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THE EVALUATION OF COMPUTER-BASED NATIONAL EXAMINATION SYSTEM IN INDONESIA

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Abstract

Benchmarks of educational success can be seen from the achievement of student learning outcomes through national examinations held by the government at least once in the education level unit: SMA, SMK, and MA here, since 2014, the government has changed the pen and paper-based national examinations to become computer-based national examinations. The system is implemented semi-online which means the questions are sent online and students work on the problems manually via the school computer off-line. Changes to the examination system must be accompanied by adequate and professional human resources as implementers and information technology systems. This research was carried out by taking a sample of 7 schools (high schools, vocational schools, and MA), all of which are in Jakarta. The research method is qualitatively using observation and interviews. The design of the research design is a combination of two research models namely CIPP and Kirkpatrick. The results of the study show that computer-based exams have more advantages compared to paper-based exams in terms of the distribution of questions and answers, time for examining results, and reducing paper usage.

Keyword: *National Examination, computer-based National Examination, Paper-based test, and Student Learning Outcomes*

Education is a main factor as well as a determinant in the success of human resources development to be able to compete with human being at other nations for the country. Therefore, to develop better Indonesian human resources, then we must fix our old-system of education in Indonesia through fixing many aspects namely, infrastructure, educator's quality, time discipline, teaching materials, and professional teaching – qualitative learning activities. Both formal and informal education, an early childhood and an elderly education must become as a serious focus so that Indonesians can become a nation which are not underestimated by other nations.

A country without an education awareness has no clear direction and purpose. The quality of education in a country really determines the society's life. The lower the education level is, the worse impact that the country will face for its development. It does not deny that the number of crimes occured are due to low level of community's education so that they do not have skill and expertise which can be as their provision to face the future.

School as national exam organizer plays an important role in succeeding the national exam for students. The school must be able to provide books, teachers, a conducive infrastructure for making students feel comfortable in the learning process. The school is also responsible for creating school circumstance from negative things which can influence student's learning. Besides, the school is also responsible for giving students a motivation in learning. Motivation can be given through motivation training to raise student's spirit in learning and to give information about the importance of national exam for further student's success. Hence, students will be motivated to face national exam with the best result. Parents and school play a role in changing the students' mindset in education.

Students must make their friends as a challenge to succeed national exam and make them as motivators to study harder to achieve the best result of national exam. In fact, some parents and schools do not take a role maximally to give support and motivation to students. Some parents are less concerned about the success of the students and only expect their children's passing result. Students must have a confidence that they are part of future success so that they do not put off for learning. Learning should be hastened as to reach success needs a sacrifice. The other important thing is to make all activities in learning become as fun activities instead of making them a burden.

The benchmark of success is seen from the students' learning result achievement during the education phase through national exam organized by government through Education and Culture Ministries simultaneously. Since 2005, the national exam has been organized by two systems, that is, computer-based national exam system and paper-based national exam system. Computer-based national exam system is conducted at several schools which are ready with computer-based infrastructure's system as its tools. The beginning phase of computer-based test is only on the level of SMA/MA, SMK and SMP/MTs. Computer-based exam system is organized by semi-online system. The questions are distributed to schools of the exam organizers by online system, then the exam is organized by offline system. The exam result will be sent back to the center through online system from school.

National exam is an exam system which is conducted nationally for students to measure and to evaluate their competence during the learning process in the certain levels of education (primary school, secondary school, vocational school and senior high school). The implementation of national exam is organized by government through Education and Culture Ministries concerning to its implementation, time of implementation, materials or questions, as well as graduation criteria. The achievement of national exam success is as a reflection of the achievement in education success which students take throughout the learning process.

Computer-based national exam or commonly known as paper-based test (PBT) is a national exam system that is conducted by using computer as its media with a semi-online system. The implementation goal of computer-based test is not quite different with paper-based test, that is, to identify the success or the achievement of learning process for certain levels that students take. The computer-based test is firstly implemented in 2014 at SMP Indonesia Singapura and SMP Indonesia Kuala Lumpur (SIKL). Furthermore, in 2015, there was an implementation of national exam stubs by engaging 556 schools in 29 provinces and overseas.

The national exam implementation in the future will be organized by online (semi-online) at all schools, either at SMA or SMP. This is due to technology advancement in IT and to eliminate the manual test system which is conducted by using pen and paper considering to the savings of paper use that can cause wastes and to reduce global warming (go green).

Computer-based test is also employed to ease the test implementation, to ease the distribution of the test script, to save the printing budget, the delivery, as and the escort, as well as to avoid the leakage of national exam script, to ease the management of national exam result, and to shorten the time of the input and test data execution process. If the test is implemented by manual type of questions (UNPBT), then it needs budget of script printing in all over Indonesia, spends over budget of distribution, takes time to check the students' sheet, takes time to input those test results, also there are student concerns about the missing answer sheets during the distribution of national exam papers.

Literature Review

In this literature review parts will explain two things about both evaluation systems and Online-Test which tend to be a new examination system in Indonesia.

1. Evaluation

A policy plays an important role in every decision-making. Wrong decision will lead to mistakes in policy-making so the loss cannot be avoided. Therefore, an evaluation is needed at every activity mainly for the present long-term activity. Evaluation is conducted to see how far the program runs properly to the determined concept at the beginning. Besides, evaluation is needed to see the weakness and strength of the present program so that all weaknesses in the present program runs well and can be fixed for a better future program to achieve a maximum result.

Jennifer Brown Urban and William (2009: 540), Trochim in Amarican Journal of Evaluation menyatakan *The systems evaluation partnership (SEP) is then presented as a model for achieving research practice integration via carefully planned and executed evaluation*. By doing the evaluation, an evaluator must have an overview to the evaluated thing and have an overview or target that will be achieved after going through that evaluation. At the beginning step, the evaluator must determine the focus that will be evaluated and the design that will be used, must identify all problems and possibilities that might arise and must do the clarification.

In the education field, evaluation is often related to the process in determining student's learning result. The evaluation of the achieved results is important for the field of science and research. States, regions or institutions make decisions based on evaluation of the results achieved by individual researchers, scientific institutions or scientific projects. The evaluation in the education field is important to fix the quality of education. Preparing the best education earlier is properly done to all people, to every parent. Certainly, the role of education in family cannot be separated from the parents' role who prepare and select the school appropriately. The government as the supervisor and as the controller of education institution also has an important role in maintaining the quality of education in Indonesia. The better the quality of education, the better the dignity of the nation viewed by other countries.

By doing evaluation, the success or failure of the program/policy will be identified as normatively will obtain a recommendation whether the program/policy can be further implemented; or need a revision before its continuity, or even should be stopped. Similarly, evaluation also reviews the relation between theory (policy) with its practice (implementation) in the form of policy's impact, whether that impact is proper to the estimation or not. From the evaluation results, we are also able to evaluate whether the policy/program gives its benefit or not for the targeted society.

2. Online-Test

Jennifer Brown Urban dan William Trochim dalam Amerrican Journal of Evaluation menyatakan *The systems evaluation partnership (SEP) is then presented as a model for achieving research practice integration via carefully planned and executed evaluation*. In doing the evaluation, n evaluator must have an overview to the evaluated thing and have an overview or target that will be achieved after going through that evaluation. At the early phase, the evaluator must determine the focus that will be evaluated and the design that will be used, must identify all problems and possibilities that might arise and must do the clarification.

Traditional Examination refers to a formal examination administered through question papers to which students respond in the form of written answers to a limited choice of previously unseen examination questions, set in advance and answered in examination centers where invigilators (examination supervisors) prevent communication between students and prohibit the use of notes or other revision aids. Traditional exam needs a lot of budget mainly for printing the script and for its distribution process. The use of papers should be reduced by benefiting computer technology for decreasing global warming. The advancement of technology and information takes a change to the better direction, particularly in the education field that starts the implementation computer-based test.

Computer-based testing (CBT) is an efficient way for test sponsors to provide a secure, consistent environment for certification and licensure while significantly enhancing the candidate experience. It is common for testing volumes to increase after a full conversion from PPT to CBT, often as a result of the availability of a greater number of testing locations and more flexible scheduling and testing opportunities. Migration from PPT to CBT does affect candidate behavior and it is possible for some testing programs to experience brief reductions in demand triggered by candidate apprehension regarding Computer Based Test (CBT). The participants do not need to prepare stationeries, such as pencil and eraser as paper-based test. By the implementation of computer-based test, the participants' worries that could be emerged at the manual test will be minimalized. Mistakes in answering the questions can be changed easier without erasing the former answers.

Computer Based Test (CBT) is a series of questions, problems, or practical tasks issued on a computer in order to gauge somebody's knowledge, ability, or experience. It is the use of computer to issue question to an examination candidate, allow the candidate to give in answers through the computer and provide a bases for evaluating the candidate. Computer-based tests let participants know the test results immediately without taking much time. The test result is distributed immediately without having checked the answers manually.

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Online test system or computer-based test is a testing system which let the test update dynamically, without cross-checking the previous question sheet. The questions delivered in the test system might contain the content which is produced on-the-fly by webserver. The question is uploaded by system by central government and is sent to schools that are as the computer-based test organizers. Through username and password given by central government, hence the school and student can start doing the exam. Students answer the questions directly from computer as it can decrease the use of papers.

The challenge on CBT test designers and administrators is to construct CBT to be fair and reliable and to produce valid test scores. Furthermore, they have to be designed to minimize examinees' frustration and to limit the sources of examinee anxiety. Minimizing the obstacles that can interrupt the test implementation, then the success of the test implementation can be increased. Identifying the obstacles that might be happened, preventing and anticipating are concrete ways should go through by the test organizer. By that system, the further computer-based test is expected to be as solution for national exam which can be reliable with very minimal errors and very accurate results.

With promulgation of computer technology in educational testing, computerized testing (henceforth CBT) as green computing strategy is gaining popularity due to its advantages such as effective administration, flexible scheduling and immediate feedback over its conventional paper-based testing (henceforth PBT). Findings of the study revealed that the scores of test takers were not different in both modes and the moderator variables were not considered external factors that might affect students' performance on CBT. Some advantages of computer-based test compared to manual test (paper-based test) are eliminating the use of pen and papers for a better future (go green). The leakage of questions system that might be happened in the manual test can be prevented by computer-based test for no more process of printing and script test of national exam distribution.

In accordance to several definitions of online test, it can be concluded that online test is a system used to test the quality of something (intelligence, skill, learning result, and so forth) to obtain the results in a certain scale which is conducted computer device connected to network to be able to communicate each other. Some indicators in an online test are the networks used (such as *wifi*, *LAN*, *MAN* or modem), an adequate computer device, the system of randomized questions, the level of supervising examination of online test, the readiness of software and hardware usage, and the energy supply which is needed when there is immediate interruption (for instance, a sudden power outage by PLN).

For a successful ICT-driven educational process, there must be a properly focused and consistent ICT policy orientation to support building of pervasive ICT infrastructure, focused capacity building in human resources, as well as favourable enabling legal, regulatory and policy environments. The adequate human resource is the main key for supporting the creation of information and communication technologies. The adequate competence is not the thing that can be bargained in the implementation and the success of computer-based test. The corporation must be constructed by all parties related to the computer-based test implementation. Students as the subjects of the test should be given a knowledge to the computer operation. Students must be told about the way for doing the login, selecting the questions, the answers, and sending or saving the answers in computer.

METHOD

In this method parts will explain about participants, procedures, data analysis. This information will guide the researchers to make arguments at discussion parts .

Participant

The technique of collecting samples in this present research is by using non-probability sampling technique, that is purposive technique. Based on that condition, then the research takes 4 schools of SMA in Jakarta, 2 schools of SMK in Jakarta and 1 schools of MAN in Jakarta. The respondents of this research are principal, technician, proctor, students and central coordinator of computer-based national exam, Education Assessment Center (Puspendik), the Ministry of Education and Culture. Each respondent knows about the research objective, that is, to increase the improvements in the implementation of computer-based national exam in the forthcoming years.

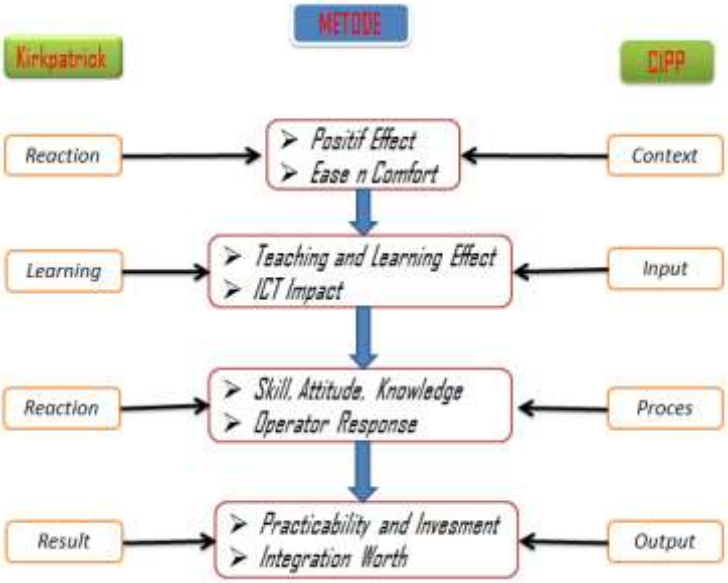
Procedures

The four levels represent a sequence of ways to evaluate programs. Each level is important and has an impact on the next level. As you move from one level to the next, the process becomes more dif- ficult and time-consuming, but it also provides more valuable information. None of the levels should be bypassed simply to get to the level that the trainer considers the most important. These are the four levels: Level 1-Reaction, Level 2-Learning, Level 3-Behavior, Level 4-Results.

Furthermore, the model selection in this evaluative research, especially of computer-based test research which is integrated with the evaluation from Kirkpatrick is CIPP model. In terms of Stufflebeam's CIPP evaluation model, a very useful approach to educational evaluation is known as the CIPP, or Context, Input, Process, Product approach. Basically, the CIPP evaluation model requires a series of questions to be asked about the four different elements of the model on context, input, process, and product.

Every research requires a good valid data both qualitative of quantitative. This research employs quantitative method research, that is, the data is collected by observation and interview. The research design is a combination of two research models, that is, CIPP and Kirkpatrick that becomes a new model design which is a combination from the two chosen models. By integrating several stages in the previous models into a new item that will be used in this research. There are four new stages results as a combination between two models, that is 1) Possitive Effect (Response, motivation and

influence), Ease and Comfort; 2) Teaching and Learning Effect, ICT Impact to the Process; 3) Skill, Attitude, Knowledge for the Process: Operator a Rapid Response to to Problems; 4) Practicability and Invesment Output, Integration Worth.



Data Analysis

The data analysis in this research is conducted through 3 phases, that is, since before entering the field, during at the filed, and after completion in the field. Before entering the field, the researcher has already had an overview about the research objective as well as the things that want to be researched. The analysis is conducted on the result of introduction, background or secondary data which will be used to determine, various research focus. However, this research focus is still temporary and will be developed after the researcher enters and is during at the field. Moreover, when the researcher is at the field, the researcher can determine the "key informant" so that the collected data could be developed when the researcher is at the field until that data is saturated, or after that researcher has finished to investigate.

The technique of data analysis used in the evaluation research of online computer-based test implementation employed Miles and Huberman model. On those models, the analysis comprises of three road maps which are conducted altogether, namely: 1) data reduction, 2) data display, and 3), conclusion/verification). Those three components of the analysis are interactive. The stage of data reduction is conducted by doing the more important, the more meaningful, and the more relevant categorization and data grouping with the research objective so that the final conclusions can be drawn and verified. The stage of data display uses the analysis of theme and table. This is done for the data served looks interesting and easy to understand, either by one self or others.

Data reduction defines as a process of changing and processing raw data which is obtained from various sources during the present research process. Various data are selected and classified based on the benefit, the importance, and based on the objective from each research process. The process of data reduction is carried out during the research and after the researcher gets back from the field. By data reduction, it will ease researcher to process the data until the researcher draws the appropriate conclusion.

To test the data validity (internal validation) is to extend observation, to increase the research persistence, to do the triangulation with the result of different data collection technique, to discuss with relatives, and member checking. Moreover, to determine transferability (external validity) that is made in detailed, systematic, and clear, so that this present research result can be used in the other

context and situation. Lastly, to test reliability is conducted by "audit trail" (the process of guaranteeing the truth of research). *Triagulation is a teqnique often used case studies that uses different perspectives in order to generalize finding beyond the spesific case.*

DISCUSSION

Information and Communication Technologies are the technologies of information and communication. ICT is a big shade of terminology which includes all technical equipment to process and to convey information. ICT consists of two aspects, that is, computer-based information technology and computer communication technology. In the computer-based test implementation, the use of information and communication technology is said to be very important. All national exam data package will be sent through information technology. The distribution of the script package, the distribution of the students' answers results, and the distribution of national exam results or the announcement the test result will be assigned by information and communication technologies. Information and Communication Technologies are very important to the success of computer-based national exam. However, the anticipation of the worst possibilities must be thought even that matter is highly undesirable. The assurance of power supply, bandwidth power, technician knowledge, proctor knowledge, availability of backup computers and backup servers are some examples that can disrupt the implementation of computer-based test.

The readiness of national exam for ICT (Information and Communication Technologies) is not only about the matter of network, but also about the readiness of schools as the exam organizers. The computer-based test which is conducted since 2015 continuously increases each year. That increase must be followed by the advancement system of the used information and technology. The readiness of information technology and communication must also be accompanied with the readiness of human resources as the information and technology organizers. Future hope is that the test runs smoothly of which the participants of the test are all schools in the level of SMP/MTs, SMK and SMA/MA. The use of bandwidth during the test should be arranged maximally to avoid disturbance when requesting an outgoing token so that the students can login properly. Likewise, if students have a disturbance can be immediately solved because token always appears in a real time. When the test is running, the internet use must be focused on the national exam without ruling out other works that require internet network.

The big amounts of students who follow national exam could lead computer client's error. The ability of proctor in handling problems is the main key which supports to solve those problems. Reflected from disturbance faced by those students, then backup computers must be provided at each room to computer availability if problems appeared and leads students to move to backup computers. In each room, there should be 4 backup computers minimum available from 40 students of test participants in each room. Accordingly, backup server must also be available in each school as the test organizers, of which one backup server minimum. The availability of power supply must also be confirmed when the test is implemented. The outage power which suddenly happened will disturb the test implementation even the students do not lose their answers. However, the outage power will still disturb as students should restart the national exam or the worst possibility is doing the make-up exam at the day that must be rescheduled.

The most important investment value at school by implementing computer-based test is by seeing the original result obtained by students. If the paper-based tests are concerned about leakage and many students are worried about cheating (having a discussion), then by computer-based test, those matters will be solved. Therefore, computer-based test gives benefit for the school as the evaluation overview towards student's achievement by having the original result obtained by students without interference from others. Those results can be used as a reference for improvement of school learning so that it can improve the achievement as an investment in the future.

The practical value of benefit obtained from computer-based exam is easier to perform than paper-based exam. Schools are not preoccupied with taking manuscripts about and returning computer answer sheets. The benefit earned by students is that they are easy to do the test. Students are not preoccupied by circling computer answer sheets or deleting answers if they are mistaken in doing the test. Students are enough to click answers that are appropriate or considered as correct answers. If mistakes happened, then students are easier to change the answers.

The distribution of the answer sheets of computer is also missing so that it will increase the budget savings. The answer sheets of computer checking which is usually conducted by scanning the answer sheets of computer automatically disappear for the answers can be directly sent through school operator (proctor) to the central computer-based national exam system (kemendikbud). The results of students' national exam at every school can be acknowledged directly by central government just after the answers are sent by the school through proctor (even the school have not known the results obtained by students yet).

CONCLUSION

It can be concluded that computer-based national exam is much more economical if compared to paper-based test.

1. Students are more enjoyable with computer based examination systems than paper based examination because of the perceived ease
2. With computer-based examination systems, paper usage decreases
3. Computer-based examination systems does not require the distribution of test questions and answer sheets
4. With computer-based examination systems, the test results obtained by students can be faster when compared with manual exams because there is no examination carried out directly by a computer system
5. Computer-based examination systems require reliable human resources as operators and technicians.
6. Information, Communication and Technology preparation must be adequate and provided well to support the smooth computer-based examination systems.

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