Initial Application of Computer-Based Test as a Tool for Leaners' Learning Evaluation in The Industrial Revolution 4.0 Era

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Abstract: Industrial Revolution 4.0 provides challenge, even more so, in the field of education. For the sake of the resources reduction and effectivity & efficiency of learners' learning evaluation, Computer-Based Test provides its advantages to do so. This is an exploratory research using the experimental method. The experiment is applied in the use of Wondershare QuizCreator as a tool for leaners' learning evaluation. This research tries to deal with three critical questions: (a) what beneficial advantages does the CBT Wondershare QuizCreator provide in the learners' learning evaluation, (b) how is CBT Wondershare QuizCreator going to be applied to gain its effectiveness and efficiency, (c) is CBT Wondershare QuizCreator available to provide the test statistical validity and reliability. The result of the experiment in this research shows that inspite of the Industrial Revolution 4.0 challenge, pedagogy-based manipulations are needed in the application of CBT Wondershare QuizCreator to gain its powerful usage.

Keywords: Computer-Based, Test, Learning, Revolution, Industry

1. Introduction

Rapid improvement of the technology creates changes amongst human activities especially on their daily activities. This phenomenon is widely understood as the industrial revolution 4.0 on which technology takes an important role in human lives. Being better technological literate, net generation characterizes this industrial revolution 4.0 era. This digital literacy, accompanied by the technological accessibility amongst human communities, makes technological much more accessible than ever. It is not the second or third priority of human lives anymore, moving to be the first need in human lives. Most, if it may be said, of human daily activities deal with technology. It is now being the core of human activities. Speed, accuracy, sources reduction and punctuality are the characteristics of effective activities conducted during the industrial revolution 4.0. Moreover, technological influences have already taken part in educational process.

E-learning has been commonly used in educational sector. It's effectivity and efficiency make this e-learning activity conducted obligatorily. One consequent that follows is the online examination to access learners' acquisition of a certain competence requirement. Conventional examinations are still widely applied nowadays. It consumes lots of material such as paper, ink and some others. STIKS Tarakanita, as one of the educational institutions, are still applying this conventional method of assessing its leaners' competence acquisition. It consumes a lot of papers and ink, which are put into trash afterwards. It consumes spaces to store. When they become overload, the management takes the procedures of archives reductions. Consequently, it also consumes financial budgeting too. Summarizing this condition, the conventional examination process covers many chronological steps starting from examination process, test material duplication, examination process which involves many personnel, scoring process, archives storing management, and finally scoring process by the lecturers. It surely consumes much financial budgeting.

Computer Based Test (CBT) comes to be one alternative of learning assessment. *Computer Based Test (CBT)* offers sources reduction. It offers fast and accurate report of learners' scoring system too.

Dealing with CBT Sekolah Tinggi Tarakanita (STARKI) Jakarta uses *Computer Fixed Test (CFT)* for the sake of its practiaclibility. The examination can be conducted at the same time for many groups of learners, but the questions of the examinations are managed in a such way that it will appear on screen randomly from one students to another. It automaticaaly reduces the possibility amongst leaners to commit cheating during the examination. It accomodates more leaners to take the examination but it needs less proctors to be involved. Being part of the CBT, CFT provides real-time scores. This research applies the process of CBT in *Basic Computer and Online Network* (Komputer Dasar dan Jaringan Online). To deal with this CBT, the researchers use WonderShare Quiz Creator, an computer application to create questions of the examination. The process of creating questions, executing the examination and the process of scoring are all taken in an internet- connected computers.

Academically, examination is the process of measuring learners' competence acquisition after a process of learning in a specified period of time by evaluating the learners' ability to answer the questions given correctly and appropriately and or to provide solutions towards artificial problems provided by the lecturers. It commonly measures intellectual competences of the learners [1].

Examination is usually conducted conventionally, meaning that leaners should come into certain rooms that have been provided for the purposes of the examination. Besides, it is also time consuming, personnel consuming because it needs proctors, sources consuming because it needs a lot of paper, ink & other stationeries, and energy consuming because it involves a lot of people to handle. It also creates a big trash that need to be managed [2].

CBT is the online test and managed by internet-connected computer in the *Supervisor mode*. This model requires a supervisor to identify the Examinees and validate the process. Supervisor control the Examinee to login, control the process and confirm whether the Examinees have already taken the examination comprehensively [3]. There are four types of CBT form developed by ITC. (1) Open Mode CBT. It accommodates anyone without any supervision. It is openly and publicly accessible by anyone. Registration is not necessary. (2)

Controlled Mode CBT. It accommodates anyone without any supervision. It is openly and publicly accessible by anyone. Registration is obligatory by using the username and password. (3) Supervised Mode. It accommodates anyone with administrator. It is openly and publicly accessible by anyone, but username and password are required. The administrator is authorized to log the Examinees in and confirm whether the Examinees have taken the test comprehensively. (4) Managed Mode CBT. It is centralized online test. The authority defines and validate the test equipment's specification and performance. The authority also provides training for any personnel involved in the process of the CBT.

Generally speaking, *CBT is used to increase the efficiency and effectivity of the test administration. It is also hoped to increase the test validity and reliability*. Reviewed from the side of the Examinees, CBT possibly motivates leaners to increase their academic performance. Lecturers are forced to create and prepare the examination to be more qualified and increase the measurability of the test [4].

Based on the adaptive algorithm and the characteristics, there are eight models of the CBT. They are *Computerized Fixed Test (CFT), Linear On The Fly Test (LOAF), Computerized Adaptive Test (CAT), A Stratified Computerized Adaptive Test (AS), Content Constrained CAT With Shadow Test, Testlet Based CAT, Multistage Computerized Mastery Test, Computer Adaptive Multistage Test* [5].

Research done by Vivi Pratiwi and Susanti tried to create ICT-based learning evaluation tool by using Wondershare Quiz Creator. It proposed that qualified evaluation tool must meet some prerequisites and principles. It must be able to provide accurate data relevant to its functional purposes and measure the sample of certain behaviors. The research applied the system development model referring to ADDIE model (Analysis, Design, Develop, Implementation, Evaluation). The result proposed that Wondershare Quiz Creator is applicable significantly and positive responses from the learners are available [6].

Haida Dafitri's research tried to solve the problem caused by the undisciplined behavior of teachers to submit test material on time to the vice head master for the curriculum affairs, inefficient and ineffective time allocated for the test, the paper consuming test, learners' cheating habits and possibility and the time consuming of the scoring process which result in late submission of the leaners' scores towards. The research took place in SMA Harapan I Medan. This research applied survey, interviews and literature studies through articles, books and journals. The result showed that *wondershare quiz creator* helps the management of the school to conduct its entry selection test better and more effective and efficient [7].

Research conducted by Petrus Dwi Ananto Pamungkas, Harjunadi Wicaksono, dan Henri Septanto deals with how to ease and asses selection test for the applicant of computer operator specified training. *Prototyping* method was used to create multimedia-based test selection creator application. The result showed that the multimedia-based selection test is less time and sources consuming and provided real time score.[8].

2. Research Methods

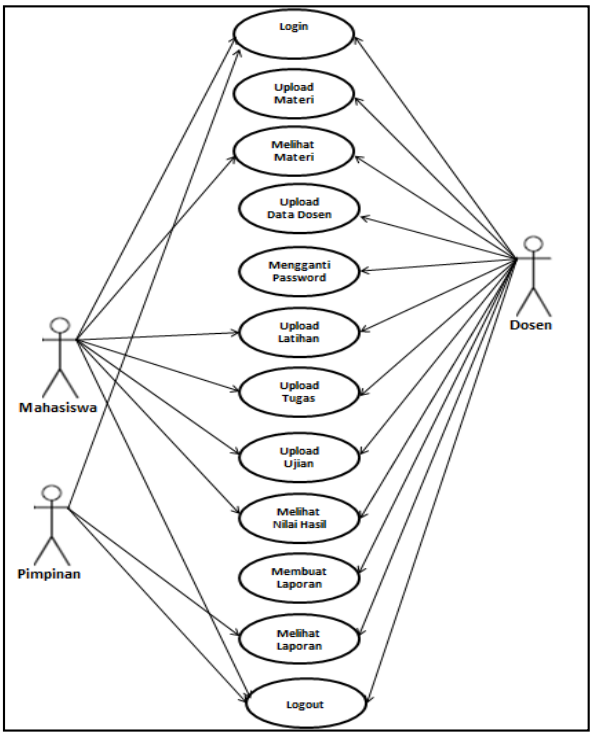
This research applies experiment and trial initial application of the CBT in a conditioned classroom. The research was conducted in computer laboratory of Sekolah Tinggi Tarakanita (STARKI) Jakarta. In relation to the CBT, the research uses WonderShare Quiz Creator. The

subject used for this research is Basic Computer and Online Network (Komputer Dasar dan Jaringan Online) The data were collected from the online preparation test simulation and the real test, liturature studies through online articles, journal and books. The analysis was done afterwards.

3. The Result and the Analysis

3.1 Use Case Diagram *Computer Based Test (CBT)* in Sekolah Tinggi Tarakanita (STARKI)

Figure 1 describes the learners, lecturers and board of management involvement in the application of WonderShare Quiz Creator in Sekolah Tinggi Tarakanita (STARKI). The lectures created test material directly on the computer application or indirectly by typing the test material first, and operator helped them input them into the computer application. Learners log them in and did the test. Head of the Study Program received the result of the test afterwards.



Picture 1. Use Case Application Diagram

3.2 Initial Preview of the WonderShare Quiz Creator

This intial preview gives the opportunity to Examinees to choose type of the test.

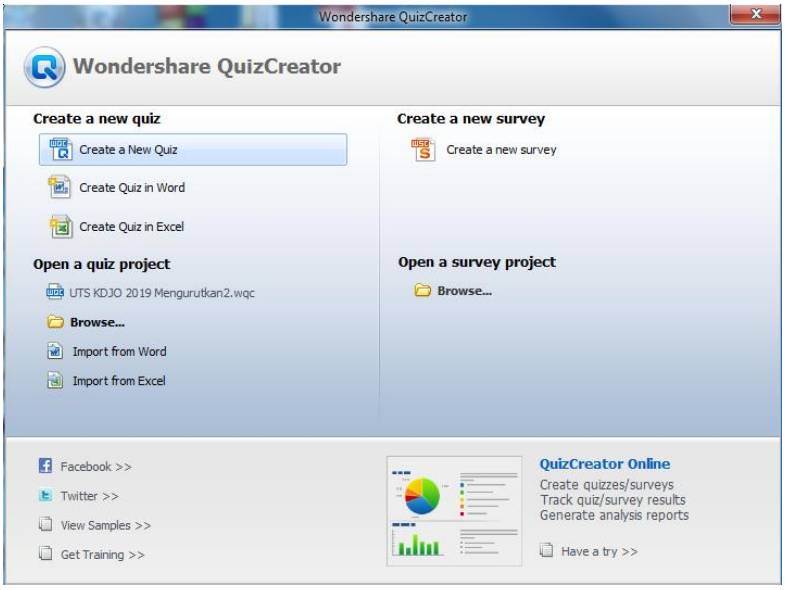


Figure 2. ***Initial Preview of the*** **WonderShare Quiz Creator**

3.3 Preview of the Type of the Test

This screen displays the test material. This can take in the form of objective tests such as True or False, Simple and Complex Multiple Choices, Gap Filling, Sorting, Matching and some others.

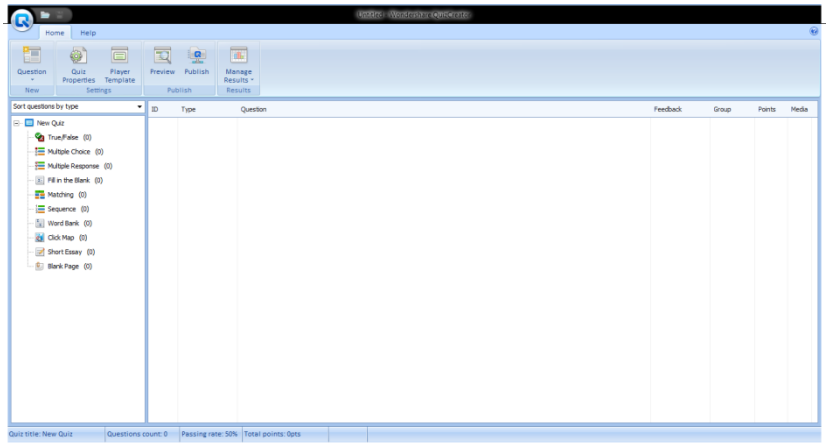


Figure 3. Preview of the type of the test

3.4 Preview of the Ready-to-use- Test

This screen displays the information of the ready-to-use-test. The display of number of questions and type of questions are available.

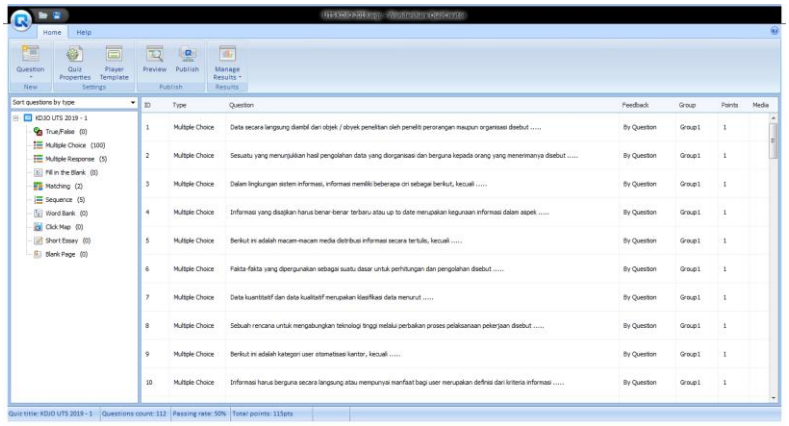


Figure 4. Preview of the Ready-to-use-Test

3.5 Preview of the Login

This screen provides the coloumn for the examinees to input her identity

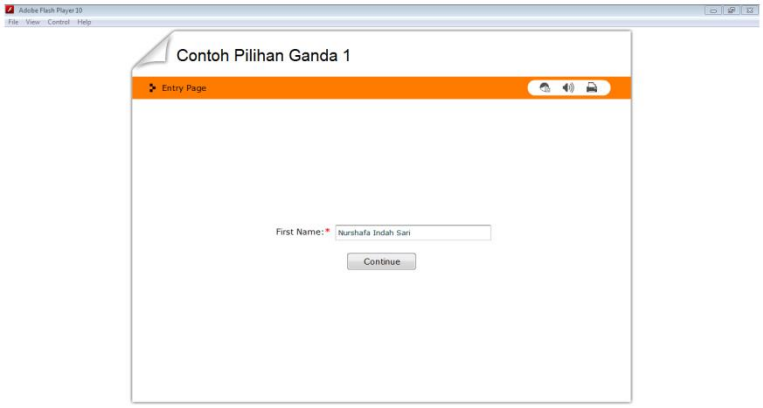


Figure 5. Preview of the Login

3.6 Preview of the Test Material

This preview displays test material. It covers the number of the test material, time provided to answer the questions, the questions, choices of the asnwer, chosen answer, scrolling buttons.

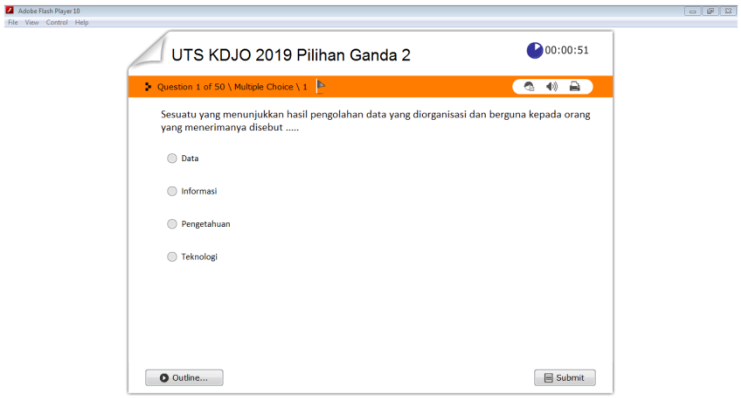


Figure 6. Preview of the Test Material

3.7 Preview of the Correct Answer

This preview informs whether the answer has been chosen is correct. The correct answer is indicated.

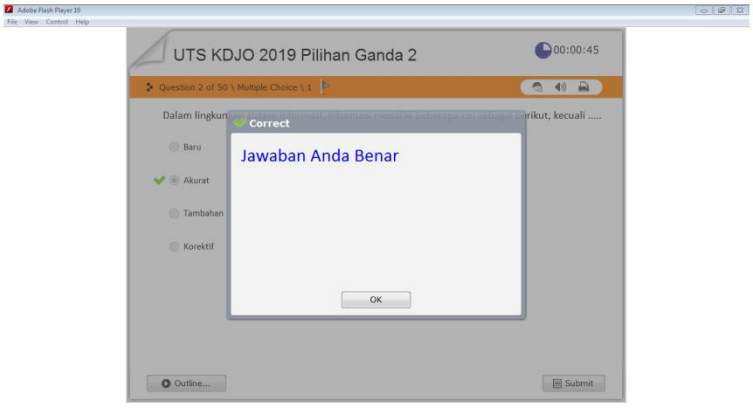


Figure 7. Preview of the Correct Answer

3.8 Preview of the Incorrect Answer

This preview informas whether the answert has been chosen is incorrect. The incorrect answer is indicated.

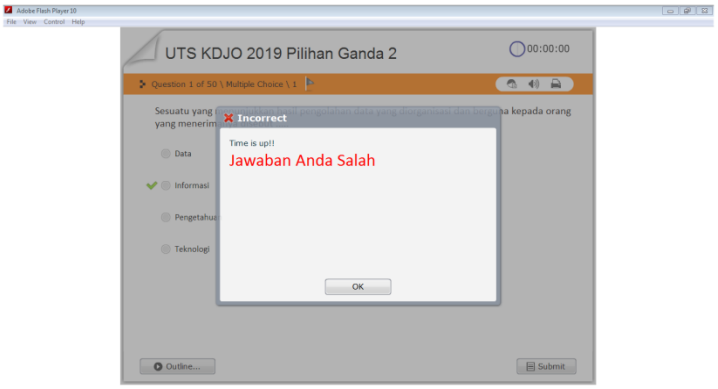


Figure 8. Preview of the Incorrect Answer

3.9 Preview of the Result

This preview informas the score obtained by th examinee, the level of the passing grades and the time consummed to finish the test.

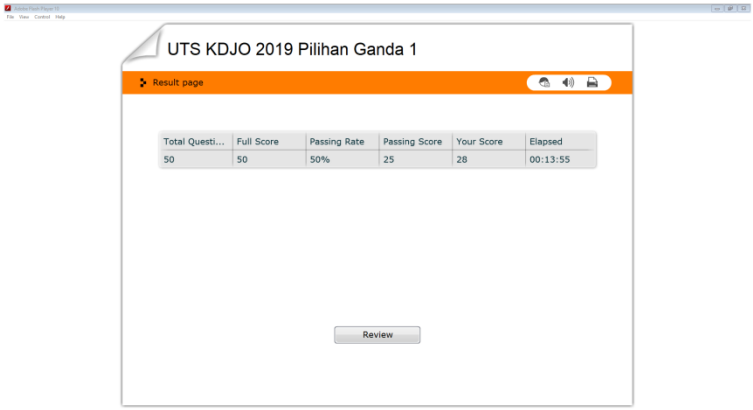


Figure 9. Preview of the Result

3.10 *Black Box Testing*

Black Box examines :

Table 1. Needs to be tested

Needs to be tested	Test Element
WonderShare Quiz Creator Installation	Preview of the application on computer
Test Question Creation	Managing time and Choosing type of test
Figure Insertion	Preview of the Figure of the test
Copy of test file into computer	Preview of the test file on screen
Executing test file	Executing test file .exe
Login	Validate login
Submit	Preview Correct and incorrect answer
Finish	Preview the score of the test result

Table 2. Test Scenario and the Result

Requirement	Test Scenario	Expected Result	Test Result
Application Installation	Installing WonderShare Quiz Creator	1 Displaying Preview of the shortcut of the application on desktop	Successful
		2 Displaying Preview of the Opening	Successful
Question Creation	1 Create Objective Test Simple Multiple Choices	Displaying Preview of the Objective Test Simple Multiple Choices	Successful
	2 Create Objective Test Complex Multiple Choices	Displaying Preview of Objective Test Complex Multiple Choices	Successful
	3 Create Objective Test Complex Multiple Choices	Displaying Preview Objective Test Complex Multiple Choices	Successful
Figure Insertion	Insert Figure	Displaying Preview of the	Successful
Test File Distribution	Copy test file .exe into examinees' computers	Displaying Preview of the shortcut of the application on desktop	Successful
Executing Test File	Executing test file .exe	Displaying Preview of the login	Successful
Login Name	Input Name of the Examinee	Displaying Preview of the general instructions	Successful
Answering	Answering and push *submit* button	1 Displaying Preview of "Correct Answer"	Successful
		2 Displaying Preview of "Incorrect Answer"	Successful
Finishing the Test	Push finish button	Displaying Preview of the test score	Successful

4. Conclusion

The result of the initial application of WonderShare Quiz Creator in Sekolah Tinggi Tarakanita (STARKI) shows that the use of CBT eases the process of the learners' assessments. The speed and the accuracy of the result taken by the application proposes the strength of this application. Besides, the application is also applicable for test preparations: the researchers were able to analyzes the validity and the reliability of the test questions based the numbers of the correct and incorrect answers. He examinees can also take its advantage by reviewing the questions they have done based on the correct and the incorrect answer they have chosen. The last, the use of this CBT application is surely less time, energy and sources consuming.

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