E-Learning Based Web Programming Course in the COVID 19 Pandemic Time

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Abstract—The learning process in the STKIP PGRI West Sumatra Informatics Education Study Program still uses conventional learning methods, namely through face-to-face contact between lecturers and students in the class. The traditional learning method currently taking place has limitations that can hinder the learning process, such as limited time and space to interact with each other, especially during the Covid-19 pandemic. With these conditions, the online learning process is an alternative to support learning in its current state, with technological developments that can simplify the learning process and make the time more flexible and support the learning process anywhere, anytime, and anyone. An electronic learning system (E-Learning) was created from these conditions, which is expected to be an alternative solution for online learning to overcome the STKIP PGRI West Sumatra Informatics Education Study Program's limitations, especially in introductory web programming courses. E-learning is designed using the System Development Life Cycle (SDLC) method supported by the PHP programming language and implementing the Laravel Framework. The learning process using E-learning is designed using localhost as the central server. This study's results resulted in an E-learning application built based on the analysis and design recommended by the STKIP PGRI West Sumatra informatics education study program. With this application, it is hoped that it can simplify the online learning process, especially in existing introductory web programming courses.

Keywords—website development, e-learning, laravel, SDLC, learning media

1 Introduction

In the modern era like today, information technology is developed according to human needs to help humans carry out their activities. One of them is the number of technologies used in obtaining information. Information technology is currently needed in various fields, including health, business, entertainment, and especially education.

The influence of information and communication technology in education is increasingly felt in line with the shift in learning patterns from conventional face-to-face learning towards more open and media-driven education. With the influences of technology, education in the future will be more relaxed and two-way, diverse, multi-disciplinary, and related to work productivity and competition.

Along with the rapid development of Information Technology (IT), the need for an IT-based teaching and learning (education) concept and mechanism are inevitable [14][15][16]. The idea that became known as E-learning has influenced conventional education's transformation into digital form, both in content and in the system. The world community has widely accepted the concept of E-learning, as evidenced by the widespread implementation of E-learning in educational institutions (schools, training, and universities) and industrial institutions (Cisco Systems, IBM, HP, Oracle, etc.).

The essence of E-learning is a conventional form of learning that is translated into a digital format through internet technology. E-learning can be used in distance education or traditional education, depending on its importance.

Developing a learning model is not just presenting subject matter on the internet but needs to be considered logically and holds learning principles. Likewise, a development design that is simple, personal, fast, and includes online evaluation. Based on the observations made, the Informatics Education Study Program at STKIP PGRI West Sumatra does not yet have its E-learning Website. The authors want to make a unique E-learning application in the Informatics Education Study Program that functions as learning support [17][18][19]. To increase the learning process's effectiveness, it is necessary to have an E-learning application with acceptable standards accessible by lecturers and students.

[6] Explains that E-learning has the nature of flexibility, choice and is dynamic, which means that in the teaching and learning process, it can be done where, when, and whoever is without being limited by space and time. In line with that, [7] explains that the implementation of E-learning is an effort in distributing subject matter via electronic media or the internet so that students can access it anytime from all parts of the world. Whereas in the article [10] is an overall concept of mobile learning and digital learning which includes learning through digital devices (telephone, PDA, etc.) and the online environment in which they are based. From this explanation, two keywords in E-learning can be found, namely flexibility and distribution. Flexibility means that students can choose the time and place to study because they have to come somewhere simultaneously. Distribution means that educators can deliver subject matter using CDs or the internet so that students can access it anywhere, anytime.

Laravel is a PHP framework that emphasizes simplicity and flexibility in its design. Just like other frameworks, Laravel is built based on MVC (Model-View-Controller). Laravel includes a command-line tool called "Artisan," which can be used for bundle packaging and bundle installation. According to a survey conducted by Sitepoint.com in December 2013 in the PHP framework's popularity, Laravel ranks at the top, making Laravel the best PHP framework for 2014. Currently, Laravel is a framework with an up-to-date version of PHP because Laravel hints at PHP version 5.3 and above.

Aminudin [8] explains the reasons for using Laravel instead of other frameworks 1). Simple coding, 2). There is a superior and convenient generator, Artisan CLI, 3). Schema Builder features for various databases, 4). Migration & Seeding features for multiple databases, 5). Query Builder Features, 6). Eloquent ORM (Object Relational Mapper), 7). Package and Bundle creation features.

2 Methodology

This research uses the Waterfall modeling technique, which uses an orderly sequence which is used to improve programming consisting of Analysis, Design, Production/ Implementation, Construction, Testing, and Maintenance [2].

The research method in brief in this study is used to obtain the data required are as follows:

2.1 Planning

The stage of collecting data by observing/monitoring the environment, determining problems, concluding the system's weaknesses and advantages, then provides a temporary picture for solutions by planning globally and providing system objectives. Information data and description of the product to be made.

2.2 Analysis

Describing a complete information system into parts (analysis stages; Identity, Understand, Analyze, Report) to identify and evaluate the problems that occur and the expected needs so that improvements can be proposed.

2.3 Design

Make a detailed design based on the analysis result report. By making several selected models and selecting the best model from some of the best models, this design's results can be upgraded into program code.

2.4 Implementation

This stage is implementing and evaluating, and thinking about sustainability to answer the system's needs as long as it uses it. To achieve this, the system needs to be cared for and maintained for the system's sustainability. Product data offered (website and database).

3 System planning

3.1 Context diagram

The Context Diagram of the Management of E-learning for the Informatics Education Study Program is show in Figure 1. Context Diagram of E-learning Program is mentioned in Figure 2 and E-learning for the Informatics Education Study Program is shown in Figure 3.

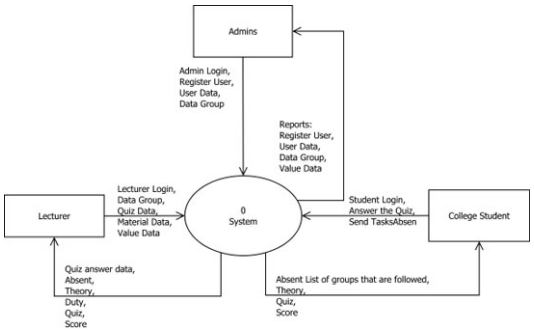


Fig. 1. Context diagram of the management of e-learning for the informatics education study program

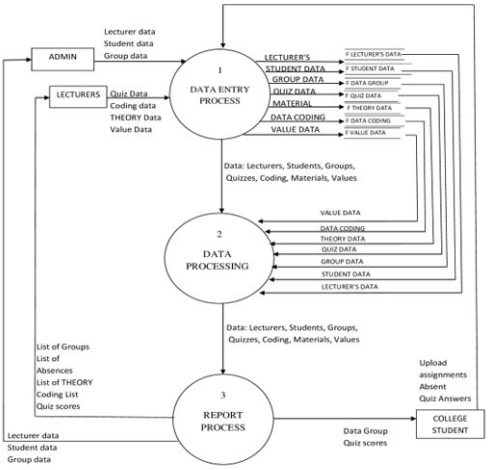


Fig. 2. Context diagram of e-learning program

3.2 Entity relationship diagram (ERD)

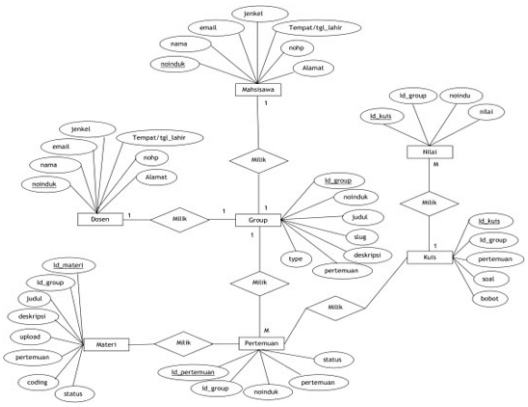


Fig. 3. E-learning for the informatics education study program

4 Results and discussion

4.1 Input process

a) User input. Before starting E-learning, at the initial stage, you must create a new user account. Every user involved in the learning process using this E-learning Website must be registered in the system. Every new user is required to register first on the registration page. User Registration Form/User Input can be seen in Figure 4.

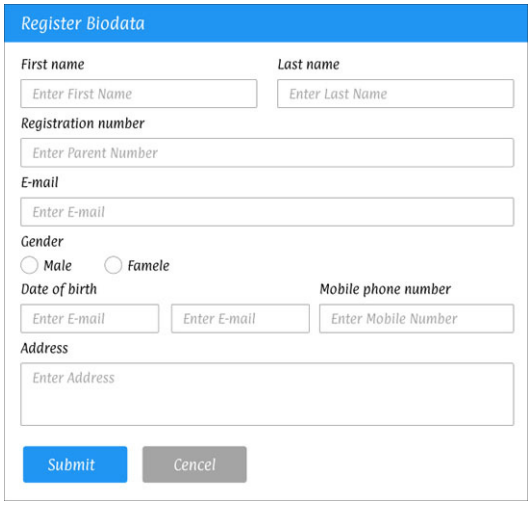


Fig. 4. User registration form

b) Input group. To be more neatly organized, each learning material should be grouped into categories, for example, grouped according to groups specially made by the lecturer. The group input form can be seen in Figure 5.

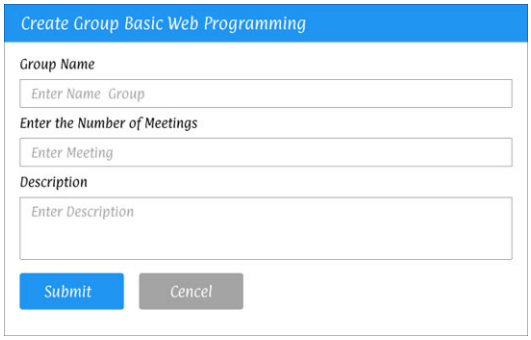


Fig. 5. Form input group

c) Material input. Material input is one of the lecturer home window features that function as a filling material in a file format or video. The material input form can be seen in Figure 6.

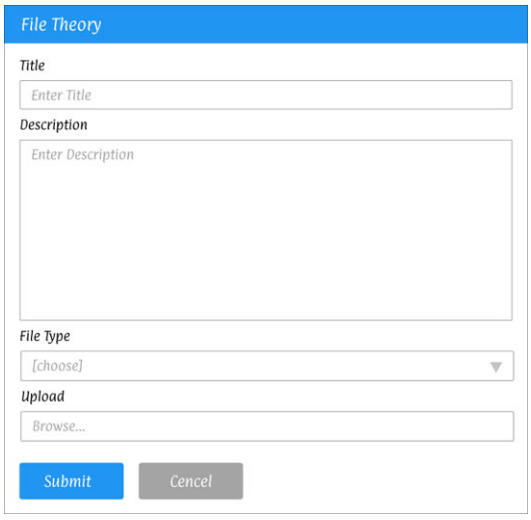


Fig. 6. Material input form

d) Input coding. Input Coding is essential in this E-learning Website. This system will be an added value because, in this process, students can learn coding online. The input coding form can be seen in Figure 7.

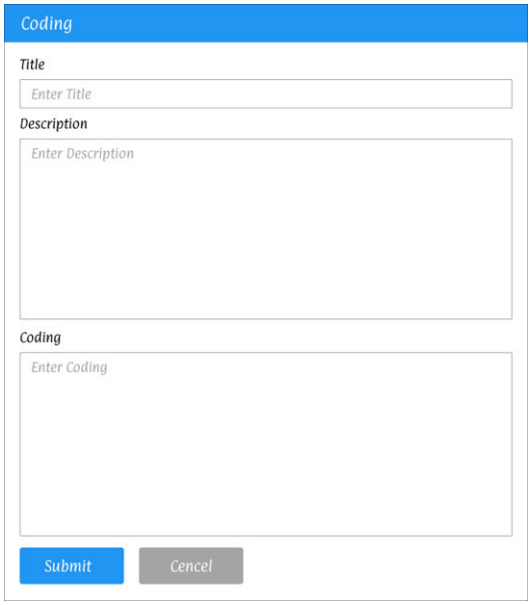


Fig. 7. Coding input form

e) Input quiz. Quiz input is another essential feature of E-learning because it is only located on the lecturer menu. This quiz input form has two stages, the first is filling in the quiz title, and the exam time can be seen in Figure 8, and the second is the question filling questions, and values can be seen in Figure 9.

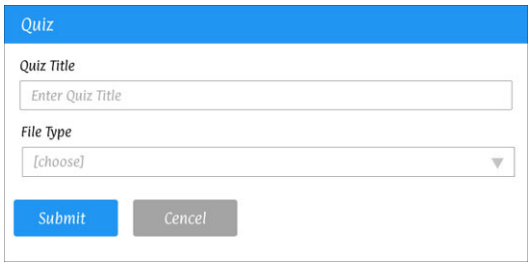


Fig. 8. Quiz input form

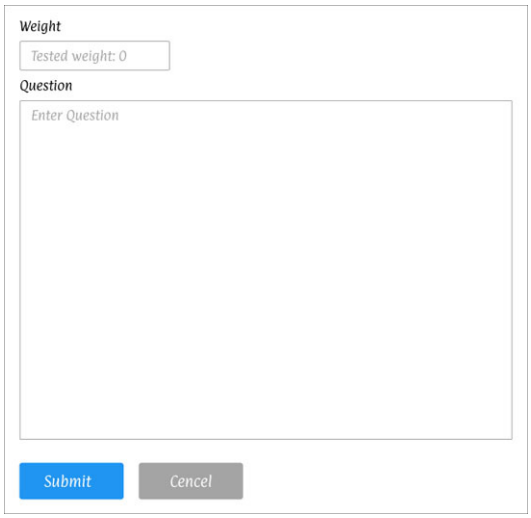


Fig. 9. Quiz input form

4.2 Processing

a) Search. In this form, a group search can be carried out, namely by group name shown in Figure 10.

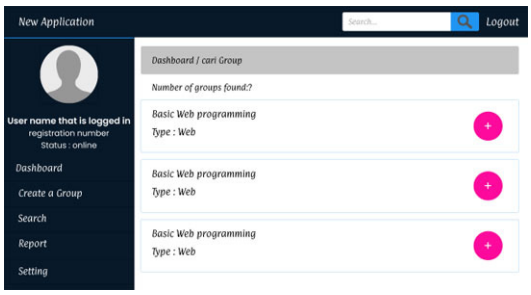


Fig. 10. Search

b) User search. In this form, user searches can be carried out, namely based on the user's name, shown in Figure 11.

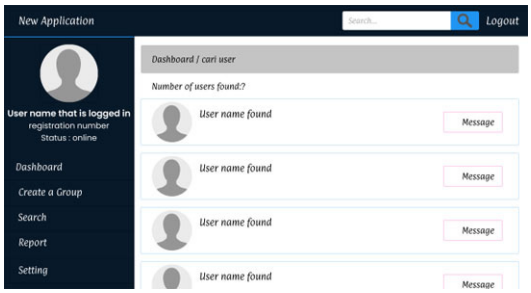


Fig. 11. User search form

4.3 Output process

a) Home group view. The Home Group Form is a place where lecturers and students carry out E-learning activities. On this form, there are several features, including the posting feature for information and containing information about the group such as group name, group id, description, and equipped with a meeting on the right side. The homegroup form can be seen in Figure 12.

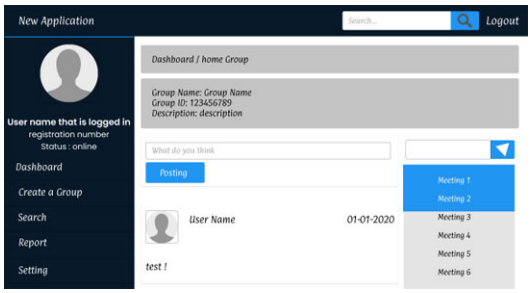


Fig. 12. The home group form display

b) Home display of meeting material. In the form home, the material for this meeting is where the materials, quizzes, and assignments that want to be uploaded are located in Figure 13.

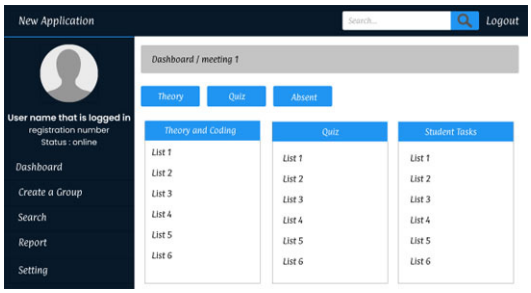


Fig. 13. Meeting material home display form

c) Display coding. In this coding form is a page devoted to students who want to learn coding online with the material provided by the lecturer. This form can be seen in Figure 14.

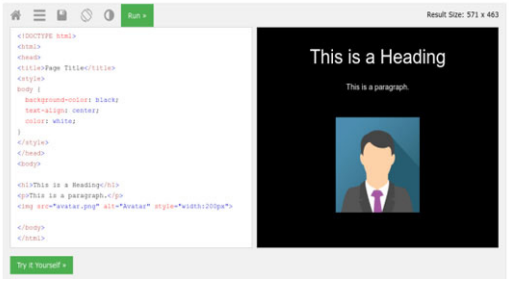


Fig. 14. Display coding form

d) Quiz view. In the quiz form, this is the core of an ongoing E-learning system. This can be seen in Figure 15.

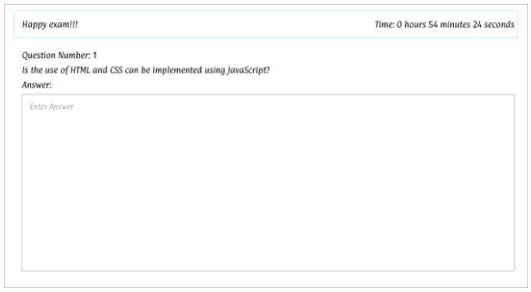
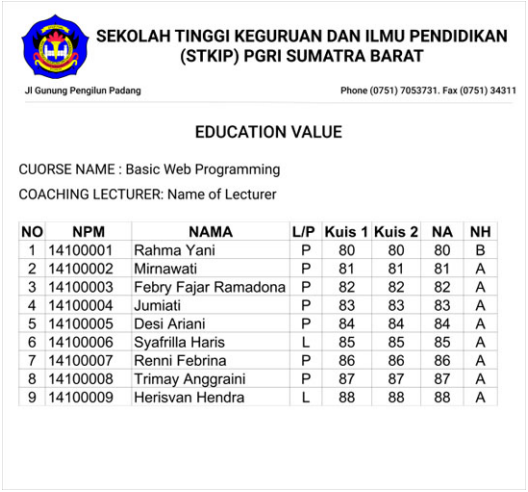


Fig. 15. Quiz display form

e) Value display. The value-form in the E-learning application is in the form of a PDF to make it easier for users to see it. This can be seen in Figure 16.



SEKOLAH TINGGI KEGURUAN DAN ILMU PENDIDIKAN
(STKIP) PGRI SUMATRA BARAT

Jl Gunung Pengilun Padang — Phone (0751) 7053731. Fax (0751) 34311

EDUCATION VALUE

CUORSE NAME : Basic Web Programming

COACHING LECTURER: Name of Lecturer

NO	NPM	NAMA	L/P	Kuis 1	Kuis 2	NA	NH
1	14100001	Rahma Yani	P	80	80	80	B
2	14100002	Mirnawati	P	81	81	81	A
3	14100003	Febry Fajar Ramadona	P	82	82	82	A
4	14100004	Jumiati	P	83	83	83	A
5	14100005	Desi Ariani	P	84	84	84	A
6	14100006	Syafrilla Haris	L	85	85	85	A
7	14100007	Renni Febrina	P	86	86	86	A
8	14100008	Trimay Anggraini	P	87	87	87	A
9	14100009	Herisvan Hendra	L	88	88	88	A

Fig. 16. Value display form

f) Timesheet view. The Absent form for E-learning is already in PDF form to make it easier for users to see it. This can be seen in Figure 17.

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Jl Gunung Pengilun Padang — Phone (0751) 7053731. Fax (0751) 34311

Lecture attendance

CUORSE NAME : Basic Web Programming

COACHING LECTURER: Name of Lecturer

NO	NPM	NAMA	L/P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Ket
1	14100001	Rahma Yani	P	×	×	×	×													
2	14100002	Mirnawati	P	√	√	√	√													
3	14100003	Febry Fajar Ramadona	P	×	×	×	×													
4	14100004	Jumiati	P	√	√	√	√													
5	14100005	Desi Ariani	P	×	×	×	×													
6	14100006	Syafrilla Haris	L	√	√	√	√													
7	14100007	Renni Febrina	P	×	×	×	×													
8	14100008	Trimay Anggraini	P	√	√	√	√													
9	14100009	Herisvan Hendra	L	√	√	√	√													

Fig. 17. The absent display form

5 Conclusion

From the description above, it can be concluded as follows:

a. The Learning Management System (E-Learning) in the Informatics Education Study Program of STKIP PGRI West Sumatra can simplify the offline and online learning process, especially in basic web programming.
b. The implementation of Waterfall modeling and System Development Life Cycle (SDLC) in this E-learning system can help facilitate the adjustment process for manual learning that runs with the designed E-learning learning process.
c. By using E-learning, the learning and teaching process can be done online and does not replace the learning and teaching process in full but only complement the existing learning system.

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