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Online Exam in Electronic Learning Design

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Abstract: *Digital Revolution 4 requires all educational institutions to adjust to the changing times. At present electronic learning is the first demand in all educational institutions. Not only in the scope of the University even in the scope of high schools and junior high schools are required to apply this technology. E-Learning, previously known as a medium for teaching and learning activities, is now beginning to rise to the exam model. The online exam model is expected to be applied in educational institutions start from Middle School, besides adjusting to the changing times, as well as a media to familiarize students with electronic-based examinations. So that when they go to college or into their time to work, students are not surprised by what they face. For example college entrance test or CPNS(civil servant) entrance test which are now using the online examination system or commonly called CAT (Computer Assisted Test). Design Structured programming is needed in the application design stage, including system design, database design, interface design, and prototype. With the application of the online exam tool, it is expected that students in middel school environments can improve their competency in using information technology*.

Keywords*: e-learning, information technology, online, exam,middle-school,CAT*

I. INTRODUCTION

In approving the digital revolution 4 launched by the government, all educational institutions are sponsored to implement electronic learning in teaching and learning activities. Indonesia welcomes the demographic bonus of 2045 with fears of being left behind in information technology capabilities. The use of information technology is uneven in Indonesia. Includes the application of online exams in the learning management system. Japan as a developed country has been using technology consistently. In the futere “disruptive technologies” replace existing technologies and change the range of applications for technology while “sustaining technologies” which are incremental and increase the efficiency of technological applications. E-Learning and various ICT tools have the real potential to be disruptive technologies to transform teaching and learning, that threatens the existing ways of teaching and learning and the ways higher education institutions are organized and managed. Transformation of teaching and learning through the use of ICT has to be occurred at many different levels: the government, each academic community, each institution, each department, each faculty member, and each student (Ying, 2016). This research develops an online exam with an integrated system. But the database is placed internally so it doesn't overload because the storage center is only internal. most online exams use a centralized storage center that holds too many applications. This makes it slower. This infrastructure can also be a solution to the cost problem.

Classical exam methods are handled and supported electronically, time is saved for those areas of teaching that require face-to-face a lot of time and that currently miss out. In particular these are in-depth discussions, reflections, oral exams, if

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applicable, or the coaching of these areas. Nevertheless, we have to clearly point out that face-to-face teaching at the university or school is still very important and should remain as significant as it is. This research is trying to develop alternative and the best possible forms of performance assessment and testing of knowledge (Frankl et al., 2011). Almost all Indonesian universities have developed electronic learning. In their quest to secure or maintain academic accreditation, university administrators often decree that all online courses must have one proctored exam during each semester or quarter (Cluskey et al., 2011). They believe web-based courses can provide educational opportunities to students who would otherwise have to do without, and they believe those courses can be of a quality comparable to traditional lecture courses (Dutton et al., 2002).

There are three dimensions in knowledge management: knowledge base, favorable environment and knowledge practice (Liu & Li, 2019). In customary framework directing exam is extremely repetitive work for analyst and educator too. The entire procedure of allocating exam and assessing their score after the test was done physically till date. Be that as it may, online examination framework is absolutely electronic framework. The framework goes for diminishing expenses connected with directing exams over a timeframe and accomplishing complete computerization of examination framework related assignments like enlistment, distribution of results, which prompts a high level of framework effectiveness (D.V. Kotwal, S.R. Bhadke, A.S. Gunjal, 2015).

II. LITERATURE REVIEW

Nik Mastura Nik Mohammad, Mohd Nor Mamat, Posiah Mohd Isa conducting research with the theme M-learning conducted in Malaysia. In the world of electronic learning, this is actually not something new with the adoption of electronic learning (Mohammad et al., 2012). Requirements to carry out good education must indeed use electronic learning as an additional medium in learning activities. This is because educational needs require us to be like that, which is to improve quality because of the limited capacity of the campus if only using conventionally. Therefore, electronic learning devices must be made more friendly, compatible and suitable for all electronic devices. Malaysia as a developing country must be as fast as possible to be ready to enter an era where all activities enter using wireless media. All areas, especially educational institutions, must have wireless internet access.In research conducted in Malaysia, it discusses the application and steps taken to implement mobile learning (m-learning) in Malaysian educational institutions. Therefore the importance of the role of technology in learning (Rukun el at, 2015; Dony et al, 2015, Hendriyani & Amrizal, 2019; Lubis et al, 2019; Bandri et al, 2020; Asnur et al, 2020).

Another literature used by researchers is a study by Mohammad A Sarrayrih and Mohammad Ilyas. In this paper, they propose a system that provides security to improve on-line examination by utilizing technologies such as biometric authentication, internet-firewall, cryptography, network protocol and object oriented paradigms. Furthermore, we propose a framework for conducting online exams through insecure internet backbone (Sarrayrih & Ilyas, 2013). However, the proposed system will provide a secure communication based cryptography and group communications. In our research paper, we discuss the performance of student's online course exam with respect to security and main challenges faced by online course exams within the university. We conclude that by improving the security system using biometrics face recognition that can be incorporated into the proposed system to fulfill the challenge of online exam.

Other studies conducted by Kumiko Aoki. Japan is known to be a technological powerhouse, being noted for its automobiles, consumer electronics, laptop computers, portable gaming devices, and more recently healing animal robots. Japan is also noted for its popular culture; manga, anime, novels, films, character goods, game programs, cosplay cafes, karaoke and so on. It may be natural for people outside Japan to assume that e-learning in Japan must be well advanced and

innovative. In reality, the application of technologies in education in Japan is far behind of other developed countries. Especially in higher education, apathy of students towards their study prevails and teachers continue ignoring such student attitudes. E-learning, which is supposed to revolutionalize the way people learn as it has potentials to enable more student-centered learning, has not been realized in Japan and mostly used to perpetuate the teacher centered teaching in a different format (Aoki, 2010).

Another literature by Vatcharaporn Esichaikul, Supaporn Lamnoi, Clement Bechter said that most e-Learning systems provide web-based learning so that students can access the same online courses via the Internet without adaptation, based on each student's profile and behavior. In an e-Learning system, one size does not fit all. Therefore, it is a challenge to make e-Learning systems that are suitably "adaptive". The aim of adaptive e-Learning is to provide the students the appropriate content at the right time, means that the system is able to determine the knowledge level, keep track of usage, and arrange content automatically for each student for the best learning result (Esichaikul et al., 2011). This study presents a proposed system which includes major adaptive features based on a student model. The proposed system is able to initialize the student model for determining the knowledge level of a student when the student registers for the course. After a student starts learning the lessons and doing many activities, the system can track information of the student until he/she takes a test. The student‟s knowledge level, based on the test scores, is updated into the system for use in the adaptation process, which combines the student model with the domain model in order to deliver suitable course contents to the students. In this study, the proposed adaptive e-Learning system is implemented on an "Introduction to Java Programming Language" course, using LearnSquare software. After the system was tested, the results showed positive feedback towards the proposed system, especially in its adaptive capability.

This study uses several libraries including those in Anchalee Ngampornchai and Jonathan Adams with the title "Student's Acceptance and Readiness for E Learning in Northeastern Thailand". The study explored student readiness for online learning in the Northeast of Thailand, using the Unified Theory of Acceptance and Use of Technology (UTAUT). The survey also explored students' self-regulation, computing devices ownership, and level of familiarity with education-related technologies (Ngampornchai & Adams, 2016). The responses imply that students have a slightly positive perception toward e-learning. They use mobile technologies extensively, and have experience using social media; but are unfamiliar with other collaborative e-learning tools. A discussion includes recommendations for cultural context and the design of e-learning in Thailand.

Electronic Learning

Today, there is a growing interest in online learning all over the world .Electronic learning plays important role not only in academic institutions but also in small and medium-sized enterprises, which have the will to renew knowledge and experience of their staff. E-learning provides practical solutions to the students, who did not participate in the past education processes (Deperlioglu et al., 2011). Distance learning via web instruction is a viable opportunity to increase availability of statistics instruction (Summers et al., 2005). With online learning, it can happen anywhere and anytime flexibly (Verawadina, et al, 2020; Hendriyani et al, 2020, Feladi, et al,2020; Purnama et al; 2020).

Online Exam

The main advantage of online examination is that it can be conducted for remote candidates and evaluation of answers can be fully automated for MCQ questions and other essay type questions can be evaluated manually or through auto-mated

system, depending on the nature of the questions and the requirements. Also online examinations can be conducted at any time and does not incur higher cost as traditional exam scenario as there is no paper work involved (Ramu & Arivoli, 2013).

Offering students alternate teaching mediums has the effect of reaching more students and increasing achievement. Students with little schedule flexibility may appreciate the option for viewing screencasts at any time and from any location. In particular, the author has found that providing online instruction in the form of a screencast to supplement traditional classroom instruction is a medium that reaches both high and low achievers and students with little schedule flexibility. The results of the student feedback survey suggest that providing students with screencasts for exam preparation is associated with increased student performance (Sturm-Beiss, 2013)

III. METHODOLOGY

The process of designing an online exam device design consists of several stages. Borg and Gall describes a series of steps or steps that must be taken in this approach, namely Research and information collecting, planning, develop preliminary form of product, preliminary field testing, main product revision, main field testing, operational product revision, operational field testing, final product revision, and dissemination and implementation. The research and development stages proposed by Borg and Gall consist of ten steps (Borg, W.R , Gall, 1983). The floating stage of design is the second stage in the 10 steps of the famous Borg and Gall.

This research is continued in the development stage. In this study modification of the steps is carried out, as shown in the following figure 1;

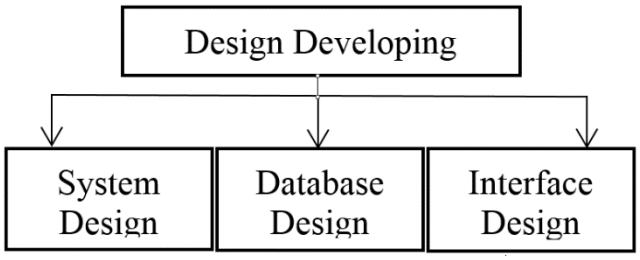

Figure 1. Flow Diagram for Design Application

This research stage show in figure 1 begins with the data requirements stage which includes steps to collect what are needed in system development. Next is the design development stage, in this stage consists of the system design stages that are built using a structured approach, namely Data Flow Diagrams (DFD). The second design is a design for database needs that was built using a structured approach method, Entity Relationship Diagram (ERD). The third design is the design to create an interface. The interface design is built using the Pencils and Adobe Photoshop applications.

Data Collection Techniques

The data collection technique used is document study. Document studies are data collection methods that are not addressed directly to research subjects. Document study is a type of data collection that examines various kinds of documents that are useful for analysis material. Documents that can be used in collecting research is primary documents.

Primary documents are documents written by people who directly experience an event. In this case the researchers used previous studies with the theme of electronic education that had been conducted.

Data Analysis

Data analysis method used is descriptive qualitative data analysis method. Descriptive qualitative data analysis methods in a qualitative study are useful for developing theories that have been built from data that has been obtained in the field.

Qualitative research methods in the early stages of the researcher doing exploration, then carried out data collection in depth, ranging from observation to preparation of reports in the form of an online exam design for electronic learning.

IV. RESULTS AND DISCUSSION

System Design

Context diagram is a diagram that consists of a process and illustrates the scope of a system. Context diagram is the highest level of DFD which describes all inputs into the system or the output of the system that gives a picture of the whole system. Figure 2 discuss the Exam application diagram On line Exam;

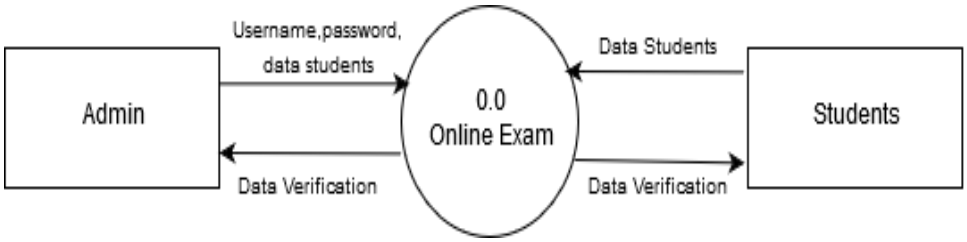

Figure 2. Context Diagram for Design Application

Figure 2 shows the context diagram in this design that there are two user involved, admin and participant (students). The diagram above is basic exam application on line that is needed will be decomposed into more detailed system. Context diagram is level 0. The most detailed system design consists of level 1, level 2 and sometimes can be up to level 3. DFD Level 1 from the exam application on line shown in the next figure. At the DFD level 1 there are 4 (four) processes, namely:

1. Authorization Is a separation process user In access the exam on line . There are two userinvolved in the exam on line this, that is admin and students. Where every user have certain authority in accessing this system.
2. Exam Represents a process implemented participants where participants can do an exam on line by being given time predetermined by the program.
3. See Score Is a continuation of the examination process. This process serves to show score or the results of exams conducted by Students. Students can only see their own value after doing the exam, while the admin can see the value of all Students who are have done an exam on line
4. Selection Is a process that can only done by the admin with consideration certain. So. has the admin determine the results selection, students can see a list of results the selection.

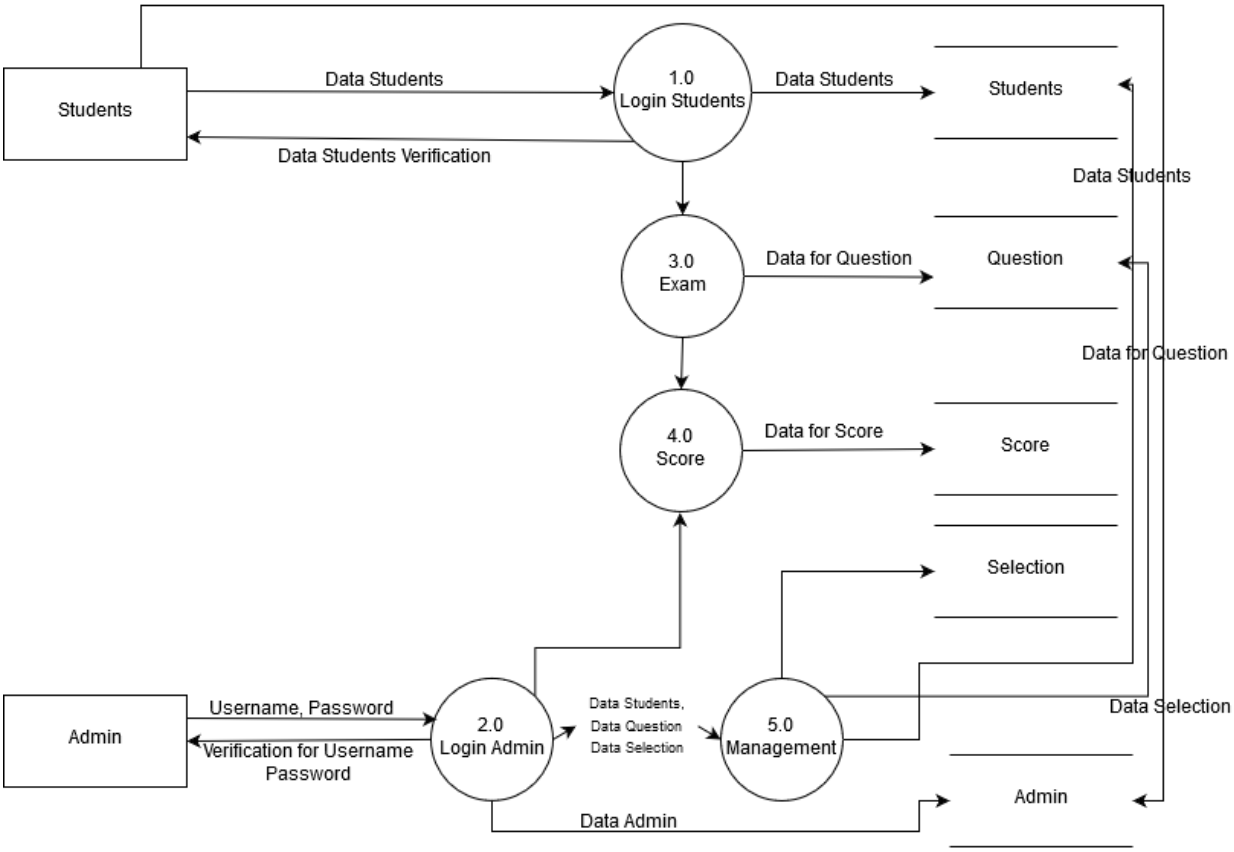

Figure 3. Data Flow Diagram Level 1

Prototype Design

The process of making prototype e-learning application is made based on the reference design documents that have been made. With reference to 2 kinds of entities related to the system ie admin and students. Prototype created using PHP and Mysql database. Here's a figure 5, picture of examples of prototype display.

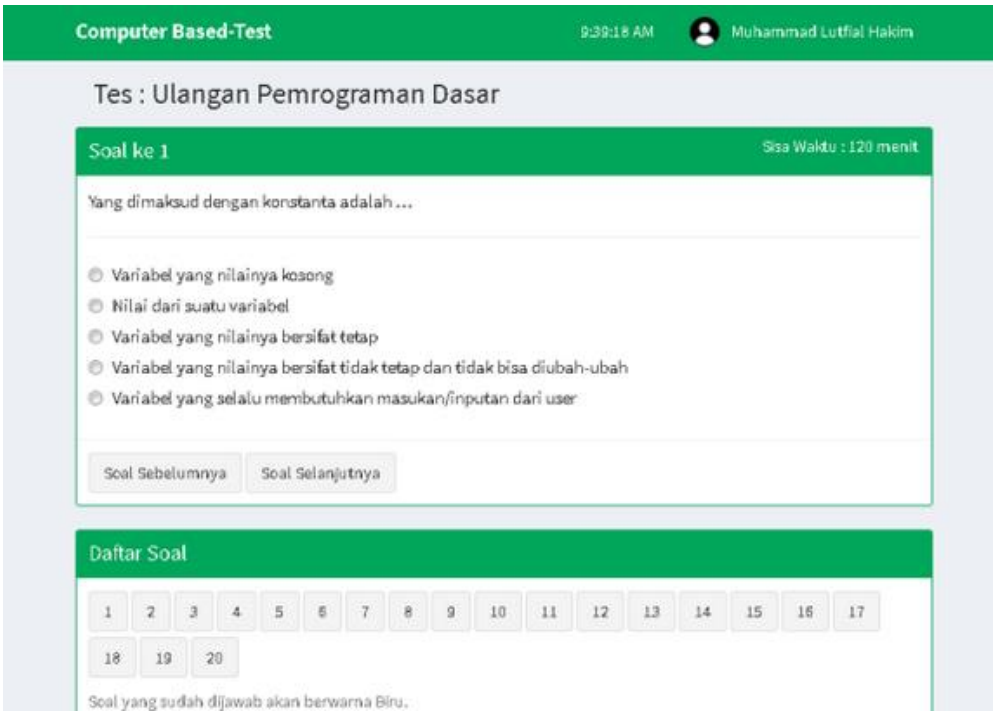

Figure 5. Prototype Application

The results of this research is the new patern for exam application is designed using database design, system design and prototyping. The prototype of application was made with PHP programming language and MySQL database that runs on the Apache web server. The online exam application has been successfully designed as a prototype. The new online student admission application has two users, namely admin and participant based og database design.

In many educational systems, technology integration has been regarded among the top priorities in policy making, budget planning, and curriculum development. if we compare the implementation of learning in Indonesia with other countries it is certainly very far behind. In Malaysia, Learning motivation among students and lecturers to change their attitude of learning must be strategized. Their attitude towards online learning activities must be extensively trained and enforced via series of trainings, workshops, seminars and others (Mohammad et al., 2012). In Indonesia, there are still many who do not know e-learning, especially online exams.

Learning Implementation Electronic learning has been proven to increase learning in schools or universities. For example, ability to solve syntactic problems through creative thinking, when they are engaged in Search, Solve, Create and Share (SSCS) learning (Saddhono et al., 2019).

The reason why Indonesian students not familiar with electronic learning is caused by various factors, one of which is infrastructure. One of the research study about it , claimed that Results showed that university students in Thailand have an above average level of e-learning acceptance. Data collected from three biggest public Univerities in Thailand (Teo et al., 2011). We compare in Indonesia based on government regulations, there are not many universities that can apply e learning in full by having permission for distance education and most are private universities. This is the reason why the application of basic e-learning must begin in middle school. starting from the application of the simplest e- learning. For example, online exam with internal data storage so that it does not spend a lot of money. This strategy can cover the infrastructure problem.

V. CONCLUSION

The implementation of E-Learning in Indonesia starts at the University level. Abroad, students at the University are very familiar with the application of electronic learning since in middle school or even elementary school. This causes the ability of students to use information technology in Indonesia too late. Schools do not implement electronic learning because of infrastructure problems. In addition, the database used is very slow and expensive because the technology is used centrally. Schools in difficult areas will be in the trouble. This can be overcome by using data storage internally. This means that e-learning data is stored on school servers so that it is easier to implement and not too expensive. This online exam design is made specifically with the aim of being able to be applied internally in accordance with applicable rules.

VI. RECOMMENDATIONS

1. It is necessary to design more that can simulate more attractive application for example for real time chat application or another features in Learning Management System
2. It is necessary to connect the database and sytem with Learning Management System in the institution, so that it can be connected with the information system in the institution.

VII. REFERANCE

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