Critical reading skill and discovery learning method at elementary schools based on an Android-application: A computerization approach

E Elhefni1, 2, *, Z Zulela1 and S Sumantri1

1 Pendidikan Dasar, Universitas Negeri Jakarta, Jl. Rawamangun Muka, RT.11/RW.14, Rawamangun, Pulo Gadung, Kota Jakarta Timur, Daerah Khusus Ibukota Jakarta 13220, Indonesia
2 Pendidikan Guru Madrasah Ibtdaiyah, Universitas Islam Negeri Raden Fatah Palembang, Jl. Prof. K.H. Zainal Abidin Fikri KM.3,5 Palembang, Sumatera Selatan 30126, Indonesia

*elhefni@radenfatah.ac.id

Abstract. This study discusses the implementation of the method of discovery learning in critical reading learning in Indonesian language lessons in elementary schools. This study aims to determine the improvement of critical reading skills of fifth-grade students of elementary school through discovery learning methods and to find out the implementation of discovery learning methods in improving critical reading skills of fifth-grade students in elementary school. The method used in this study is the Elliott model action research method. The action research was carried out on 32 fifth graders at one of the Islamic private elementary schools in Palembang, Indonesia. Based on the results of the study, it can be concluded that the use of discovery learning methods in critical reading learning can improve students' skills in critical reading. Thus the results of this study can be recommended to elementary school educators to use this discovery learning method in critical reading learning in Indonesian language lessons in elementary school. In addition, the discovery learning guide can also be used to facilitate the learning process.

1. Introduction
Reading learning is one of the focuses of language learning which plays an important role in elementary school. This skill is an activity that is very necessary for anyone who wants to advance and improve themselves. According to Deporter, reading learning in elementary schools has a very important role. The development of mental abilities in adulthood causes humans to be able to overcome greater challenges [1]. According to Bond, the ability to read well is one of the most valuable human achievements because our world is the world of reading [2]. Learning to read in the elementary school class needs to get the attention of the teacher. According to Slamet, the teacher must strive to be able to provide a basis for adequate reading skills to students [3]. Likewise, according to Jinxiu and Zhengping, learning to read needs to be considered because learning any subject will be involved in many readings "[4]. One of the reading skills that must be possessed by students is critical reading skills.

Critical reading skills will bring students who think critically. These critical reading skills should be taught to elementary school students and also to students of various ages. This is as stated by Zabihi and Bordi that the importance of providing critical reading assignments and activities of various ages"[5].
According to King et al., critical reading is a reading activity that involves the process of analysis and evaluation and requires the reader to give considerations to the quality of the content and style of the text that is read based on valid criteria [6]. Critical reading skills must be mastered by students to get the correct information from the source of the reading material. Students' skills in critical reading will bring students who think critically. Critical thinking is a process of intellectual discipline that actively and skillfully conceptualizes, applies, analyzes, synthesizes, and/or evaluates information collected from the results of observation, experience, reflection, reasoning, or communication, as a guide to beliefs and actions [7], and involves thinking productively to evaluate evidence [8]. Cottrel also argues that critical thinking is cognitive activity related to using the mind [9]. Thus these critical reading skills need to be nurtured since students are still in elementary school so they can think critically. Critical reading is the key to productive thinking and the most important part of reading activities. In critical reading, the reader is required to understand the text, think of the text being read, the determination of right and wrong in the text, interpretation, and scoring of opinions or knowledge.

Furthermore, based on the results of several studies conducted by researchers, among others, Duran and Yalcintas suggested that critical reading skills can contribute to students' critical thinking skills [10]. This critical thinking ability is useful to determine the truth and change information and can generate new ideas [11]. Akin, Koray, and Tavucau also stated that being skilled in critical reading can improve student learning achievement [12]. Likewise, according to Macknish that being skilled in critical reading is considered to be able to support student studies and student reading skills [13]. Meanwhile, Comber and Nixon concluded that skills in understanding critical reading can help students answer selected questions in the text [14]. The same thing was also concluded by Kobayashi that critical reading skills can increase productivity in making the essence of their reading [15]. Thus, based on some of the results of the above research it can be concluded that critical reading skills can contribute significantly to students in supporting their studies.

Based on these rationales, this study was conducted to obtain information about improving the critical reading skills of fifth-grade elementary school students through discovery learning methods and to obtain information about the implementation of discovery learning methods in improving critical reading skills of fifth graders of Muhammadiyah 14 Elementary School Palembang, Indonesia. The solution found by researchers to overcome students' weaknesses in critical reading is by using the learner discovery method. Implementation of this discovery learning method is expected to help and encourage students to find various concepts and ideas to develop aspects of exploration and experimentation with knowledge [16], can effectively help students learn [17], and can improve student activity, as well as improve student learning skills [18]. Furthermore, Sani also argues that the discovery learning method can be applied by integrating elements of the scientific approach to learning. The scientific approach elements include observation, asking questions, trying/gathering information, reasoning, and communication [19]. Based on some of the opinions above, the implementation of the discovery learning method is expected to be a solution in improving students' critical reading skills in learning Indonesian.

2. Method

This study used an action research design with Elliott's action model [20]. The goal is to solve problems or improve the situation at hand [21] and to improve student learning outcomes [22]. The location of the study was the Muhammadiyah 14 Palembang Elementary School located on Jalan Jenderal Sudirman Km. 4.5 Complex Balayudha Palembang, Indonesia. The subjects of this study were 32 fifth grade students D, odd semester 2018/2019 academic year at Muhammadiyah 14 Elementary School Palembang. They were given action by using discovery learning methods to improve their critical reading skills. The stages of the learning process of critical reading discovery learning methods include the following phases: (1) stimulation, (2) problem statements and formulating hypotheses; (3) data collection; (4) data processing, (5) verification, and (6) generalization [23,24]. Students' critical reading skills are measured using tests in the form of essays consisting of 12 question items. The 12 items indicated 12 indicators of critical reading skills, namely (1) writing important information contained in the text, (2) writing the main ideas of the text and explanatory sentences, (3) making conclusions based
on information in the text, (4) identifying literary sources, (5) the consistency of the author in using key terms, (6) identifying the author's goals, (7) showing the compatibility between the main ideas and the situation at hand, (8) verifying information in the text, (9) identifying statements about the facts made, (10) recognize reading characters, (11) understand causal relationships, and (12) provide main ideas / reading themes [25]. Critical reading skills are measured using initial test scores, post-test cycle one, and post-test cycle two which are analyzed using the percentage formula. Students are considered to have achieved completeness criteria if they have achieved an average score above 75.

3. Result and discussion
The critical reading skills test is given in three stages: (1) pre-cycle test, (2) cycle 1 test, and (3) cycle test 2. Recapitulation of the average score of the pre-cycle test, post-test cycle 1, and post-test cycle 2 is presented in the following figure 1.

Figure 1. Comparison of scores before action, post-test cycle 1, and post-test cycle 2.

Figure 1 shows that the average score of critical reading skills obtained by students before the application of the discovery learning method is 62. Based on the results of the test it is known that 11 students (34%) are already skilled in critical reading and 21 students (66%) are not skilled in reading critically. This shows that the percentage of students who are not skilled is higher than students who are skilled in critical reading. Based on this, researchers and collaborators consider it necessary to apply the discovery learning method to overcome this problem.

Furthermore, based on the results of the post-test cycle 1, there were 17 students (53%) who were not skilled in critical reading and 15 (47%) students who were skilled in critical reading. Meanwhile, in cycle 2, students' skills in critical reading increased significantly, namely, 29 students (91%) were skilled in critical reading and only 3 students were not skilled (9%).

The following figure 2 shows the score of each indicator that has been achieved starting from pre-action, cycle 1, and cycle 2.
Figure 2. Comparison of the average score in each indicator of critical reading skills before the action, after the cycle 1 action, and after the cycle 2 action.

Figure 2 shows that there are significant differences in the average score of indicators of critical reading skills between pre-cycle, post-test cycle 1, and post-test cycle 2. Based on the results of this test it is known that there is an increase in the average score of the indicator. The average score of the indicator in the pre-cycle stage is 62. Furthermore, after the action with the discovery learning method in the first cycle increased by 66 and in the second cycle 84.

Based on figure 1 and figure 2 above, it can be seen that there was a significant increase in the average score obtained by students in cycle 2. This significant increase in average score was obtained through the use of discovery learning methods which were assisted by (1) learning guidelines the discovery of critical reading skills, (2) learning media in the form of laptops and projectors, and (3) giving rewards, while in cycle 1 learning was carried out using discovery learning methods assisted by color paper media. Increasing the score of learning outcomes and the indicator score of critical reading skills obtained by students before being given action and given action in cycle 1 using the discovery learning method has been able to improve students' critical reading skills. However, the score obtained cannot yet reach the completeness score criteria. This is because students have not maximally completed the test in accordance with the steps of the discovery learning method.

Next in cycle 2, researchers and collaborators make improvements in the use of the discovery learning method. The method is complemented by adding guidance on learning to find critical reading skills. This is similar to what was stated by Mayer that guided discovery learning is more effective in helping students learn [17] and according to Alferi et al. the use of discovery learning with help will show the expected results [26]. The learning process with this discovery learning method uses the help of learning guidelines for finding critical reading skills, learning media in the form of laptops and projectors, and giving rewards.

4. Conclusion

The findings of this study indicate that students' critical reading skills in cycle 1 score average student learning outcomes and the average score of indicators achieved by students is 66. Furthermore, the average score of learning outcomes obtained by students in cycle 2 is 85 and averages the average achievement indicators of critical reading skills achieved by students is 84. A significant increase in cycle 2 is because the learning process uses guidelines for learning the discovery of critical reading skills, learning media in the form of laptops and projectors, and giving rewards. Thus, based on data obtained from cycle 1 and cycle 2 it was concluded that critical reading skills could be significantly
improved by using discovery learning methods assisted with discovery learning guidelines, learning media in the form of laptops and projectors, and giving gifts to students.

References
[1] Deporter B and Hernacki M 2010 Quantum Learning: Membiasakan Belajar Nyaman dan Menyenangkan (Bandung: Kaifa)
[2] Subadiyono 2011 Peningkatan Pemahaman Bacaan dengan Menggunakan Pendekatan Interaktif (Yogyakarta: Pohon Cahaya)
[3] Slamet 2007 Dasar-Dasar Pembelajaran Bahasa dan Sastra Indonesia di Sekolah Dasar (Surakarta: LPP UNS dan UNS Press)
[4] Jinxiu J and Zhengping Z 2016 Principles and Implementation of Reading Activities in Primary School English Class English Lang. Teach. 9(12) 74–79
[5] Zabihi R and Pordel M 2011 An Investigation of Critical Reading in Reading Textbooks: A Qualitative Analysis Internatational Educ. Stud. 4 80–87
[6] King M L 1967 Critical Reading (Philadelphia and New York: J.B. Lippincot Company)
[7] Mulnix J W 2012 Thinking Critically about Critical Thinking Educ. Philos. Theory
[8] Santrock J W Educational Psychology 5th ed. (New York City: McGraw-Hill International Edition)
[9] S Cottrell 2005 Critical Thinking Skills Developing Effective Analysis and Argument (New York: Palcrave Macmillan)
[10] Duran E and Valçin-tag E 2015 Review of the Critical Reading Education in the Primary Schools1 Procedia - Soc. Behav. Sci. 174 1560–1566
[11] Florea N M and Hurjui E 2015 Critical Thinking in Elementary School Children Procedia - Soc. Behav. Sci. 180 565–572
[12] Akın F, Koray Ö and Tavuçuķ K 2015 How Effective is Critical Reading in the Understanding of Scientific Texts? Procedia - Soc. Behav. Sci. 174 2444–2451
[13] Macknish C J 2011 Understanding Critical Reading in an ESL Class in Singapore TESOL J. 2(December) 444–472
[14] Comber B and Nixon H 2011 Critical Reading Comprehension in An Era of Accountability Aust. Educ. Res. 38(2) 167–179
[15] Kobayashi K 2007 The influence of critical reading orientation on external strategy use during expository text reading Educ. Psychol. 27(3) 363–375
[16] Bruner J S 1977 The Process of Education (England: Harvard University Press)
[17] Mayer R E 2004 Should There Be a Three-Strikes Rule against Pure Discovery Learning? The Case for Guided Methods of Instruction American Psychologist 59(1) 14–19
[18] Balim A G 2009 The Effects of Discovery Learning on Students’ Success and Inquiry Learning Skills Eurasian J. Educ. Res. (35) 1–20
[19] Sani R A 2015 Pembelajaran Saintifik untuk Implementasi Kurikulum 2013, 3rd ed (Jakarta: Bumi Aksara)
[20] Elliott J 2001 Action Research for Educational Change (Buckingham: Open University Press)
[21] Erlam G, Smythe L and Wright-St C V 2018 Action Research and Millennials: Improving pedagogical approaches to encourage critical thinking Nurse Educ. Today 61 1–19
[22] Nasrollahi N N, Mohammad A and Krish P 2012 Action research in language learning Procedia - Soc. Behav. Sci. 47 1874–1879
[23] Priyatni E T 2014 Desain Pembelajaran Bahasa Indonesia dalam Kurikulum 2013, 1st ed. (Jakarta: Bumi Aksara)
[24] Nuryakin and Riandi 2017 Improving Middle School Students’ Critical Thinking Skills Through Reading Infusion-Loaded Discovery Learning Model in the Science Instruction in Journal of Physics: Conference Series, 2017 812(1)
[25] Oliveras B, Máequez C and Sanmartí N 2011 Critical Readind Activities To Develop Critical Thinking in Science Classes,” in The ESERA 2011 conference 100–106

[26] Alfieri L, Brooks P J, Aldrich N J and Tenenbaum H R 2011 Does Discovery-Based Instruction Enhance Learning? J. Educ. Psychol. 103(1) 1–18