MOTIVASI:

Development of a Semi-Online Application to Support Indonesian Student Competencies Assessment (AKSI)

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Abstract—**The Modul Tes Inovatif Siswa Indonesia (MOTIVASI) is an application that is designed and built to support the implementation of the Indonesian Student Competencies Assessment (AKSI) survey. The AKSI survey itself aims to; (1) find out and compare the achievement level of educational programs, (2) diagnose students' strengths and weaknesses in various aspects, (3) identify factors that influence student achievement, (4) monitor the development of educational achievement. MOTIVASI is developed by two teams, the technical and the Information Technology (IT) team. The technical team is responsible to design the workflow of AKSI survey and identify the variables. The IT team is responsible to build the applications or software in accordance with the design and workflow. The plan and design start by identifying the variables needed. The test in the AKSI survey is conducted by a computer or Computer Based Test (CBT). The features of the application are divided into three groups, they are identity feature group, instrument feature group, and the data feature group. From the results of the application design and development, the MOTIVASI application is obtained and it functions very well in supporting the implementation of the AKSI survey.**

Keywords—AKSI, CBT, MOTIVASI application, students' achievements

I. INTRODUCTION

Learning outcomes are the abilities students have after receiving their learning experiences. Bloom et al [1] stated that learning outcomes cover three domains: 1) cognitive domain, the focus of this domain is on the ability to think, memorize, and solve problems; 2) affective domain, related to values, attitudes, interests, and appreciation, while 3) psychomotor domain related to motoric skills and arranging. Information on these abilities can be found out through an evaluation. According to Nitko and Brookhart [2], evaluation is a process of determining policies regarding product or learning achievement. Meanwhile, Djemari Mardapi [3] categorizes learning evaluation into two categories, formative and summative. Formative evaluation aims to find out which concepts most students have not understood yet, while summative evaluation aims to determine the level of students' achievement. Therefore, it can be concluded that evaluation is a process to assess whether a program is implemented in accordance with the objectives to be achieved.

Evaluation is the final component of the learning system. According to Dja'far Siddik [4], the evaluation can be used as; (1) incentive to improve student learning, (2) feedback for students, (3) feedback for educators, (4) information for parents, (5) information for institution. One of the measurement that can be used as a tool to obtain information about students is learning achievement tests. According to Cronbach [5], Linn and Gronlund [6] and Crocker and Algina [7], test is a standard procedure for obtaining a sample of behaviour of a particular domain. The test results can be used to determine the learning achievement of students and can be used to improve the quality of education.

Learning achievement test as a measuring tool must meet the requirements to be considered as a good measuring tool. According to Umar [8], a good test must be: (1) valid, means that each measuring instrument only measures one dimension or aspect, and (2) reliable, refers to precision or accuracy of measurement results. According to Brennan [9], the validity of a test is the ability of a test to measure characteristics or dimensions according to what is meant to be measured, while the reliability of a test refers to the degree of a test that is able to measure various attributes consistently. According to Mehrens and Lehmann [10], reliability is the degree of consistency between two measurement results on the same object, while according to Anastasi and Urbana [11], test reliability is the stability of scores obtained by the same person when they are retested with the same instrument at different times or different sets of equivalent questions or under different conditions.

To obtain a valid and reliable test, the items used in the test must be standardized or calibrated and presented in various types of questions. Arikunto [12] divides the test into two forms: (1) subjective tests, generally in the form of essay and (2) objective tests are tests that can be carried out objectively. Objective tests then can be divided into: (1) true-false, (2)

multiple choice, (3) matchmaking, (4) filling in or completing. According to the Ministry of National Education [13], there are basically three cognitive levels to get a specific picture of the ability level of students, namely: knowledge and understanding, application, and reasoning.

The Ministry of Education and Culture of Indonesia adopted the PISA study model, particularly the test instruments. This national study is called Asesmen Kompetensi Siswa Indonesia (AKSI) or the Indonesian Student Competency Assessment and organized by Centre for Assessment and Learning [14]. AKSI maps the educational achievement in order to monitor the quality of education at the national/regional level, which illustrates the achievement of students' abilities through a longitudinal survey. The data and results of AKSI are expected to be a basis of policies and programs formulated to improve the quality of learning in particular and the quality of education in general.

To support the implementation of AKSI, the Centre for Assessment and Learning (Pusmenjar) developed an application called Modul Tes Inovatif Siswa Indonesia (MOTIVASI). The development of this application is in line with the development and influence of Information and Communication Technology (ICT) in education, especially in assessment. Ma'muroh [15] states that ICT-based assessment is an assessment that utilizes computer technology and internet networks. Furthermore, Wulan et al [16] stated that the use of ICT in the implementation of the assessment is nothing new in the digital era as it is today. MOTIVASI is an offline-based application that can be run in stand-alone or network mode. According to Hilman [17], Andi Hatmoko [18] and Zainul Arifin [19] web-based applications are applications that can be run by using a computer and require internet connection.

The MOTIVASI application is developed by a team divided into two main jobs, namely the technical team and the IT team. The technical team is responsible in designing a workflow of the AKSI survey and identifying the variables required in the application. The IT team is in charge in building the applications or software according to the design and workflow designed by the technical team. The MOTIVASI application is designed to identify the necessary variables such as province, district / city, education level, NPSN, school name, AKSI code, school status, subject, class, student sample, instrument type, and to carry out the test survey. Furthermore, with this application, the test and questionnaires can be done by students more efficient in terms of time and implementation. Minimum specifications of a computer required to run the MOTIVASI application is at least installed OS is Windows 7, Pentium 4 Processor, 512Mb / 2GB RAM, and 1366x768 screen resolution.

II. PROBLEMS OF THE STUDY

Based on the background, problems are raised regarding the development of applications to support the implementation of the Indonesian Student Competency Assessment (AKSI) study.

III. OBJECTIVES OF THE STUDY

The purpose of developing the MOTIVASI is to support the implementation of the Indonesian Student Competency Assessment (AKSI) survey.

IV. DEVELOPMENT RESULTS AND DISCUSSION

MOTIVASI consists of two groups of features, namely: (1) implementation of the assessment and (2) processing of results. The following is an explanation of the features contained in the application.

A. Implementation of the Application

The first step to carry out the AKSI survey is to download the application, copy it into a directory, then extract the files (Figure 1) to be run. The main menu display will appear as shown in Figure 2.
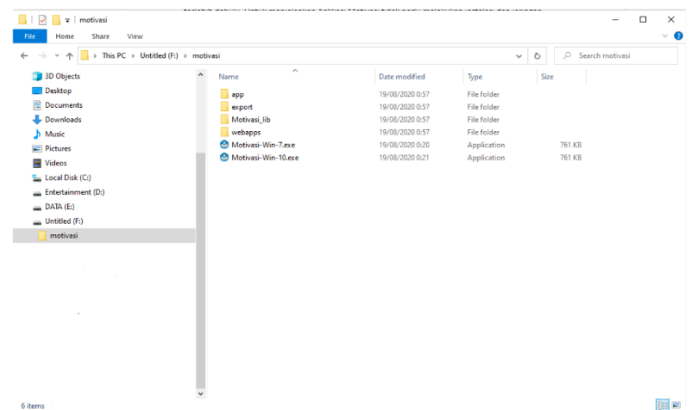

Fig. 1. Extracting the application into directory.

Fig. 2. Display of the MOTIVATION application menu options.

1) Starting the application: To enter the AKSI Motivation Application, students must enter their Student ID and Password in the login page as shown in figure 3.
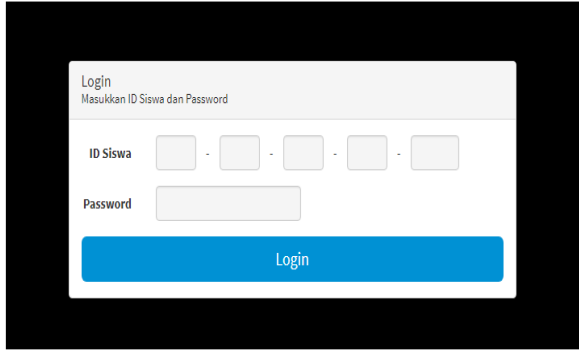
Fig. 3. Display login form, student ID and password.

2) Starting the examination: After logging in, students will see a menu session consist of education levels, subjects, and topic as in figure 4-6.
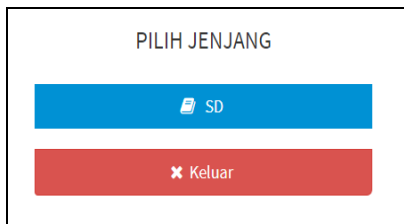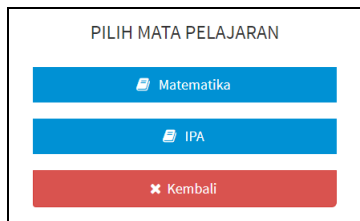

Fig. 4. Select level.

Fig. 5. Select subject.

Fig. 6. Select topic.

After choosing the level and subjects, students will see the topics. Each subject will be given several topics. Students must choose one of these topics that have been given. When entering the exam session, students will work on a set of questions that will be randomly assigned to each student as shown in Figure 7 below.
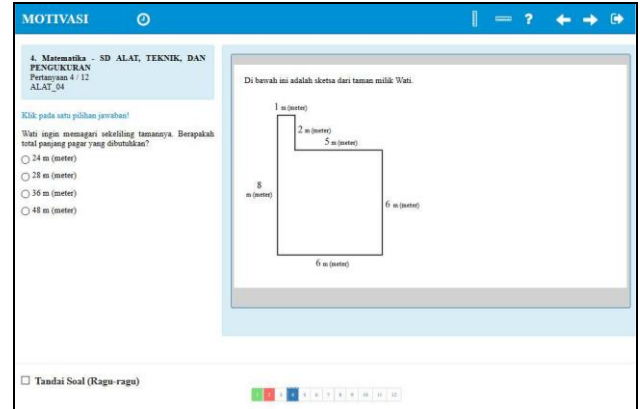

Fig. 7. Examples of mathematic items.

Students can see the display which consists of: (1) the questions being tested, (2) the choice of answers, (3) the remaining time, (4) application assistance, (5) previous questions, (6) next questions, (7) exit session, (8) mark the question (doubt), and (9) list of the question number.
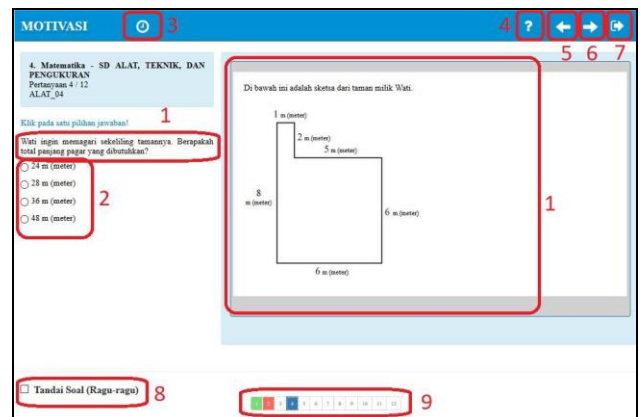

Fig. 8. Icon description and question item display.

As in figure 8, on each question number, there is a question status feature. Question status are distinguished based on the colour of each item tested (Table 1.) When students end the session and click exit icon, a pop-up window will appear asking for confirmation as in Figure 9.

TABLE I. DESCRIPTION OF QUESTION STATUS FEATURES

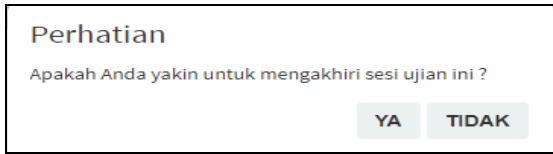| Colour	Description
Yellow	question with doubtful answers
Red	unanswered questions
Green	answered questions
White	unopened questions
Blue	the question being worked on

Fig. 9. Display of exam session options.

3) Officer login: In the officer Home Menu, there are 5 menus of activity options and a Logout button at the top right as shown in Figure 10 below.The Student List menu will appear as shown in Figure 11. In the student list menu, officers can import student data or add student data manually. If the officer selects the activity list menu, the application will display a display as shown in Figure 12 below.

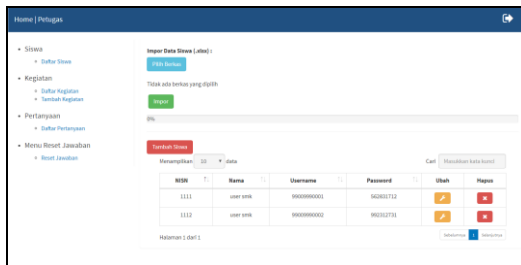Fig. 10. Display of the activity options menu.
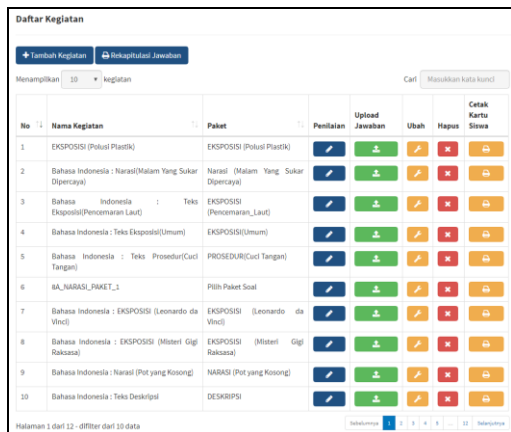

Fig. 11. Display student list menu.

Fig. 12. Display of the activity list menu.

B. Processing of Results

Before processing raw data from student responses, student responses on essay questions must be scored, based on scoring rubrics, manually or automatically. Clicking the View Guidelines link, will directing the page to scoring rubrics as shown in Figure 13 and 14. Questions that have been scored will automatically appear in the form of blue-bars, while questions that have been scored manually will appear in grey bars.
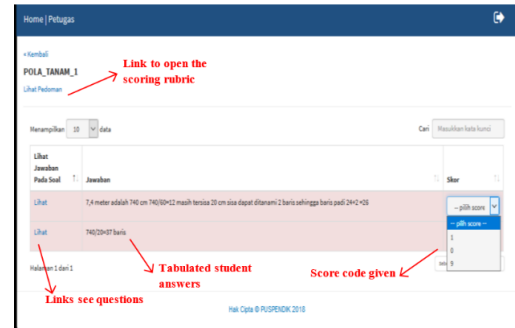
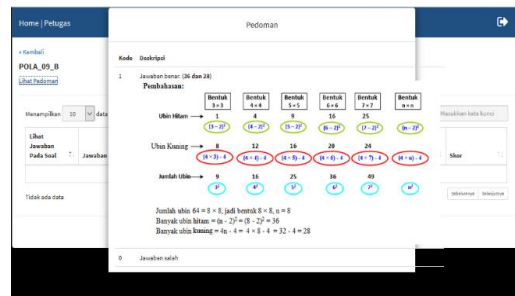

Fig. 13. Display of the rubric for essay questions.

Fig. 14. Scoring rubric for description.

Summary of student responses that have been scored is automatically stored in spreadsheet format inside the webapps folder as seen in figure 15 below.
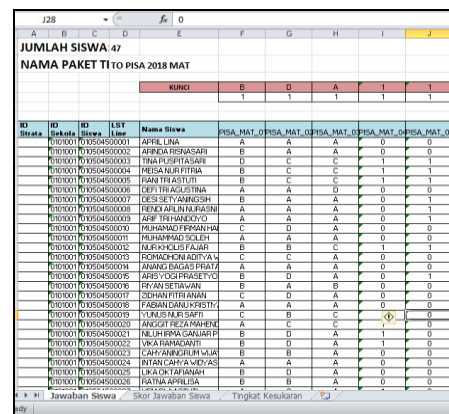

Fig. 15. Recap of student responses to multiple choice questions, short answers, and descriptions.

V. Conclusion

Based on the workflow the MOTIVASI application is running well and according to plan, and could access and support the AKSI surveys.

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