Reading and Online Research Comprehension: A Review of the Theory and Its Implications for Reading Comprehension Learning in the New Literacy Era

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Abstract. This paper focuses on the analysis of the online research and comprehension theory development initiated by Donald J. Leu in 2007-2015 and its implications on reading comprehension learning in the new literacy era. The method used in this analysis is Lasswell's "5W" model. The results of the analysis showed that in 2007-2015, there was a change in the terms used from 'online reading comprehension' to 'online research and comprehension' and finally to 'reading and online research comprehension'. No substantial changes were found with regard to the concept of the theory. The analysis on the implications showed that the theory had impacts on the demands of competencies that must be mastered by both teachers and students to adapt. Adaptation especially to changes in the new literacy era in relation to reading comprehension. From the discussion, we can concluded that the theory can be used as a reference to be adapted in learning reading comprehension in Indonesian classrooms.

Keywords: Donald J. Leu; new literacy era; online reading comprehension learning; reading and online research comprehension.

1 Introduction

The rapid technology development along with the high changes in the social life demand a redefinition of literacy. The right definition can ease the construct development of the new literacy concept. This can be advantageous to learn it systematically in order to increase the equality and access to create current and future generation who are literate and can adapt to the development era.

Previously, literacy was simply defined as read, write, and communicate effectively capabilities[15][14] . Literacy skills (reading and writing) has been defined as abilities that have

many benefits [30]. In this new literacy era, this definition has evolved to include the ability to take advantage of various technological applications and process various information sources on the internet [9]. In other words, someone can be considered literate if they have to read, write, and communicate capabilities by utilizing various technology applications and information channels available on the internet such as Google, Chrome, Facebook, Twitter, Instagram, Skype, Zoom, Microsoft Teams, and so on.

This definition will certainly continue to evolve in line with future technological developments. That is, if someone is called literate today, it is not certain that he will be considered literate in the future. The concepts and constructs about literacy will continue to develop and expand every day in various fields, including education. The knowledge and ability to adapt to new concepts in the new literacy era will determine the important role of an educator in the classroom, which will certainly determine the future of the learners [27]. This is an important reason why an educator needs to have the knowledge and ability to adapt to new literacy concepts.

One of the important skills that need to be mastered by educators and students in this new literacy era is the ability to read comprehension. Reading comprehension activities in the new literacy era have a slightly different perspective from reading comprehension activities in general. In the new literacy era, reading comprehension activities are projected on a problem-based research process that includes new skills, strategies, and social practices as someone uses the internet to solve a problem and answer everyday questions [6]. This concept was then introduced by Leu [27] as online research and comprehension (ORC) and was developed into reading and online research comprehension (RORC) by Kanniainen [17].

To fully understand of the reading and online research comprehension theory and its implications for learning to read in the new literacy era, a descriptive review of the theory development needs to be conducted. Based on the explanation, this article aims to answer: (1) How is the development of reading and online research comprehension (ORC) theory? (2) What are the implications of reading and online research comprehension theory on learning to read in the new literacy era? The results of the presentation in this paper are expected to be used as reference material for further research.

2 Research Method

To answer the research questions, a critical analysis method of literature was used by adapting Lasswell's theory [22], namely the "5W" model with elements of theoretical questions used are "who", "says what", and "what effect". The design chosen is descriptive critical analysis of the comparison of messages (theory) from the same source at different times. The theory being compared is the theory of ORC proposed by Donald J.

Leu from 2007-2015, as well as the development of the latest term into RORC. [17]. In addition, the implications of the analytical review results related to the theory on learning to read and comprehension in the new literacy era were also analyzed.

3 Result and Discussion

This section describes the descriptive review results related to the development of ORC theory which was coined by Donald J. Leu from 2007-2015, as well as the expansion of the latest term into RORC. The results of the analysis review are then linked to the theoretical implications of reading comprehension learning in the new literacy era.

3.1 Donald J. Leu and Online Research and Comprehension (ORC) Theory

ORC is a theory that develops through the basic theory of online reading comprehension. The theory was first proposed by Donald J. Leu in 2007 [6]. Leu is an expert in literacy and technology and his research focuses on new skills in reading, writing, and learning related to the internet and technology. He has published many publications related to literacy and online reading and research comprehension.

From 2007 to 2014, Leu and several other researchers used the term online reading comprehension in their research. Leu [6] said that this ORC appeareddue to the large amount of information that appeared online so that certain skills were needed, such as the ability to read comprehension online. This skill is expected to reveal more specific information that is read online. In addition, new skills are needed to criticize and evaluate reading material online. From this perspective, online reading is described as a problem-based research process that requires new skills to solve problems using the Internet. [24]. In addition, online reading activities are very complex compared to conventional reading (offline) because they require readers to think more critically [8][12]. However, Beers and Probst [4] and Dwyer [11] asserted that activities in online reading comprehension are not only reading texts online, but they are more complex and extensive.

Some of the facts behind the emergence of this theory of ORC are therapid growth of today's online readers. This rapid online readership is also closely related to the new era of literacy, which changes the reading, writing, and communication patterns of peoplewho were originally conventional to follow technology development. [21]. This rapid technological development creates new media [20], which change reading activities from conventional to digital. Especially in the academic field, online reading sources are the main

reference in the digital era learning [3]. This is why the online reading comprehension theory was created. Therefore, a deeper understanding of conventional and digital reading is needed [25][23].

There are five stages in the practice of ORC, namely reading to (1) construct useful questions/problems, used to read the important parts of questions/problems; (2) locate information, read to find information as needed; (3) critically evaluate online information, requires the reader to criticize and evaluate the information obtained; (4) synthesize online information, requires readers to synthesize information obtained from various online media; (5) use new technologies to communicate information, readers communicate online through a variety of online media [5][26].

The term ORC has undergone significant changes since 2013. The term changes to RORC are based on the need to prepare students to achieve educational standards in the 21st century. This new term was initiated as a form of theoretical renewal which initially only focused on online reading and new literacy. This theory was then developed by including another focus such as an assessment of reading through the internet. This refers to the school needs that must prepare students to think critically and be digitally literate [27]. However, online reading comprehension is also known as online research and comprehension because online reading should be integrated with offlinereading. This refers to the characteristics of online readers, which are based on research and problem-solving tasks [6]. Online readers will continue to explore and interpret what is read offline [19].

The emergence of RORC theory is due to the fact that the term ORC creates a lot of confusion, including contrasting offline reading comprehension with online reading comprehension in the context of new literacy. In fact, the two activities are different activities even though they are related [7]. This theory was initiated and harmonized with new literacy and is one of many literacy theories [19]. Hence, it can be said that online research and comprehension is explicitly defined as online reading skills that refer to the Common Core Reading Standards with an assessment [28]. While in practice, there is no significant difference with the previous theory.

The latest development on the term RORC was presented by Kanniainen [17]. The term online research and comprehension evolved into reading and online research comprehension. The researchers think that previous theories about how online reading relates to reader understanding need further investigation. Therefore, the researchers created a new term, namely reading and online research comprehension as a new instrument to be investigated. It was found out on his research that reading and online research comprehension was more

challenging than the reading comprehension in general. This finding referred to the previous research focusing more on the online reading skills which is considered less concerned about its learning condition [2].

Kanniainen [17] revealed that there are several parts that need to be considered to measure online reading comprehension activities. First, pay attention to the reading sources. Reading sources must come from online internet sources. The reading sources in this assessment are divided into four sources. Each reading material comes from a different source. While the assessment variables in RORC are locating, evaluating, synthesizing, and communicating [27]. The reading to construct useful questions variable is not included in the assessment because it is considered to have been represented by the implementation of the task in the second variable, namely locating information.

3.2 The Implications of Theory for Learning to Read in the New Literacy Era

The development of reading theory and online research comprehension is influenced by the rapid development of information and communication technology and social practices of society. This certainly has an impact on the practice of learning to read in schools, both for educators and students.

For educators. The demands for rapid adaptation to all changes inevitably encourage educators to adapt learning to read in the classroom. Educators must prepare various learning components ranging from models, strategies, approaches, teaching materials, to learning evaluations that are in line with the demands of reading comprehension skills in the new literacy era. This is because students get influenced by various aspects of learning, so it is necessary to think about it with a mature concept [33].

In the practice of learning to read in the classroom, educators are required to have the ability to access not only manuals but also digital information sources. For example, the ability to access e-books (electronic books) and e-libraries (digital libraries) as well as various other sources and channels of information. The learning approach is no longer teacher-centred but must shiftto student-centred approach. Learning must be part of the learning process that optimizes the activeness and creativity of students [10]. Students should be given the widest possible space to be able to have a high-level thinking (creative, critical thinking, communicative, and collaborative) in finding and processing information from various media and convey ideas productively and responsibly. The practice of collaborative learning to read is actually not a new thing [32]. The difference can be shown by the use of digital sources and media.

Learning to read strategies in the classroom can be combined with interactive learning that utilizes various digital channels, for example Learning Management System (LMS) or web-based learning. This will be a positive stimulus for students and this is a prerequisite for

the more effective learning process [1]. For evaluation, educators can also take advantage of various digital application facilities such as email, Wikipedia, Kahoot, Quizizz, and various social media such as Facebook, Instagram, Twitter, and others. Learning innovations such as the example above need to be continuously developed by educators because they are one of the key factors for learning success [34].

For students. In the new literacy era, students cannot rely on one source of information only since they are required to be able to understand and utilize various sources of information to solve everyday problems. Therefore, students need to acquire the ability to read and understand from a variety of sources and channels of information.

As explained in the previous theoretical review, there are at least five skills that must be honed by students in this new literacy era based on the theory of reading and online research comprehension. These abilities are (1) to identify questions/problems; (2) to find information; (3) to evaluate information; (4) to synthesize information; and (5) to communicate information [17][26][18] as shown in fig. 1 below.

Fig. 1. Abilities that must be mastered in the new literacy era according the
Reading and Online Research Comprehension theory (6)

First, the ability that must be mastered by students is to identify questions/problems. These questions/problems will direct students to engage with texts or online sources of information [17][31]. Proper identification of the information presented in the question/problem will make it easier for students to find the right information.
Second, the ability to find information that is relevant to the question/problem. In order to be able to find relevant information, students need to determine the right keywords to enter into search engines [17][32].
Third, the ability to evaluate information that has been collected from various online information sources. Students must think critically at this stage to ensure that the information that has been obtained is credible [17][13].
Fourth, the ability to synthesize information from various sources in which its credibility have been compiled and evaluated. At this stage, students must think critically and creatively by

comparing information from various online sources. Students need to explore various texts with diverse perspectives to compare and distinguish between information in one text and another [17],[31].

Fifth, the ability to communicate information that has been synthesized by communicating and interacting with other students. At this stage, students are required to collaborate and communicate through various information networks such as email, social media, scientific forums, and others [17][27].

Based on the explanation, there are several aspects that need to be considered by educators and students in order to respond to new concepts related to the theory of reading and online research comprehension. First, educators can prepare teaching components that can support the implementation of digital learning. Second, students can train themselves to improve digital literacy competencies and higher-order thinking skills.

4 Conclusion

The theory presented by Donald J. Leu and his team regarding reading and online research comprehension clearly provides new insights concerning the demands for changing concepts and practices of reading comprehension in this new literacy era. The theory development that took place in the period 2007-2015—though not conceptual in nature—is enough to prove that the theory developed by Donald J. Leu is not a stagnant and static theory. On the other hand, Donald J. Leu proves that the theory of reading and online research comprehension is a dynamic theory and develops progressively in line with the new literacy issues that continue todevelop. Thus, we can concluded that the theory of reading and online research comprehension proposed by Donald J. Leu can be used as a reference to be adapted in the context of developing reading comprehension learning in the new literacy era at various education levels in Indonesia.

Based on these conclusions, it is suggested for further researchers to develop studies related to the implementation of reading comprehension theory and ORC in the practice of learning reading comprehension at various levels of education. In addition, educators who are currently still using conventional reading comprehension learning patterns can shift to digital reading. Adjustment of approaches, models, strategies, teaching materials, to the evaluation of reading learning needs to be done by educators immediately in order to answer the challenges of competence in the new literacy era. For students, current developments require the mastery of five skills in reading comprehension in the new literacy era as contained in the theory of reading and online research comprehension through higher-order thinking activities: critical thinking, creative, collaborative, and communicative.

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