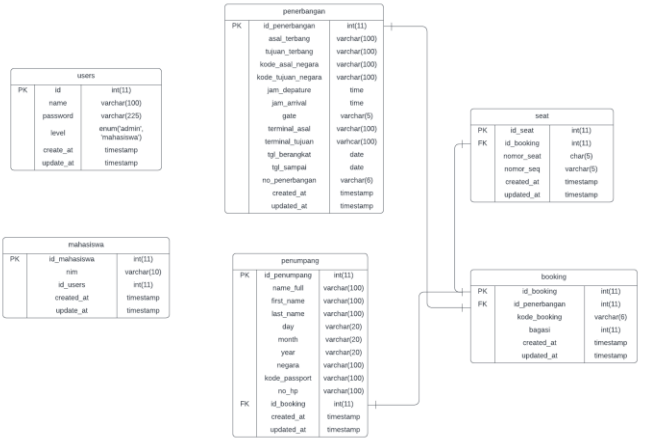

Figure 2. ERD (in Indonesia language)

Figure 2 shows the ERD in the Check In Simulation system which has 6 tables that have certain functions. Apart from database design, infrastructure design is made in the form of a use case diagram as follows.

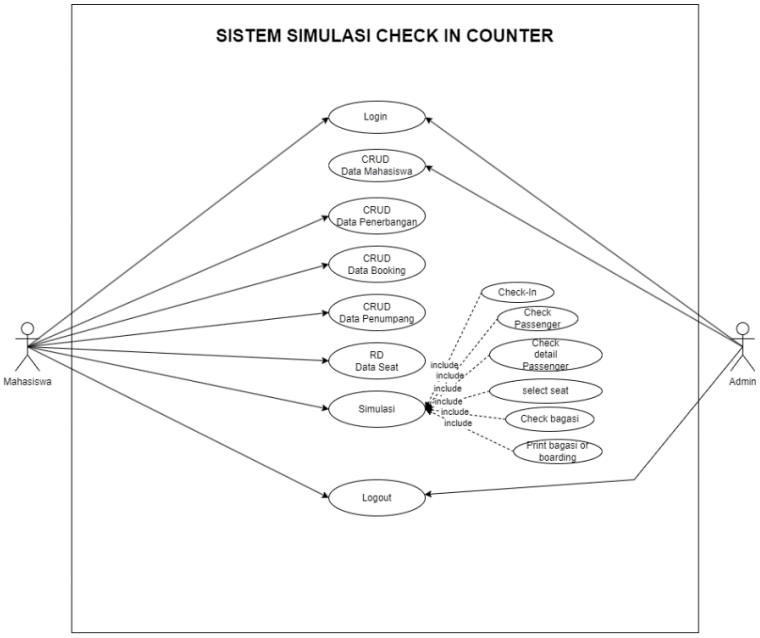

Figure 3. Use Case diagram (in Indonesia language)

Figure 3 displays a use case diagram containing 8 features that can be accessed by several roles. This system has 2 roles, namely students as officers and admins. The following are the features of this system and what roles can access these features:

Login: This feature functions as a place to enter the system, this feature can be accessed by students and admins; Student CRUD: This feature functions to add, update, or delete student data. This feature can be accessed by admins; CRUD flights: This feature functions to add, update, or delete flight data. This feature can be accessed by students; CRUD booking: This feature functions to add, update, or delete booking data. This feature can be accessed by students; and CRUD passengers: This feature functions to add, update, or delete passenger data. This feature can be accessed by students; RD seat: This feature functions to delete seat data. This feature can be accessed by students; Simulation: This feature functions to simulate check-in counters. In this feature, there are features, namely check-in, check passengers, check detailed passenger data, select a seat, check baggage, and print boarding or similar. This feature can be accessed by students; Log out: This feature functions to exit this system. This feature can be accessed by students and admins.

Coding: This sub-chapter discusses the results of the coding stages of the Airlines Check-in Simulator System system.

Admin: The dashboard page is a page that functions to manage the necessary data. The admin dashboard only contains student account data which will later be used to log in on the login page.

Students: The dashboard page is a page that functions to manage the necessary data. On this dashboard, there will be flight, booking, passenger, and seat data. If you have logged in, enter the dashboard from the menu page.

3.2 Discussion

This sub-chapter discusses testing carried out using the black box testing method.

Table 1. Blackbox testing

No	Page tested	Action	Reaction	Result
1	Student login	Enter the correct account	Enter the menu page	Success
		Entering the wrong account	An error message appears and re-entering	Success
2	Menu	Pressing the dashboard button	Enter the dashboard page	Success
		Pressing the Check in simulation button	Enters the simulation page	Success
		Press the logout button	Enter the login page	Success
3	Flight	Creating a flight crud	Successfully adds, edits or deletes data	Success
4	Booking	Create booking data crud	Successfully adds, edits or deletes data	Success
		Adding or editing the same booking code	An error message appears, and re-enter it	Success
5	Passenger	Create passenger data	Successfully adds, edit, or deletes data	Success

		Adding passenger data with the same booking code	The booking code that has been used by the passenger does not appear	Success
		Editing passenger booking code	Cannot edit booking data because it is disabled	Success
6	Seat	Viewing and deleting seat data	Successfully displays and successfully deletes seats	Success
7	Check in simulation	Entering passenger data in the form of last name and booking code is incorrect	An error message appears and re-enters	Success
8	Passenger information	Passenger information Check the box to confirm that the passenger is correct	Go to the passenger information details page	Success
		Not checking the box	An error message appears, and you have to check the box	Success
9	Passenger detail information	Enter passport code and press update	Successfully enter passport code	Success
		Press the next button without entering the passport code.	Enter the seat selection page	Success
10	Seat selection	Select a seat and press the next button	Enter the baggage page	Success
		Not selecting a seat, and pressing the next button	Does not go to the baggage page	Success
11	Baggage	Loading baggage	Go to the boarding pass and baggage pass page	Success
		Didn’t check in baggage.	Go to the boarding pass page and the baggage pass doesn’t appear	Success
12	Boarding pass dan baggage pass	Printing the boarding pass	A print popup appears	Success
		Printing a baggage pass	A print popup appears	Success
		Klik buttin completed	Enter check in login	Success
13	Admin Login	Enter correct account	Enter dashboard page	Success
		Enter incorrect account		Success
14	Student manage account	CRUD students	Success add and delete student data	Success
		adding or editing the same data	an error message appears and re-enters	Success
15	Admin Logout	Logout	Enter login page	Success

Table 1 displays the results of black box testing that has been carried out for 15 features in the flight simulator where from the results of this test it can be concluded that all features work well according to their function.

4 Conclusion

The airline check-in simulator was developed to help students practice the process of checking in customers so that it meets industry needs. With this system, students have a real view of the check-in process at the airport. Referring to the tests carried out using the black box testing method on the airline check-in simulator, it was found that all the functions in the system were running well according to the user's needs.

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