

E-ASSESSMENT DESIGN FOR JUNIOR HIGH SCHOOL

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Abstract

Technologically advanced era brings electronic assessment (E-assessment) as the more effective alternative way for assessing learners. However, the limited ability in creating technology-based assessment was hampering this evaluation form. This paper focused on describing the procedure of designing e-assessment. This study was a Research and Development (R&D) which followed some phases such as Analysis, Design, Develop, Implementation, and Evaluation (ADDIE) in creating a research product. In the data collection process, some instruments like interview, document analysis, documentation, questionnaire, and test were applied. The compiled data were analyzed using qualitative and quantitative data analysis. The result was a soft file product consisted of 50 multiple-choice items namely HOTS Quiz. The design was stated as applicable and acceptable as very appropriate by 1) the material and language testing expert with the average 84% achievement; 2) the IT experts with the average 87,5%. Furthermore, the result of the first and second implementation showed an improvement, where the students' average score in the first implementation was 65, 7 while the second implementation reached 79, 4. Thus, it can be concluded that the designed HOTS Quiz was appropriate to use as the alternative for assessing ninth graders' higher order thinking skills.

Keywords: E-Assessment, Design, Thinking Skills

INTRODUCTION

As the bridge between teaching and learning, assessments may become one of the most powerful ways of improving student achievement. The assessment of learning result is the information or data collecting process about student's achievements in attitude, knowledge, and skills aspect which is done systematically to observe the process, study progress, and study result improvement by giving an assignment and evaluation as stated in Ministry of Education and Culture regulation (Permendikbud) number 53, 2015. In line with the core frameworks of 21st-century skills as stated by Scott (2017) such as 1) learning and innovation skills, 2) life and career skills, and 3) information, media, and technology skills, it was very crucial to upgrade the quality of assessment to meet those demand. Hence, Indonesian education sector began to modify Paper-Based National Exam (PBNE) to Computer-Based National Exam (CBNE) in the academic year of 2014/2015. It was considered as an effective solution for carrying out the evaluation or educational assessment conducted on a large number of students (Sulistyaningsih, 2016) because of its efficiency and immediate scoring.

In the early investigation, it was found that School A, one of Junior High School in Yogyakarta, has implemented the CBNE since the academic year 2015/2016. However, the final year students were not very well-acquainted with the questions which has been designed to assess their analyzing (C4), evaluating (C5), and creating (C6) skills or known as Higher Order Thinking Skills (HOTS) questions. A learner is considered having HOTS when he/she can apply the gained knowledge in a new context (Wardhani, 2005). However, the result of computer-based PISA in 2015 which was released by OECD (2016) showed that Indonesian students' achievement was still below the average of all OECD countries. Whereas, an international community, the global perspective about the quality of education is important to prove that the policymakers are successful in improving the international standard demand in the education sector.

HOTS questions have several essential roles according to *Direktorat Pembinaan SMA Ditjen Pendidikan Dasar dan Menengah* (2017), they are: 1) Preparing learners' competence in facing 21st century challenge; 2) Increasing loving and caring sense to regional advancement; 3) Improving the students' learning motivation; and 4) Upgrading the quality of assessment. Furthermore, according to *Direktorat Pembinaan SMA Ditjen Pendidikan Dasar dan Menengah* (2017), the policymaker also

increased the embedded HOTS questions in UN 2015/2016 to improve its quality. In contrast, a tendency of the assessment techniques used in schools was recalling information or doing routine questions, which will not help students in enhancing their higher-order thinking skills. As an example, HOTS questions have not been embedded yet in semester test. Consequently, students were not well acquainted in solving HOTS questions. Whereas, learners must deal with HOTS questions in UN. Therefore, it is very essential for policymakers and educators to habituate learners with HOTS in teaching and learning and assessment. Moreover, teacher's less ability in designing E-Assessment also influenced the number of Computer Based Test (CBT) simulation in the school which were not very optimal.

Concerning to the mentioned problem, the aim of the present study was to describe procedure in designing E-Assessment as alternative media for the Junior High School students, especially ninth graders' high order thinking skills, preparing them in facing their next level of schooling which requires them to have higher critical thinking ability, and serve their demand as millennial. According to a survey conducted by Paul and Scott (2010), the first generation to appear in the new millennium are those born after 1980. The survey reports that in comparison to other generations, the digital natives believe that their unique identity is due to their affiliation with technology such as social networking sites, wireless technology, video games, and self-created videos. A further study reports that 74 percent of teens aged twelve to seventeen have mobile access to the Internet (e.g., phone, tablet, and similar devices), while 24 percent have posted videos of themselves on social media (Scott and Paul, 2012). Therefore, the product of E-Assessment consisted of multiple choice questions which have been taken from the previous English National Examination. The questions were limited with the questions assessing the students' higher thinking level, especially in reading and writing skills. Furthermore, the media can be used in computer and smartphone. Thus, students can access it anytime and anywhere they want.

METHODOLOGY

The product of e-assessment only focused on ninth graders chosen by random sampling. Since it required the computer as main equipment, the implementation process was conducted in the computer laboratory. This study was categorized as Research and Development (R&D). According to Woessmann, new innovation and technological progress can be generated from individuals' knowledge, skills, and idea by the role of education. Additionally, Sasso and Ritzen (2016) stated that the purpose of R&D activities was to enlarge the stock of knowledge and ideas and discover new solutions. The product was expected to solve the existing problem in the research setting. The focus of this research was to design e-assessment to habituate the students to the CBT of English subject containing HOTS questions. Thus, it was very appropriate for this research to use R&D as the research design. The researcher used ADDIE model as the guide to build the product. Aldoobie (2015) investigated that ADDIE model was commonly used by instructional designers, any content's developer, or even teachers as an approach or guide in producing an efficient, effective teaching design by applying the processes of the ADDIE model on any instructional product. Furthermore, the acronym ADDIE which stands for Analysis, Design, Development, Implementation, and Evaluation represented the systematic process and essential components of creating the instructional design.

Some instruments in the forms of interview, content analysis, documentation, questionnaire, and test. There were two types of data in this study, such as qualitative and quantitative data. The qualitative data were gained from analyzing the English national examination questions. To acquire the authentic evidence, a documentation process of the Paper Based Test (PBT) of English National Examination (ENE) and interview with the English teacher to comprehend the deeper analysis. From the data, the researcher obtained some necessary result about the ENE which assessed the students' higher order thinking level. The qualitative data were obtained from questionnaires given to English education lecturers as a material expert judgment, IT experts, English teachers, and participants.

FINDING AND DISCUSSION

The first phase in designing e-assessment was analysis. An interview was done to get information about the real situation and needs in the research setting. Some essential result of the interview such as students' difficulty in solving higher order thinking skills questions, the accessibility of the product, and the limited number of available computers became the consideration in designing the soft file of e-assessment. While the analyzed documents were the English National Examination (ENE) document from academic year 2012/2013, 2013/2014, 2014/ 2015, 2015/2016, and 2016/2017. The HOTS Questions were categorized using the main guidelines according to Krathwohl (2002) theory about high order thinking skills was the supporting guidelines in selecting the questions which assess analyzing, evaluating, and creating skills. Besides that, the instrument in analyzing the high order thinking skills questions according to Direktorat Pembinaan SMA Ditjen Pembinaan Dasar dan Menengah (2017) was also used as the following figure:

**INSTRUMEN TELAAH SOAL HOTS
 BENTUK TES PILIHAN GANDA/URAIAN**

Nama Pengembang Soal :

Mata Pelajaran :

Kls/Prog/Peminatan :

No.	Aspek yang ditelaah	Butir Soal				
		1	2	3	4	5
A.	Materi	V	V			
1.	Soal menggunakan stimulus yang menarik (baru, mendorong peserta didik untuk membaca).	V	V			
2.	Soal menggunakan stimulus yang kontekstual (gambar/grafik, teks, visualisasi, dll, sesuai dengan dunia nyata)*	V	V			
3.	Soal mengukur level kognitif penalaran (menganalisis, mengevaluasi, mencipta) yang dalam penyelesaiannya dicirikan dengan salah satu atau lebih tahapan proses berpikir berikut: <ul style="list-style-type: none"> • Transfer satu konsep ke konsep lainnya • Memproses dan menerapkan informasi • Mencari kaitan dari berbagai informasi yang berbeda-beda • Menggunakan informasi untuk menyelesaikan masalah • Menelaah ide dan informasi secara kritis 	V	X			
4.	Jawaban tersirat pada stimulus.	V	V			

*) Khusus mata pelajaran bahasa dapat menggunakan teks yang tidak kontekstual (fiksi, karangan, dan sejenisnya).

**) Pada kolom nomor soal diisikan tanda silang (X) bila soal tersebut tidak memenuhi kaidah.

.....
 Penelaah

.....
 NIP.

Figure 1 Instrument to analyze multiple-choice HOTS

The design stage was conducted after the analysis phase. The test item in the designed quiz were questions to assess the students' higher thinking level. The type of the questions were multiple choice items with four options. The questions were about short functional texts, descriptive, recount, and narrative text, cloze test, jumbled words, and jumbled sentences. In addition, the researcher also examined the blueprint of English National Based School Exam as the references format in making quiz blueprint. The ENE documents were taken from the internet sources. There were 50 questions in each ENE scripts. The ENE in Junior High School was given in the written form, whether in the Paper Based National Exam (PBNE) or Computer Based National Exam (CBNE). The instrument to analyze HOTS in multiple-choice questions was used as follows:

DOKUMEN NEGARA
SANGAT RAHASIA

3

Bahasa Inggris SMP/MTs

Nama :
No Peserta :

1. This text is for the following question.

**Please
Keep the lavatory
Clean
For the next user**

What does the notice mean?

- A. We should keep the lavatory.
- B. The lavatory must be kept clean by any user.
- C. We have to clean the lavatory.
- D. The lavatory user is pleased to clean it.

Figure 2 ENE 2013/2014 number 1

The question number 1 in ENE 2013/2014 above was using a picture of notice (short functional text) as a stimulus to be read. The stimulus was contextual since it is also used in the real life. To answer the question, students not only have to understand the meaning but also analyze the correct functional use of the notice in the given options. Therefore, the question was included as high order thinking skills question which measures the students' analyzing ability.

The following text is for questions 2 and 3.

**STUDENT ORGANIZATION OF SMP NEGERI 4
Jl. Samoja 5 Bandung 40275 tlp.022-7312394**

To: Fino of class 11B

Would you please attend our meeting that will be held:

- Day/date : Saturday, March 11th 2013
- Time : 11 a.m.
- Place : Multimedia room
- Agenda : Final Preparation for Wall Magazine Competition 2013

Please come on time, see you there!

Andy Chairperson
Devina Secretary

2. From the text, we know that

- A. the meeting is held in Jl. Samoja, Bandung
- B. the meeting will discuss about Multimedia Room
- C. Fino is expected not to be late in the meeting
- D. Devina is the chairperson of the student organization

Figure 3 ENE 2013/2014 number 2

The question number 2 in ENE 2013/2014 above was using a picture of an announcement (short functional text) as a stimulus to be read. The stimulus was contextual since it is also used in the real life. To answer the question, students have to check the correct option which was match with the given information in the announcement. It did not require the students to analyze, evaluate, or even create. Therefore, the question was included as lower order thinking skills question which measures the students' understanding ability by identifying the correct information.

The researcher utilized iSpring Suite 9.1.0 to design HOTS Quiz considering its practicality and various features for designing educational materials.



Figure 4 iSpring Suite 9 Software

iSpring Suite 9 is the current update of iSpring Suite products. This software is very useful to design various interactive quiz, such as multiple choice items, matching, short answer, jumbled sentence, and so on. The software can stand alone or support the function of another software, such as Ms. PowerPoint. The combination of both software could produce well-designed of interactive assessment which can be converted to flash or HTML formats. Therefore, it is used as the main software to design the test prototype. The quiz product can be open from both computer and mobile phones. The following are the steps of designing e-assessment using iSpring Suite 9.1.0.

a. The installation process of iSpring Suite Software

After the iSpring Suite downloaded, the program must be installed in the computer. The installation process will run after clicking the button like below.



Figure 5 Installing iSpring Suite 9 Software

b. The quick start of iSpring Suite Software

After the installation process has finished, the quick start of iSpring Suite will appear. Then, click the Quizzes to start designing the quiz.

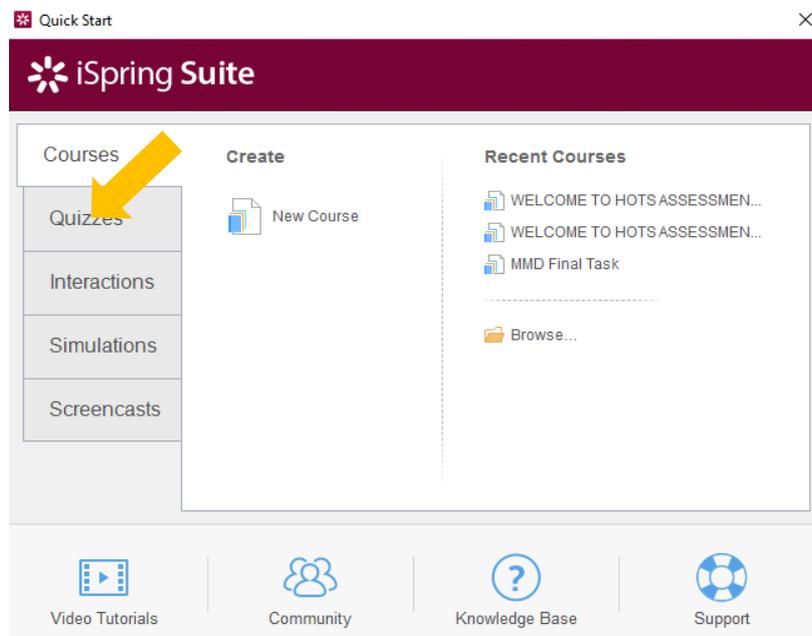


Figure 6 Quick Start of iSpring Suite 9 Software

c. iSpring QuizMaker

iSpring QuizMaker is available to help educators/ researcher designing quiz. There are graded quiz and survey. To design the HOTS Quiz, the graded quiz is chosen.



Figure 7 iSpring QuizMaker

After choosing the graded quiz, the process of developing HOTS Quiz will be started as follows:

1. User Info Slide

The first slide is user info slide. It is used to collect the user main data. It consist of three main info such as name, class, and school. The user has to fill the blank form before starting the quiz.

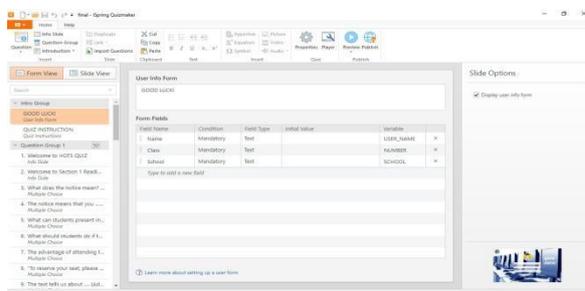


Figure 8 Designing User Info Slide

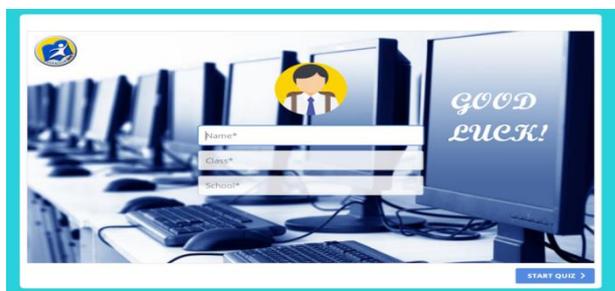


Figure 9 User Info Slide Design

2. General Quiz Instruction

The general quiz instruction is the instruction about how to finish the whole quiz. It consists of six points about the technical instructions.

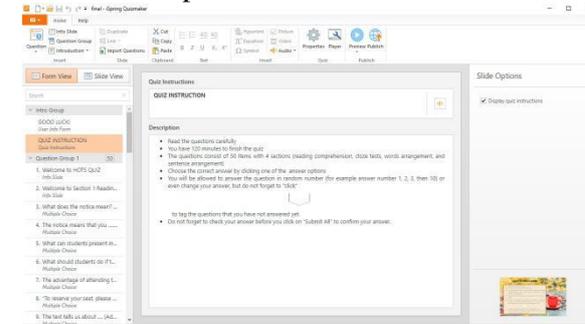


Figure 10 Designing General Quiz Instructions

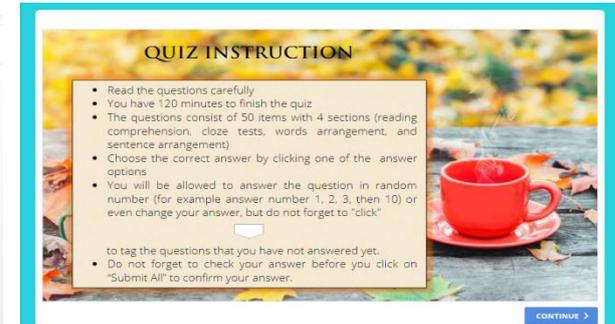


Figure 11 General Quiz Instructions Slide Design

Users can continue to the next slide by clicking the continue button or by pressing "enter" if they use the keyboard.

3. Welcoming Slide

The welcoming slide contains the information about the HOTS Quiz, such as the objectives and the author.

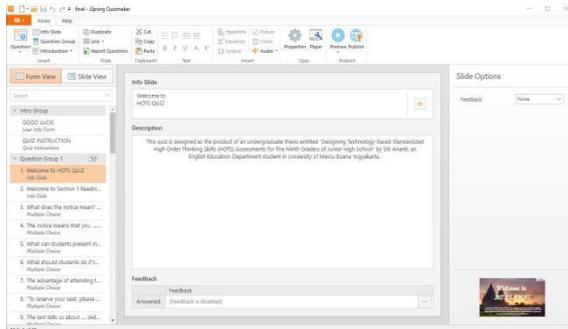


Figure 12 Designing Welcoming Slide



Figure 13 Welcoming Slide Design

4. Section Instruction

Section instruction slides show the instruction about the quiz in each sections, such as the type of quiz, types of short functional text and short paragraphs, and detail instruction about how to answer the quiz. There are 4 slides of section instruction: section 1 about reading comprehension, section 2 about cloze test, section 3 about jumbled words, and the last is section 4 about jumbled sentence. Each slide stays right before the changing of each section.

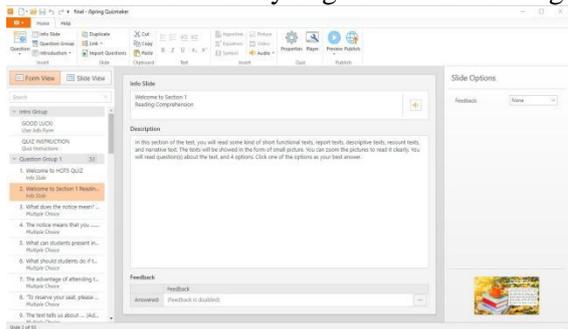


Figure 14 Designing Section Instruction



Figure 15 Section Instruction Design

5. Questions

The questions slide presents the HOTS questions items. There are 50 number of question items which were taken from the previous English National Examination (ENE). This section contains picture of the short functional text or short paragraphs which displayed in a small icon. However, users can zoom the picture by clicking the picture.

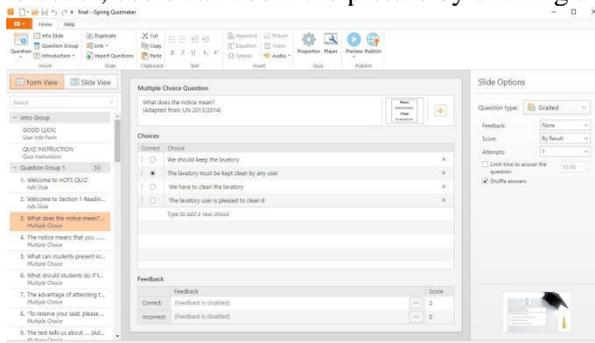


Figure 16 Designing Questions

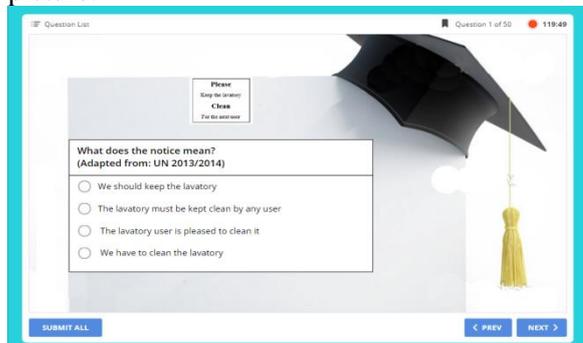


Figure 17 Questions Design

Users may do the questions in a random numbers. It can be done by clicking the question list which showed all list of questions. While the tag symbol was important to be used in order to tag the difficult questions which users may leave first or even answered with hesitation which may change later. However, all questions must be done before clicking submit all button.

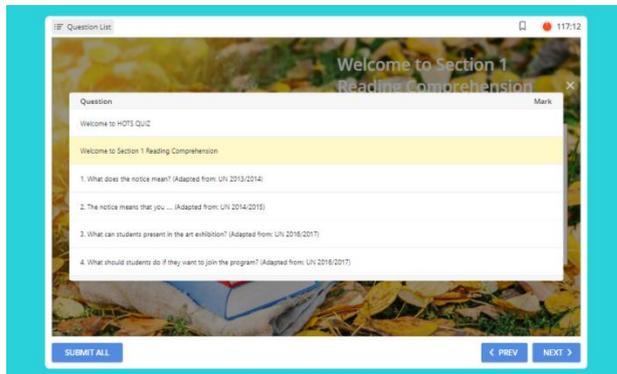


Figure 18 Question List

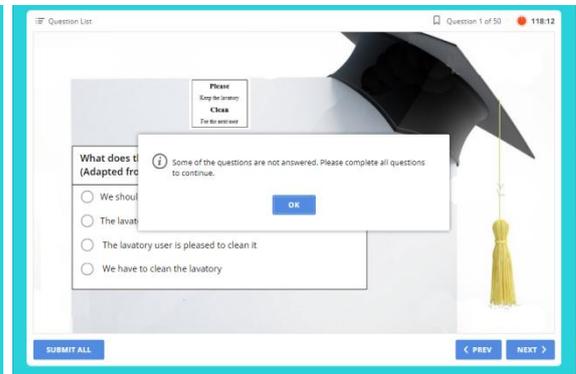


Figure 19 The Unfinished Questions Notification

As a result, users cannot submit their answer before answering the whole questions. This feature presented to prevent the unanswered questions which can decrease the result of the quiz.

6. Quiz Result Slide

As its name, the quiz result slide showed the final result of the users after finishing the quiz. Besides displaying the score to the users, it sent the score and the detail answers automatically to the teacher's email.

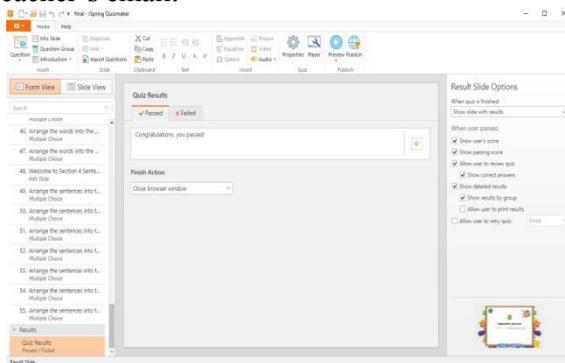


Figure 20 Designing Quiz Result Slide



Figure 21 Quiz Result Slide Design

The passing score was based on the criteria of minimum learning mastery (75%). Furthermore, users can review the quiz to know whether their answers in each number was correct or not. The detail report button also presented the whole answers report of the quiz.

The next phase after the design phase is the implementation. In this phase, the researcher implemented the product in the research setting. It was conducted at two cycles of implementation, remembering the purpose of this research was to habituate the students in dealing with the HOTS questions.

Table 1 Research Participants

Class	Total of Students	Sex	
		Male	Female
IX	20	5	15
Total	20	20	

All participants did the HOTS Quiz at the same time. After conducting the implementation process, the researcher investigated that the mean score of the students' achievement was 65, 7. However, it has not reached the purpose of the designed assessment which aimed at habituating the

students in solving the high order thinking skills questions. The reason made the researcher decided to conduct the next cycle of implementation. After conducting the second cycle of the implementation process, the researcher examined that the students' scores have improved into 79, 4. There were only three students whose scores were below the minimum criteria of learning mastery. The result of the second implementation has fulfilled the minimum criteria of learning mastery (Kriteria Ketuntasan Minimal or KKM) which decided by the teacher. Therefore, the researcher finished the implementation process until the second cycle.

The expert judgment was done gradually before the implementation and after the implementation of the product. Before the implementation process, the researcher consulted the product to the researcher's consultant as Doctor in ELT, English teacher of ninth graders, and also to the IT teacher. There were some suggestions given to the researcher as follows: 1) The designed product must be accessible on both computer and phone; 2) The designed product must be user-friendly and not complicated because the user is the ninth graders of Junior High School; 3) The product must not depend on internet access or Wi-Fi to prevent the unwanted situation in the implementation process; 4) The choice of background must be appropriate with the topic of the quiz; and 5) The product must have a number of features which made the students free to do any number of the questions items.

The next expert judgment was done after the implementation process. The researcher gave questionnaires to English teacher of ninth graders, IT teacher, lecturer of English Education Department as language testing experts, IT expert, and also participants or users to judge the designed HOTS quiz. The expert judgment from English teacher (86%), English Education Lecturer (82%), IT teacher (90%), IT Lecturer (85%) showed that the designed product was appropriate to be implemented in the research setting.

CONCLUSION

The essential role of HOTS questions to prepare learners' competence in facing the 21st-century challenge, increase loving and caring sense to regional advancement, improve the students' learning motivation, and upgrade the quality of assessment. Therefore, it is very crucial for policymakers and educators to habituate learners with HOTS in teaching and learning and assessment. Besides, the limited number of computer and teacher's less ability in designing CBT also influenced the number of CBT simulation in the school which were not very optimal. The product of e-assessment only focused on ninth graders chosen by random sampling. This study was categorized as Research and Development (R&D). The product was expected to solve the existing problem in the research setting. The focus of this research was to design e-assessment to habituate the students to the CBT of English subject containing HOTS questions. The researcher used ADDIE model as the guide to build the product. Furthermore, the acronym ADDIE which stands for Analysis, Design, Development, Implementation, and Evaluation represented the systematic process and essential components of creating the instructional design. The ninth graders could use the HOTS Quiz as the simulation of the national exam, whether in school or in their own house. The simple way to operate this quiz may help the students in using the product easily. Moreover, it can also be accessed using a phone, not only using a computer or laptop. The English teacher of ninth graders might use the HOTS Quiz for evaluating the next ninth graders since the questions were taken from the previous national examinations. Thus, it will still appropriate to be implemented for the next ninth graders. However, the technical problem like the electricity problem might still happen in the research setting as what the researcher experienced. It can be solved by anticipating the electricity problem by using utilizing any tools to manage the electric power or using the phone as the testing media. This HOTS Quiz might be useful for the next researcher who had the same research and background. This product would be used as the references. This HOTS Quiz might be beneficial for language testing designer. Especially in redesigning the paper-based into a computer-based test.

REFERENCES

- Aldoobie, N. (2015). ADDIE Model. *American International Journal of Contemporary Research*, 68.
- Brown, H. D. (2004). *Language Assessment Principles and Practices*. New York: Pearson Education Limited.
- Direktorat Pembinaan Sekolah Menengah Atas Direktorat Jenderal Pendidikan Dasar dan Menengah Kementerian Pendidikan dan Kebudayaan. (2017). *Modul Penyusunan Soal High Order Thinking Skill (HOTS)*. Jakarta
- OECD. (2016), *PISA 2015 Results (Volume I): Excellence and Equity in Education*, PISA, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264266490-en> (accessed 7 July. 2018)
- Paul, T., and Scott, K.: Millennials: A Portrait of Generation Next: Confident, Connected, Open to Change. Pew Research Center (2010). <http://www.pewinternet.org/2010/02/24/millennials-confident-connected-open-to-change/> (accessed 20 July. 2018)
- Permendikbud. (2015). Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia nomor 53 tahun 2015, tentang Penilaian hasil belajar Pendidik pada pendidikan dasar dan pendidikan menengah.
- Sasso, S., & Ritzen, J. (2016). Sectoral Cognitive Skills, R&D, and Productivity:. *IZA – Institute of Labor Economics*, 2.
- Scott, K., and Paul, T.: Teen Fact Sheet. Pew Research Center (2012). <http://www.pewinternet.org/fact-sheets/teens-fact-sheet/> (accessed 7 July. 2018)
- Scott, L. A. (2017). *21st century skills early learning framework*. Partnership for 21st Century Skill (P21). Retrieved from http://www.p21.org/storage/documents/EarlyLearning_Framework/P21_ELF_Framework_Final.pdf(accessed 7 July. 2018)
- Sulistyaningsih, E. (2016). Students' Anxiety Facing Computer Based Test (CBT) System of National Examination. *Proceeding of 3rd International Convergence on Research Implementation and Education of Mathematics and Science*. Yogyakarta.
- Wardhani, Sri. (2005). *Pembelajaran dan Penilaian Aspek Pemahaman Konsep, Penalaran dan Komunikasi, Pemecahan Masalah*. Jogjakarta: Materi Pembinaan matematika SMP di Daerah Tahun 2005 (PPP Matematika)
- Wilson, L. O. (2016). A succinct discussion of the revisions to Bloom's classic cognitive taxonomy by Lorin Anderson and David cwohl and how to use them effectively.