

Learning Applications about Standard Service Operational Procedures in Restaurants using Augmented Reality (AR)

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Abstract. The purpose of this study is to enrich the teaching materials that have been given in lectures regarding operational service standards in restaurants for Table Set-Ups so that they are more exciting and innovative by developing learning media using Augmented Reality. This application is designed using the UML (Unified Modelling Language) model built using the Unity application and Easy AR as the database API. The development of this learning system uses the ADDIE model. Evaluation of this application was obtained for measurements using N-gain in the "moderate" and "fairly effective" categories with values of 0.57 and 57.16, while for measurements using usability testing, the learnability is 2.86, the memory is 2.84, the efficiency value is 2.87, the error value is 2.82, and the satisfaction value is 1.29.

1 Introduction

In the restaurant business, service is one of the main things in supporting running this business. If a restaurant can provide good service, customers will feel appreciated and respected. The service needs to be done correctly and adequately to satisfy guests. The essential thing to know in performing services is understanding the standard operating procedures (SOP). SOP is a guide used by restaurant stakeholders in running a restaurant business to become a quality guide. According to Abdul [1], Standard Operating Procedure (SOP) is a guideline or reference for carrying out work tasks by the functions and performance appraisal tools based on technical, administrative, and procedural indicators following the work procedures concerned. It is aimed to increase commitment and reference in action so that it is more measurable [2].

Restaurants must consistently and continuously plan, implement, evaluate, and improve various aspects of service operations for optimal customer satisfaction, return visits, and word-of-mouth promotion that can have a positive impact. Superior customer service helps develop a good bond with the customer, leading to a long-term relationship between the customer and the restaurant [2, 3]. With the implementation of operational service standards, it is hoped that restaurant waiters can follow suit to act professionally and run with a complete sense of responsibility in providing services to guests. Inside the restaurant, many services are provided, some of which are presenting services for food and drinks [2]. One of the SOPs that the waiter must understand in serving food and beverage services is the Table Set-Up.

Table set-up is a structured step for arranging eating and drinking utensils following the standard of serving dishes and activities.

Hospitality management is one of the study programs on a private campus in Jakarta. One of the lessons is to study the service SOP in the restaurant because this is the main thing in the restaurant. According to standards, they are taught how to carry out service activities in restaurants. One of the services in the restaurant is the service of eating and drinking. In this service, students are taught to welcome guests, set tables, serve food, and drink until guests pay bills. Setting the table and its equipment is a process that students need to know in detail because of the many components involved in it. The position and order of laying are fundamental because they must comply with predetermined standards; if the order and position are wrong, it will negatively impact the image of the restaurant.

Lecturers carry out teaching following the available teaching materials. The teaching materials provided to students are in the form of presentations and practice modules. Emphasis on practice is the main thing in teaching because it is hoped that students can see first-hand the lecturers doing demonstrations and students can practice them. However, this activity is not carried out every week because the teaching materials presented have several topics. Every week, the lecturer presents a different topic according to the teaching outline. This is becoming a problem because students sometimes forget what has been learned in the practice that has been done. Therefore, this study aims to create an enrichment of teaching media regarding Operational Service Standards

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using Augmented Reality technology for Table-Set-up so that students can know and perform in providing restaurant services. Teaching media by utilizing Augmented Reality technology is expected to provide innovations and flexibility in learning [4, 5].

2 Literature review

Information and communication technology itself continues to overgrow, one of which is smartphones/smartphones. Smartphones have become commonplace items owned by all groups and among students; almost all students have used smartphones. The use of smartphones is a communication tool and functions as a data storage area, learning media, a means of finding entertainment (games), and various other mobile applications [6, 7]. The benefits that can be maximized from technological advances, especially on this Smartphone, are by maximizing it into a practical, creative, and educational teaching medium, in the form of Augmented Reality (AR) technology.

The industry 4.0 paradigm is the driving force behind the creation of a new generation of digital technical guidance, focused on new display technologies such as Augmented and Virtual Reality [8, 9]. Augmented Reality (AR), according to [10], can be defined as a technology that can combine two-dimensional or three-dimensional virtual objects into a natural environment and then bring it up or project it in real-time. AR can be used to help visualize abstract concepts for understanding and structure an object model. Some AR applications are designed to provide more detailed information than natural objects. Media is a tool or object that can serve as a liaison between the recipient and the sender of the message.

Currently, learning media are increasingly using augmented reality to increase interest in learning. According to Liswanti, learning media are media used in learning, including teaching aids and means of carrying messages from learning sources to recipients of learning messages [11]. In a narrow sense, learning media only includes media that can be used effectively in the learning process. Whereas in a broad sense, media does include complex electronic communication media and includes simple equipment such as TV, radio, slides, photography, diagrams, teacher-made charts, or other natural objects [4, 12].

The word restaurant comes from 'restaurer,' which means "restorer of energy." The term was used in the early to mid-1700s to define a public place selling soup and bread. However, nowadays, any public place that sells food can be called a restaurant [13]. Meanwhile, according to the Decree of the Minister of Tourism, Post and Telecommunication [14] Restaurant is a business providing food and beverage services equipped with equipment and supplies for the process of making, storing, and serving in a fixed place that does not move to obtain profits and/or profits.

In running a restaurant, many services are provided, some of which are serving food and drinks. A waiter or waitress does the presentation. According to Endar Sugiarto, a waiter/s is a person who is responsible for

serving food and beverage needs to customers in a professional manner [15]. A waiter / I must know the SOP (Standard Operating Procedure) in every activity so that the restaurant's image can be maintained. One of the SOPs that must be understood in a restaurant is the Table Set-Up. This SOP needs to be known by the waiters or waiters before serving food and drink. Table set-up is a series of activities to arrange and equip the table with tableware and other supporting equipment according to the type of dish to be served (TABLE SET UP, n.d.).

3 Research design

The method used for application development in this study Researchers used the waterfall model for developing software, and the instructional design model is known as the ADDIE model. The waterfall development model is an application development model that uses a systematic and sequential approach to software development and can be well defined in new types of development [15]. The ADDIE model has five universal course design principles: Analysis, Design, Development, Implementation, and Evaluation (ADDIE) [16] regard to instructional design has become a common practice among e-learning designers and developers [17]. In this study, the researcher did several steps and explained them.

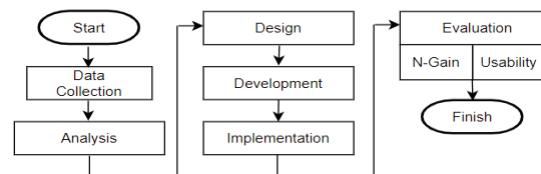


Fig. 1. Research design.

3.1 Data collection

This AR contains basic theory and information about the types of table setups in restaurants; from the types of table setups that exist, researchers put them in some data so that AR becomes complete, including images and videos. The image is used as the target image to display a video explaining the table-setup practice and explaining the detailed layout of the restaurant equipment on the restaurant table. The researcher used two types of testing stages, including the effectiveness test and usability test, which took a sample of twenty-seven students majoring in hospitality management.

3.2 Analysis

In the learning of hospitality service management, several materials have been provided as the primary learning material, one of which is the SOP regarding table setup. In every material taught, there are learning outcomes to understand what will be obtained in studying the material. AR media is an effort to enrich teaching materials to improve understanding and make it easier for students to learn material outside of the practice and content provided. The following is one

form of learning achievement in the material being taught:

Table 1. Analysis course outline material.

Core Competencies	Learning outcome	Subject matter
Understand a principle and practices of restaurant operation management to be able to develop and manage their own restaurant operation and product development	<ul style="list-style-type: none"> • Be able to define Food and Beverage Service in Hotel Operations. • Explain Food and Beverage Service in Hotel Operations with their duties and responsibilities 	<ul style="list-style-type: none"> • SOP in resto • Table-setup • Table manner

3.3 Design

The system architecture design stage is the stage of describing the workflow of the system to be built. The system architecture design stage uses Unified Modelling Language (UML) modelling. UML is a general-purpose modelling language for defining, building, and documenting software systems. It is used in system development by combining different diagrams to express different views of the system [18]. In Figure 2 there are actors. the actor is the user of the AR application. in the AR application, there are several menus that are presented so that actors can use them.

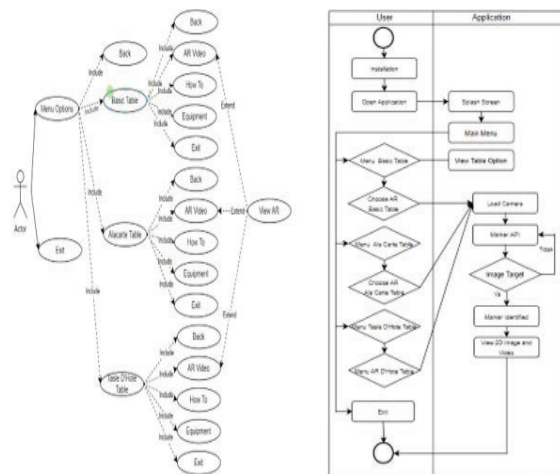


Fig. 2. Use case diagram.

Fig. 3. Flowchart e-learning systems.

3.4 Development

Creating code is a series of programs that implement the design stage into a programming language so that it becomes a system that has the expected functionality and is related to the content delivered. Making this Augmented Reality learning media application using Unity 2D and 3D software and the Easy AR SDK. coding process using Code Editor and Android Studio software. The product can run on mobile devices with the Android operating system, while the object is created using an image design application called GIMP with an open-source license. The image is designed to be captured and display learning videos that are entered into the system.

3.5 Implementation

Some examples of the appearance of learning applications using Augmented Reality for learning computer networks can be shown as follows:



Fig. 4. Dashboard multiple menu options.

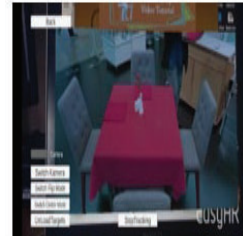


Fig. 5. AR basic table-setup displays.



Fig. 6. How to menu options.



Fig. 7. Equipment menu options.

3.6 Evaluation

The researcher used two types of testing stages, including the effectiveness test and usability test, which took a sample of twenty-seven students majoring in hospitality management. At the stage of the effectiveness test, it is carried out to measure how effective the learning is using augmented reality for the table-setup developed by the researcher [7, 19]. In this experiment, the researcher distributed a questionnaire using a google form to several students which contained learning from the table-setup, and then the students were given a test again after trying this AR application. The data were tested using N-gain statistical analysis to determine whether there was an increase in the value when the conditions were carried out before and after testing [20, 21]. This is done by researchers to find out if there is an increase after using this application. The N-Gain value can be calculated using the formula:

Information:

N-gain = Normalized gain

Posttest = The final grade of learning

Pretest = Initial value of learning

Ideal Score = Maximum (highest) score that can be obtained

Table 2. Distribution of n-gain scores.

N-Gain Value	Category
$g > 0,7$	High
$0,3 \leq g \leq 0,7$	Medium
$G < 0,3$	Low

Usability testing is used to find out how easy it is for users to use the interface of an application Usability testing uses five measurement indicators with details of

seventeen questions asked to respondents, namely four questions related to Learnability, three questions related to Memorability, three questions related to Efficiency, three questions related to Error, four questions related to Satisfaction [22]. Students were given a questionnaire again after the post-test to find out the assessment of the AR application and the results were measured through the SUS evaluation.

Table 3. Standard category [23].

Interval	Category
<40	Ineffective
40 < 55	Less effective
56 < 75	Fairly effective
> 70	Effective

The measurement results are carried out using N-Gain. The results show that the n-gain value is 0.57; these results indicate that the value of the effectiveness of learning using this application is in the "medium" criteria, while the percentage value of n-gain is 57.16; these results indicate that students use AR applications including within the "fairly effective" criteria. In this study, researchers also carried out usability measurements, and the results' details are shown in table 4:

Table 4. Distribution result of SUS.

No	Identifiers	Value	Average Value
1	A1	2,89	2,86
2	A2	2,86	
3	A3	2,83	
4	A4	2,86	
5	B1	2,86	2,84
6	B2	2,77	
7	B3	2,89	
8	C1	2,97	2,87
9	C2	2,86	
10	C3	2,77	
11	D1	2,74	2,82
12	D2	2,80	
13	D3	2,91	
14	E1	1,23	1,29
15	E2	1,31	
16	E3	1,26	
17	E4	1,34	

Table 4 shows the average total results of each indicator from the assessment of measurement indicators using usability. The efficiency indicator indicates that users feel that it is easy to get the information they are looking for in this AR application. The learnability indicator indicates the ease of learning how to use this application from the existing navigation. The memory indicator indicates the ease of remembering the use of AR applications. Error indicator, indicating that the AR application does not experience problems in its use. The overall application's satisfaction indicator is given a value to determine the design side and interface.

4 Result and discussions

In the measurement results, the efficiency indicator is the largest with a value of 2.87 and the lowest is satisfaction with a value of 1.29. the other indicators are learnability 2.86, memory 2.86, and error 2.82. In satisfaction there are several question points, including interest in the overall interface design presented, a sense of comfort in using the application, color guidelines and content layout in applications and applications whether they meet the needs. From the point of the questions presented, many students answered that they were less interested in the overall interface design presented and the color guidelines and content layout in the application. From the results of the evaluation, the Augmented Reality application needs to be improved in display so as to produce an attractive application for users. Interestingly, the content presented is enough to help students in learning table setup. Students can repeat learning through smartphones that are owned so that learning becomes flexible.

5 Conclusion

The research measures the development of learning products using the ADDIE model. This application was developed using an augmented reality application to be able to add to the enrichment of teaching materials. This application is used for table-setting learning, part of restaurant service standard operating procedures (SOP). At the evaluation stage, researchers distributed questionnaires to twenty-seven students majoring in hospitality management to get results for the measurement of usability testing and N-Gain. The efficiency indicator in usability testing gets the most significant value with a total value of 2.87, and the satisfaction indicator becomes the lowest value with a total value of 1.29. While using N-Gain, this AR application is in the "moderate" and "enough" categories. Effective" with a value of 0.57 and 57.16. The limitations in this study are limited to the application of AR applications in one course and evaluation is only used in one department, causing the results obtained to be less than optimal and suggestions for further research can also be considered for evaluation and improvement in the application interface so that it becomes more attractive.

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