Reading Assessment: Higher-Order Thinking Skills (Hots) through ICT

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Abstract: Assessment in English language learning commonly addresses four broad topics; listening, reading, writing and speaking. Reading assessment in learning is very important because it give us information on how students understand the reading and utilize their ability to use the reading. Assessment includes three level namely: low level, medium level and high level. High level reading encompases higher order thinking skills (HOTS). This article aims to examine the relationship between higher order thinking skills (HOTS) in reading assessment and ICT (Information, Communication and Technology). ICT can be used as the media to develop the skills that students must have in HOTS in reading assessment. 21st-century skills require the learning of HOTS which consists of C4 (analyze), C5 (evaluate) and C6 (create). The C4 and C5 are considered critical thinking while C6 is creative thinking. Beside HOTS, ICT is also required in the era of education 4.0 which includes 21st-century skills. Thus, HOTS in reading assessment can be developed using ICT.

Keywords: *Reading Assessment, HOTS, ICT*

Abstrak: Assessment dalam pembelajaran bahasa Inggris terdapat empat topik yaitu listening, reading, writing dan speaking. Reading assessment dalam pembelajaran sangat penting untuk memberikan informasi bagaimana siswa memahami suatu bacaan dan memanfaatkan kemampuan mereka dalam menggunakan bacaan. Assessmentterdiri dari tiga level yaitu low level, medium level dan high leveldimana high level inilah yang merupakan higher order thinking skill (HOTS). Artikel kali ini bertujuan untuk mengkaji keterkaitan antara higher order thinking skill (HOTS) dan reading assessment dengan ICT (Information, Communication and Technology). ICT dapat digunakan sebagai media sekaligus kemampuan yang harus dimiliki oleh siswa dalamassesment HOTS matematika. Keterampilan abad-21 mengharuskan pembelajaran dengan pengembangan HOTS didalamnya yaitu critical thinking dan creativity thinking. Ranah kognitif taksonomi bloom dalam HOTS yaitu C4 (analyze), C5 (evaluate) dan C6 (create) dimana C4 dan C5 merupakan critical thinking dan C6 adalah creativity thinking. Selain HOTS, ICT juga merupakan tuntutan dunia pada era pendidikan 4.0 yang termasuk keterampilan abad-21. Sehingga, HOTS dalam reading assesment dapat dikembangkan dengan menggunakan ICT.

Kata-kata kunci: *Reading Assessment, HOTS, ICT*

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In English language assessment, there are four area namely: speaking, listening, reading and writing (Brown, 2004, p. 52). Reading is an activity that can support our real life because it can provide information (Sainsbury, 2006, p. 1). So, it is important for someone to have reading skills and reading assessment is the way to know someone's reading skills. Besides, Afflerbach (2018, p. 17) believes that reading assessment in learning is very important because it give us information on how students understand the reading and their ability to use the reading. BadanStandar Nasional Pendidikan (BSNP) has compiled the Indonesian National Assessment which emphasizes the competitiveness of Indonesian children in 21st-century skills. Badan-Standar Nasional Pendidikan is directed at an assessment model that demands thinking skills that are not just recalling, restating, or refer without processing (recite). De Lange (1995, p. 96-103) categorizes assessments into three levels: low level, medium level and High-Level. ThisHigh-Level is often calledhigher-order thinking skills (HOTS). In Bloom taxonomies, HOTS is in the cognitive domains C4 (analyze), C5 (evaluate) and C6 (create) (Anderson &Krathwohl, 2001, p. 149).

In the 2013 curriculum and 21st-century skills, higher-order thinking skills (HOTS) are considered as one of the most important abilities in the learning process because they can encourage students to think broadly and deeply by analyzing, evaluating, and synthesizing the knowledge they have to solve problems in everyday life. (Kemendikbud, 2017, p. 1). Regarding the issue of education development at the international level, the 2013 curriculum was designed with various improvements. Improvements include, among others, the content standards, namely reducing irrelevant material and the deepening and expansion of material that is relevant for students and enriched with the needs of students to think critically and analytically according to international standards (Kemendikbud, 2017, p. 1).

The results of the PISA 2015 in the domain of reading literacy show that Indonesian students got the score of 397 below the average international score of 493 (OECD, 2018). Indonesian students' scores are still at level 3 and below. It is the same as the result of the PISA 2009 as reflected by the Mendikbud (2014) which states that almost all Indonesian students only master lessons up to level 3 only.

Besides, the research of Diem, Yuniarti & Mirizon (2019) show that in pretest result of English literacy,students get 14.64 on listening, 15.07 on reading, 10.36 on writing, and 11.47 on speaking, so the total of English literacy is 51.53 and this is catagorized below average. However reading is the higher score than the other skills but that score is still below and shows that HOTS have not been reached in reading.

HOTS questions have also been inserted in the national examinations and every year the percentage of HOTS questions in the national examinationsis always increased (Kemendikbud, 2017, p. 19). However, it is unfortunate that national examinations results of English language is very disappointing especially in social functions category where questions of that categoty include in reading assessment.The national examinations avegare of secondary school students in answering questions of social functions category in the English language subjects in 2017, 2018 and 2019 is 49.00%; 51.36% and 54.05% (Puspendik, 2019). Criterion $0\% \leq value \leq 55\%$ is categorized as less (BSNP, 2019).

This fact shows that HOTS in Indonesia is still not as expected. Therefore, innovation is needed in the learning process to support HOTS. Innovations used in the learning process must be in accordance with education 4.0. One such innovation is ICT (Information, Communication and Technology). Southeast Asian Ministers of Education Organization or SEAMEO ministry of education in Southeast Asia recommended changes to deal with education 4.0 with the policy of"Adoption of the 21st-century Curriculum" therough digitally mediated learning.

Maximizing the learning of higher-order thinking skills (HOTS) with ICT has taken root and is emphasized in many developed countries such as the United Kingdom, the United States and Singapore (Ganapathy, Singh, Kaur & Kit, 2017). It should be noted that this assessment on the integration of ICT to promote HOTS in the education system has focused mainly on primary and secondary level teaching and learning. According to Ali (2012), using ICT in the teaching of HOTS is a promising way to apply the constructivist principles both for learning and teaching because it helps produce good learning outcomes.

Based on the background above, applying HOTS questions that encourage students to do reasoning, not just understanding and applaying and also in accordance with the de-

mands of 21st-century skills will be very important. Therefore, researchers are interested inexamining the relationship of Higher-order Thinking Skills (HOTS) assessment in reading with ICT.

Reading Assessment

Permendikbud No. 66 of 2013 states that the assessment of education is a process of gathering and processing information to measure the achievement of student learning outcomes. Assessment is very important because it will have a positive impact on teachers and students. Assessment has a role in classroom learning that is as a fundamental process needed to promote learning so that teachers will know the extent of student achievement during the learning process so that the effectiveness of a learning and assessment can also be known to build student skills for learning (CERI, 2008, p. 2 ; Jones, 2005, p. 4).

UNESCO (2017, p. 10) describes several categories of assessment summarized in the following table:

Table 1. Categories of Assessment

Categories of *Assessment*	Description
Classroom Assessment	Assessment conducted by teachers of students in daily leaning activities. For example, Oral questions from teachers, group activities, homework, daily tests and so on.
Examinations	Assessment is carried out to provide information in decision making that has an impact on individual students. For example, examination to determine grade promotion, college entrance exams, and so on.
Large-Scale Assessment	The large-scale assessment aims to provide information about the level system performance and related factors, usually associated with a set of agreed standards. For example, international assessments of students achievement levelssuch as PISA (Program for International Student Assessment), etc.

Source: UNESCO, 2017, p. 10

Based on table 1, classroom assessment is an assessment within the scope of the class that gives an important role because it is done in the classroom during the learning process. This classroom assessment is the first assessment faced by students before examinations and large-scale assessment.

In classroom assessment, students need to be given challenging tasks to be able to think at a High-Level because, in the implementation of the 2013 curriculum, learning must be oriented to higher-order thinking skills (Kemendikbud, 2018, p. 2). This shows that the ability to think-High-Level (High Ordered Thinking Skills / HOTS) is a very important ability that must be considered by teachers in making assessments so that students are able to achieve higher-level thinking.

Reading assessment has the same goals as the assessment of other learning. As in the case of assessments in other subjects, classroom assessment in reading assessment must also contain challenging assignments for the achievement of HOTS for students because in reading assessment, there is critical reading skills that have to be developed in classroom assessment (Alderson, 2000) and to achieve critical reading skills, students need to have HOTS. Abdullah (1994, p. 291) listed subskills in critical reading skills as follows:
1. The ability to evaluate deductive inferences
2. The ability to evaluate inductive inferences
3. The ability to evaluate the soundness of generalisation
4. The ability to recognise hidden assumptions
5. The ability to identify bias in statements
6. The ability to recognise author's motives
7. The ability to evaluate strength of arguments

Besides critical reading skills, in reading assessment students need to have creativity, for example students retell the story that were read with their own language can show that students canreorganize existing things (in this case, story elements like plot, characters, and setting) to make something new (Brookhart, 2010, p. 56).

Higher-order Thinking Skills (HOTS)

Higher-order Thinking Skills (HOTS) is the ability to think that does not only emphasize recall and restate or refer without processing (Kemendikbud, 2017, p. 3). Brookhart (2010, p. 3-8) HOTS is defined in three categorize as follows:
1. Transfer (meaningful learning) because

students do not only recall but have meaningful understanding.
2. Critical thinking becase student have to apply wise judgement or produce a reasoned critique.
3. Problem solving because student have to

solve problem that related in real life and work creatively.

Anderson &Krathwohl (2001, p. 68) explain the cognitive domains in bloom taxonomies categorized by HOTS in the following table:

Table 2. Cognitive Domain in Taxonomy Bloom

Cognitive Domain	Categories	Definition
C4 (*Analyze*)	*Differentiating*	Distinguish relevant parts from those that are not relevant or important parts from those that are not important
	Organizing	Recognize how elements fit or function in a structure
	Attributing	Determine the point of view, bias, values or intend that underlies the problem presented
Verbs in C4: Solve, Analyze, Diagram, Correlate, Examine		
C5 (*Evaluate*)	*Checking*	Check the consistency of a process or product with existing standards and detect the effectiveness of the process or product
	Critiquing	Criticize a process by testing, detecting the suitability of the procedure with the given problem
Verbs in C5: Compact, Predict, Interpret, Assess, Decide		
C6 (*Create*)	*Generating*	Presenting alternative hypotheses based on criteria by generalizing a particular of phenomena
	Planning	Design procedures in solving a problem
	Producing	Creating a product
Verbs in C6: Generalize, Design, Construct, Formulate		

Source: Anderson&Krathwohl, 2001, p. 68

In HOTS, students are certainly expected to be able to fulfill all cognitive domains because HOTS is a skill that students must have in the 21st century. In addition, Kemendikbud(2017, p. 1) also stated how important

HOTS was to broaden students' thinking.

PISA results show Indonesian students have not yet reached HOTS. PISA Indonesia 2009-2015 results in the domain of reading literacy can be seen in the following table 3:

Table 3. Result of PISA Indonesia in Domain of Reading Literacy 2009-2015

Year	Indonesian Average Score	International Average Score	Indonesian Rank	Total Participants
2009	402	493	57	65
2012	396	496	64	65
2015	397	493	62	70
2018	371	487	73	78

Noted: Result of PISA in Indonesia in Domain of Reading Literacy, source by OECD, 2010, 2014, 2018&2019

If seen from the two tables above, the ranking of Indonesian students when compared to other countries participating in PISA is still in the low category. Mendikbud (2014) has also reflected that in the PISA 2009 results almost all Indonesian students were only able to finish up to level 3.

This is due to the lack of HOTS in reading assessment on English textbook. Anasy

(2016) found from 157 essay reading exercises the HOTS problem is only 15 essay where 12 essay is categorized C4, 3 essay is categorized C5 and no essay is categorized C6.

Even though, HOTS must be more integrated into school programs at every level even from kindergarten and on various learning (Resnick, 1987, p. 48) including on

English language learning which involving reading assessment. Students will not be able to have high-level thinking skills (HOTS) if teacher is only fixated on the textbook and there is no stimulation from the teacher in learning in class. Therefore, it is very much needed an alternative in learning so that HOTS students can further develop.

Information and Communication Technology (ICT)

Education 4.0 is education influenced by the industrial revolution 4.0, characterized byeducation that utilizes more digital technology in learning. The use of this technology enables the learning process to take place any time and any where, meaning that learning is not only in the classroom and during study hours. Future-oriented education has significant characteristics, one of which is technology (Singh, 1991, p. 11).

Education 4.0 demands the importance of improving 21st-century skills. In the context of 21st-century learning, technology is one of the abilities that must be mastered and applied in learning (P21, 2018). To deal with education 4.0, the Southeast Asian Ministers of Education Organization or SEAMEO's ministry of education in Southeast Asia recommended changes in curriculum.The outcome of SEAMEO's policy on curriculum was the "Adoption of the 21st-century Curriculum", through the use of digital classes in learning. This is under the recommendation of UNESCO (2014) which states thatICT is expected to improve the quality of knowledge, knowledge deepening, knowledge creation and development in 21st-century skills.

Tinio (2003: 3) argues that ICT can help learning become an active, fun and interesting process and can be linked to real life. This is because ICT can visualize something abstract for students so that conditions will be created conducive to students' mentality during learning because students are able to see material related to daily life through ICT.

In addition to helping to create conditions for learning that are conducive to students' mentality, the second important role of information and communication technology in the learning process is to provide a set of media and tools to facilitate and accelerate student work, and of course to provide skills in using high technology (advanced skills). According to Reeves (1998:1-3), for the sake of learning in schools, there are two main approaches in the use of technology, namely students can learn 'from' and 'with' technology. Learning 'from' technology is carried out as in the use of computer-based instruction (tutorials) or integrated learning systems. Learning 'with' technology is to use technology as cognitive tools and use technology in constructivist learning environments.

Relationship Reading Assessments HOTS with ICT

The use of ICT in reading assessment should not be ignored by educators. Queensland Government (2018), ICT in reading is used in the form of pieces of digital text such as eBooks and online article which give students the opportunity to read anytime and anywhere without space and time limits and introduce students to online environment in positive terms.

One of the abilities in learning including reading skills that are currently being demanded for 21st-century prowsess is Higher Ordered Thinking Skill (HOTS). P21 (Partnership for 21st-century Learning) develops the learning framework in the 21st-century as follows:

Figure 1. Framework Learning 21st Century

Figure 1 above shows the 21st-century learning framework that in addition to having technological abilities, students must also master 4Cs, namely Critical Thinking, Communication, Collaboration, and Creativity. Whereas critical and creative thinking are the two characteristics that underlie higher-order thinking skills (HOTS) (Brookhart, 2010, p. 14). When students apply both of these skills means students have applied HOTS.

To complete the P21 framework in accordance with the demands of Education in Indonesia, based on the results of the document review in the National Education System Law, Nawacita, and RPJMN for Basic, Secondary and Higher Education, 2 additional standards and aspects of skills were obtained in accordance with the Curriculum and Government policies (Kemendikbud,

2018, p. 16). As well as based on the results of a study of three documents (P21, enGauge-21CS, and ATC21S) and group discussions with a two-round Delphi study, experts have established indicators on each skill domain (Afandi, Sajidan, Akhyar & Suryani, 2019). Overall, the P21 standard in Indonesia was formulated as the Indonesian Partnership for 21st-century Skills Standard (IP-21CSS).

Table 6. Framework Indonesian Partnership for 21 Century Skill Standard (IP-21CSS)

Framework 21st Century Skills	IP-21CSS	Aspects	Indicator
Critical Thinking (C4, C5) and Problem Solving		1. Effective reasoning 2. Using systems thinking 3. Making judgments decision 4. Solving Problems	1. The ability to associate, investigate, interpret, and examine claims, arguments, evidence, and data uses a rational thought process to decide whether to believe or not and to find the best solution
Creativity Thinking and Innovation (C6)	4Cs	1. Thinking creatively 2. Working creatively with others 3. Implementing Innovation	1. The ability to design new ideas or produce new products independently or in groups (this ability involves many forms, including modification, and discovery)
Communication and Collaboration		1. Communicating clearly 2. Collaborating with others	1. The ability to collaborate with others in order to share knowledge, experiences and information that enrich personal qualities.
Information, Media and Technology Skills	ICTs	1. Accessing and Evaluating information 2. Using and Organizing information 3. Analyzing and Producing media 4. Applying technology effectively.	1. The ability to access and assess information from various sources accurately and critically, use technology in online learning outside the classroom, and use different technological tools, especially digital technology 2. Ability to apply various models, methods, and learning strategies that utilize digital technology and information.

Source: Kemendikbud, 2018, p. 14 &16; Afandi, Sajidan, Akhyar & Suryani, 2019

From table 6 above it can be seen that the ability to think at a High-Level in this case critical thinking and creativity and the use of ICT are inseparable aspects in the demands of Indonesian education today.

Regarding HOTS and ICT, Ali (2012) conducted a study by introducing HOTS through the use of ICT as a promising platform because it helped produce good learning outcomes. The results show that the use of ICT by teachers has a positive impact on students' HOTS. The other research also conducted by Rahmatina (2017) shows that the use of ICT can improve students' higher-order thinking skills because students can demonstrate, design and produce various alternative solutions to the problems given. Demonstrating including the aspects of communicating clearly, designing includes aspects of implementing innovation and producing alternative solutions to these problems including aspects of making judgments and decisions. Aspects of communicating clearly include communication and collaboration, implementing the innovations included in creative thinking and innovation (C6) and including making judgments and decisions in critical thinking (C5) and problem-solving (Kemendikbud, 2018, p. 16).

CONCLUSION

ICT can be used as a solution in developing HOTS in reading assessment. The purpose of the ICT-based Higher-order Thinking Skills (HOTS) in reading assessment is that ICT is used as a medium as well as the abilities students must have in HOTS in reading assessment. Based on what has been described previously, ICT is a world demand in the era of education 4.0 and also 21st-century skills. In addition to technology-based 21st-century skills also require learning by developing HOTS therein.

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