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Development of e-learning content with H5P and iSpring features

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Abstract. E-learning is currently a fast-developing learning method. Interactive multimedia technology, which combines computer technology, video, and audio, is needed to support this e-learning system. The objective of this study is to develop e-learning content based on interactive multimedia to support the effectiveness of a learning system. SDLC (*System Development Life Cycle*) method with the waterfall model was used in this study. The output of this study is developed e-learning with additional content that utilizes interactive multimedia features, H5P, and iSpring. Through this system, the teacher can create content improvement in the learning model. The system provides various learning sources and activities to support a more interactive teaching and learning process. This e-learning can ease students in understanding the materials and motivates them in learning through this multimedia learning media.

1. Introduction

Learning system in the school is progressing from time to time to support students' learning process. Based on the 2013 curriculum, one of the objectives of English learning in junior high school (hereinafter will be referred to as SMP) is to develop communication ability in English, either in written or orally. These communication skills consist of listening, reading, writing by using several genres such as transactional, interpersonal, narrative, descriptive, recount, discussion, etc [1].

The current learning tends to focus on achievement of curriculum material targets; it emphasizes more on memorizing the concept rather than understanding the concept. Conventional learning method and utilization of simple media tend to make students passive during the learning process. Often, the learning processes are ineffective, hence, time and resources wasted, but the learning objectives are yet to achieve. Students often bored with conventional English learning. Thus, many do not pay attention to their teacher's explanation. The lack of students' motivation to learn English has an impact on their low achievement in this subject. Suparno describes that a learner's learning outcome depends on what the learner has known, i.e., concepts, objectives, and motivation that influence interaction with the materials being studied [2]. Therefore, Shephard insists that a professional educator should care about learning achievement, which encompasses affective attributes by utilizing teaching and learning activities that can increase learner's achievement [3].

E-learning is currently a popular learning method. E-learning is a learning method that utilizes information and communication technology to make students actively engaged in learning regardless of the time and place [4]. According to Bloomsburg [5], e-learning is a learning media, which includes self-motivation, communication, efficiency, and technology due to the limitation of social interaction, students' should maintain their motivation. E-learning is efficient as it eliminates distance and commuting time. Distance is eliminated as the content of e-learning is designed using media that can be accessed from a computer and other technology through the internet network. In addition, Dahlstrom also mentioned in a study that more than 58% of students surveyed by Educause stated that



implementation of e-learning combined with traditional class is proven to be effective in assisting the learning process [6].

In order of e-learning to effectively support the learning system, an interactive multimedia technology to support computer, video, and audio technology is needed to be able to combine and increase interaction properly. Situmorang argues that teachers need interactive learning media to facilitate learning process between students and computer [7]. According to Rita, in order for a learning process to be effective, the feature of multimedia should allow students to choose, synthesize, and collaborate learning on their own [7]. Interactive multimedia also provide opportunities for students to develop learning technique; thus, the result will be maximum. The objective of this study is to identify the students' need in learning English as well as designing interactive multimedia-based e-learning with H5P and iSpring features to fulfill and support the English learning.

H5P is the abbreviation for HTML5 Package, free software and open source with MIT license to assist everyone in creating, sharing, and using interactive content of HTML5. Interactive videos, interactive presentations, quiz, interactive timelines are among many features developed and shared using the H5P at its website H5P.org. Applications and types of H5P content work similarly in all website that is compatible with H5P. Currently, H5P is integrated with three types of platforms, Drupal, WordPress, and Moodle and have been used by approximately 9,000 websites.

2. Method

SDLC (*System Development Life Cycle*) with waterfall model is used in this research. According to Pressman waterfall model is a classic systematical model, and develop software in sequence [8]. Waterfall has a structured development stage between the first sub-development stage and the next development stage. Each stage in this model serves a certain function and role. Basil writes that there are five stages in the waterfall model namely: *analysis, design, development, testing, and maintenance* [9].

The analysis stage, as an initial stage in e-learning development, is carried out to identify teacher's and students' needs in learning, provide a solution as an alternative through the development of e-learning, formulates the objectives for the development of e-learning and identifies users' needs.

The design stage is the development of web-based and interactive multimedia e-learning system as features/contents that complements the e-learning itself. There are three types of users, administrator, teachers, and students. The multimedia itself has to considered several aspects of visual communication, namely creative ideas, ideas manifestation, simple and attractive, audio (sound effect, background sound, and music), visual (layout design, typography, color), dynamic multimedia (animation, movie), and also interactive layout (navigation icons).

Development stage in database management uses the Database Management System (DBMS) and open source application Moodle; thus, the e-learning program can be operated in the computer. The multimedia features combine audio, visual, video, animation by utilizing several plugins such as Corel Draw, H5P, PowerPoint, iSpring Suite 8 and other supporting software.

The testing stage uses a black box test. The result of the test is presented in the form of a black box test table to show that the developed system has met the functional criteria. In addition, direct application test is carried out by the user to find out whether the developed e-learning is appropriate or not to be applied.

The next stage is the maintenance stage on the operated e-learning. This maintenance includes the correction of some errors, which were not found in the previous steps. This stage also includes the improvement of some functions to be more user-friendly. The maintenance process is carried out by performing the update and solving on-going errors.

3. Result and discussion

This study is carried out in SMP Negeri 1 Gorontalo city, in English lesson, where the problems that commonly found during the current learning process are:

- Face to the face learning process is quite monotonous and less attractive, hence, less optimal
- The 2013 curriculum demands many materials and tasks to be administered.

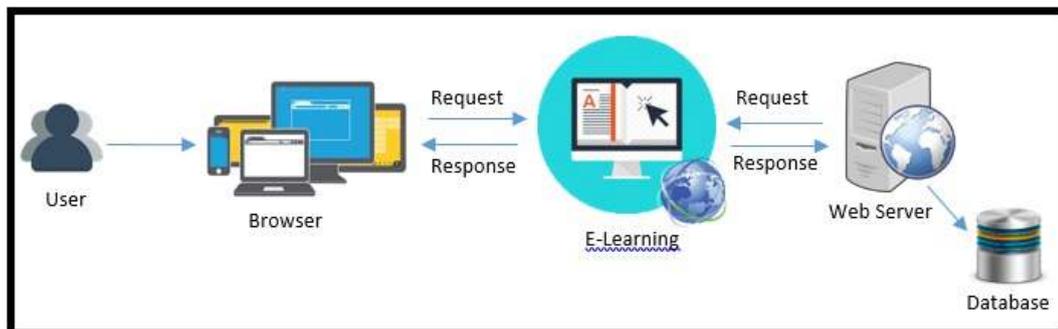
- Teachers find it difficult to teach all the topics or materials during short time lesson allocation in the class.
- The learning process is carried out with one-way interaction. Hence, students are less active in processing information.
- Students find it difficult to obtain a digital form of information and learning materials.
- Qualified learning materials/contents in the form of text, pictures, or video (multimedia) are yet available

Therefore, the features that can be developed based on the above needs are:

- A system can facilitate teacher and students in long-distance learning.
- Within the system, the presentation of the materials is in file formats (words, power point, PDF, flash, etc.) uploaded by administrator or teacher and can be downloaded by students so it can ease them to obtain the materials, both that has been taught or will be taught.
- The system enables the creation of interesting learning materials for students to learn and repeat the learning by providing more interactive content, in this case, multimedia contents.
- The system provides facilities for tasks, quizzes, or evaluation (which can be done online) with new methods using a timer, random question, auto-grading, multimedia, etc.
- The system can show the students' grades.
- The system provides sharing and consultation space such as discussion forum, chatting, and messaging to users

The system is made in two stages: web-based e-learning by using Moodle version 3.2, as an open source Learning Management System by using PHP programming language and Apache Web Server and MySQL as its database. This system is the main system that encompasses all the activities within the e-learning. Whereas, the second stage is the complementary stage as the development of e-learning content itself using interactive multimedia. The multimedia are made through software and plugins such as Corel Draw, H5P, powerpoint, iSpring Suite 8.

Figure 1 depicts the architectural design of the e-learning system. In this system, a user who accesses the e-learning needs a device, which operating system supports a web browser. Learning media file and data within e-learning is stored in a hosting or web server, which requires a response from the



database

Figure 1. The architectural design of the e-learning system

The interface scheme is shown in Figure 2. Meanwhile, Figure 3 shows the initial display of the e-learning system. In order to access the system, a user needs to log in and put in their username and password in the initial form of the system.

E-learning system has two main features, activities and resources. Activities consist of activities facilities that the student can do, whereas, resources consist of learning sources such as learning materials in various formats. These two features support the teaching and learning process. Through various material presentation facilities provided in the system, it helps students in creating various class situations, and provide learning method options that can be utilized as there are plenty of activities that can be used. The resource feature provides a selection for the presentation of materials

in various formats (*words, power point, PDF, flash, etc.*) which uploaded and can be downloaded by students, thus, ease them to learn the materials digitally. This includes materials that have been taught and materials that will be taught.

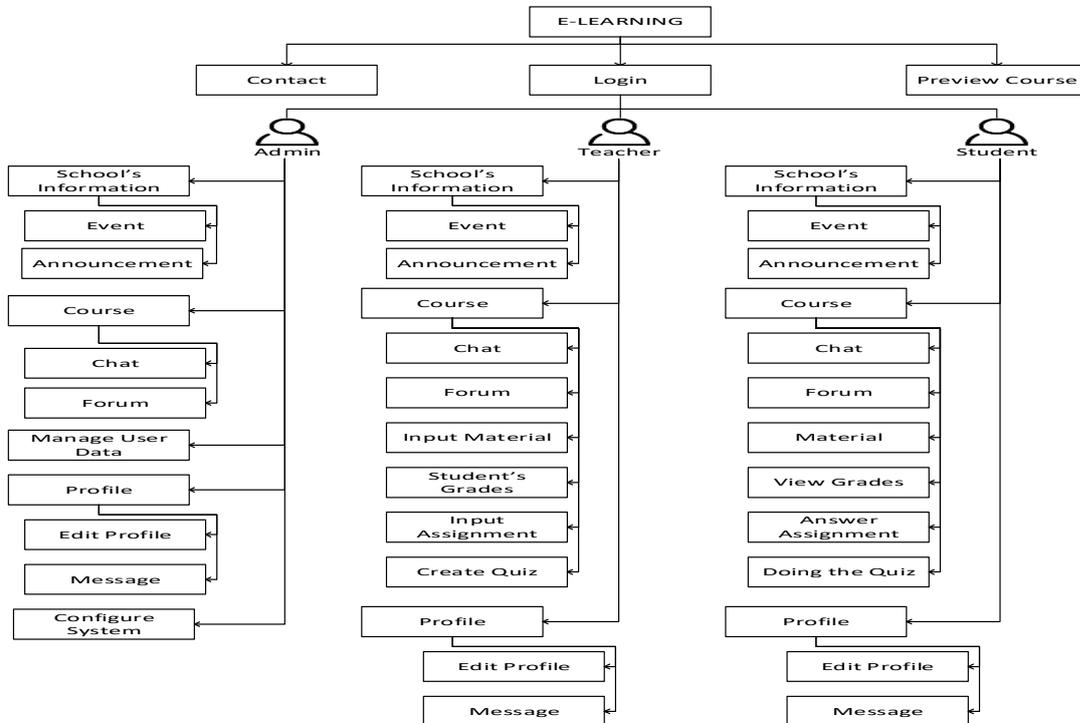


Figure 2. The interface scheme



Figure 3. Login form

This e-learning system provides communication features as sharing and consultation space called, forum and chat room. In these rooms, the registered teachers and students can join and discuss topics. The e-learning system is also equipped with a message feature. Thus, users can exchange messages. In addition, there are events and announcement features, where admin or teacher, and even students can provide information on the school, including scheduled events in the calendar and general announcements. To support more maximum learning, features for tasks, quiz, or exercise/evaluation (which can be done online) are also added with new methods using a timer, random question, auto-grading, etc. hence, teacher and students can see the students' grades.

In its development, implementation of interactive multimedia lays on the online learning process itself. There are learning packages such as reading texts with animation, multimedia, simulation,

educative games, quizzes, or exercise or interactive test. The intended interactivity is carried out through the availability of GUI (Graphic User Interface) for students to directly interact with the media through keyboards, mouse, and other forms of interactions. Implementation of e-learning and interactive multimedia in it solves the problems in conventional learning where teacher finds it hard to teach all the topics in a short time and the unavailability of interesting learning contents such as integration of multimedia in learning and also solves the problem of students' difficulty to obtain information and materials digitally.

This development of e-learning is an addition of interactive multimedia contents through new activities, H5P (Interactive Content). Through this activity, the teacher can create contents as improvement in learning model and can collaborate them into a complete multimedia material. Within this system, contents will be developed by adding a new feature called Interactive Content (H5P) for the teacher to be able to create interactive multimedia-based learning content with various options such as image hotspot, image justification, memory game, interactive videos, and many more.

In addition to the utilization of H5P, iSpring software is also used. This is additional interactivity in Microsoft PowerPoint, which also can export power points into several formats. Within this system, the SCORM format is used. For the iSpring Suite 8 version, exports to HTML5 format is enabled. This interactivity can be in the form of flash animation (.swf), quiz, video, and etc. This software is developed to support e-learning. iSpring Suite can insert various types of media. Hence, produced learning media will be more interesting. For instance, to create a quiz, there are various types of questions that can be asked: true/false, multiple choice, multiple response, type in, matching, sequence, numeric, fill in the blanks, multiple choice text, etc., which can accommodate almost all types of questions. College content for a photo, accordion for text, and column are carried out to manage the layout of the H5P contents. With column, the user can arrange and add any types of contents as needed.

The system testing is carried out by using a black box test to observe the result of the developed system through data trial and to check the functionality of the system. It is to check whether it is according to the input control inserted into the form of the display, where the test is said to be successful when the displayed result is matched the input control inserted. Table 1 shows the test of Input Form Material. In addition, the test is also carried out to direct the user through the distribution of a questionnaire. The questionnaire contains questions on the quality of the display, material presentation with the content, user interaction test, learning design aspect, and visual communication as well as user-friendly test. All these tests are administered 27 students as respondents. The result is that the system is of very good quality and appropriate to be used.

Table 1. The test of input form material

Case and test results			
enter Data	expected reaction	results displayed	conclusion
choose resources menu	resources form appear	resources form appear	consistent
input new material	the latest material successfully displayed	Material increases on form courses	consistent

Through this e-learning system, learning process happens through long-distance, students can access the learning anytime anywhere. Several benefits of this system are:

1. This e-learning system enables the creation of more diverse content through the utilization of H5P. There are more than 30 specific functions that can be combined and can continuously be added, and developed by the H5P developer. Also, the teacher can create and edit interactive videos, presentations, games, advertisement, etc. Content, application, and components of content can be imported and exported and can be shared on its official website.

2. The system will be notified when there is a new update from the H5P feature. Thus, admin can do controlling to increase implementation of the system unit. Hence, the user will not be outdated when there is an update.

4. Conclusion

A system can be used as a learning tool that utilizes technology to optimize students' learning achievement. The system also provides various resources and activities to support a more interactive teaching and learning process. As its development, interactive multimedia content activities with H5P and iSpring are also added. The downside of this system is that utilization of e-learning with *synchronous learning* concept which enables learning to happen simultaneously is yet maximized due to the limitation of video conference feature within the system. The solution is through adding video conference feature; thus, students and teacher can directly interact, and virtual classroom can also be provided.

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