

DEVELOPMENT OF TEACHING MATERIALS BASED ON THE RADEC MODEL TO IMPROVE THE HOTS OF GRADE V ELEMENTARY SCHOOL STUDENTS

Hasanatul Fitri^{1*}, Yanti Fitria², Solfema³, Elfia Sukma⁴

^{1,2,3,4}Universitas Negeri Padang

¹Hasanatulfitri93@gmail.com

Abstract

Challenges and changes in the 21st century require students to have 4C skills (Critical Thinking, Collaboration, Communication, and Creativity). These 4C skills are closely related to HOTS or higher-order thinking skills. Familiarizing students with HOTS skills in making decisions will be able to act quickly and efficiently compared to students who are less trained in HOTS thinking. These HOTS skills should be loaded into RADEC-based teaching materials. However, its application is still not optimal at the SD level. This study aimed to develop teaching materials based on the RADEC model (Read, Answer, Discuss, Explain and Create) to improve the good high-order thinking skills of fifth-grade elementary school students. The model used in this development research is the 4-D development model. It is a model that defines, designs, develop, and distributes information. Sixty-one fifth-grade students from SDN 35 Payakumbuh, SDN 13 Payakumbuh and SDN 07 Payakumbuh participated in this study. The products developed are tested for validity using validation sheets from material experts, linguists, and media experts. This validation sheet is used to determine the validity of their answers. Material expert validation scored 94% in the "very valid" category. For linguists, it was 95% in the "very valid" category, and media experts got 93% in the "very valid" category. This proves that RADEC Model-Based Teaching Materials To Increase Student HOTS Class V SD should properly be used as teaching materials in elementary schools.

Keywords: Teaching Materials; RADEC Model; HOTS; Elementary School Students

Abstrak

Tantangan dan perubahan pada abad ke 21 ini mengharuskan siswa memiliki keterampilan 4C (Critical Thinking, Collaboration, Communication, dan Creativity). Keterampilan 4C ini sangat erat kaitannya dengan HOTS atau kemampuan berfikir tingkat tinggi. Membiasakan siswa untuk memiliki keterampilan HOTS dalam mengambil keputusan maka akan dapat bertindak cepat dan efisiensi jika dibandingkan siswa yang kurang dilatih dalam berpikir secara HOTS. Keterampilan HOTS ini harusnya dapat dimuat kedalam bahan ajar berbasis RADEC. Namun, penerapannya masih belum optimal pada jenjang SD. Tujuan penelitian ini adalah untuk mengembangkan bahan ajar berbasis model RADEC (Read, Answer, Discuss, Explain and Create) untuk meningkatkan kemampuan berpikir tingkat tinggi siswa siswa kelas V sekolah dasar yang valid. Model yang digunakan dalam penelitian pengembangan ini adalah model pengembangan 4-D. Ini adalah model yang mendefinisikan, merancang, mengembangkan, dan mendistribusikan informasi. Sebanyak 61 siswa kelas V dari SDN 35 Payakumbuh, SDN 13 Payakumbuh dan SDN 07 Payakumbuh berpartisipasi dalam penelitian ini. Produk yang dikembangkan diuji validitasnya dengan menggunakan lembar validasi ahli materi, ahli bahasa dan ahli media. Lembar validasi ini digunakan untuk menentukan validitas jawaban mereka. Validasi ahli materi mendapat skor 94% kategori "sangat valid", dari ahli bahasa adalah 95% kategori "sangat valid" dan ahli media mendapat skor 93% kategori "sangat valid", Hal ini membuktikan bahwa Bahan Ajar Berbasis Model RADEC Untuk Meningkatkan HOTS Siswa Kelas V SD sudah selayaknya digunakan sebagai bahan ajar di sekolah dasar.

Kata Kunci: Bahan ajar; Model RADEC; HOTS; Siswa Sekolah Dasar

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Introduction

Changes come to education every decade. New advances, world problems, and educational challenges push educators to create new ways of teaching (Anggraini & Hudaidah, 2021). Changes that require every citizen to have the ability and knowledge to survive and compete with others. In the 21st century, students need to develop and improve communication skills, critical thinking and problem-solving, collaboration skills, and creative thinking abilities (Septikasari, R., et al., 2015) or known as the 4Cs including Communication, Critical Thinking, and Problem-Solving or critical thinking and problem-solving, Collaborative and Creative Thinking or also known as collaboration and creative thinking (Memori et al., 2020). Therefore, in the learning process, students are given provisions to develop 4C skills in everyday life. Therefore, teachers should adopt learning models that improve students' knowledge and skills. These skills are closely related to HOTS (Higher Order Thinking Skills) if studied further.

HOTS (*Higher Order Thinking Skills*) is an ability that can and enables students to participate in the 21st century (Agustin et al., 2021). Students learn to understand and think critically and to analyze, evaluate, and *create* (Indriani, 2021). HOTS, when linked to 21st-century skills, is very important. Teaching this HOTS ability is a must for teachers to their students. The application of HOTS can maximize performance and reduce student weaknesses. Students who are trained to think at a higher level in making decisions will act quickly and efficiently compared to students who are less accustomed to thinking at the HOTS level (Pratama, Y. A., Sopandi, W., Hidayah, Y., & Trihastuti, 2020). These HOTS skills can be loaded and developed through teaching materials. Teaching materials are various forms used to assist teachers in carrying out teaching activities (Fitria & Idriyeni, 2017) and make it easier for students to understand learning so that optimal learning objectives are achieved (Sasmito, L. F., & Asfuri, 2020). In addition, without adequate teaching materials, students will find it difficult to adjust to the learning process (Wulandari & Oktaviani, 2021).

However, its application is still not optimal at the elementary school level. Based on the results of observations in class V conducted in three schools on June 8 to 10, 2022, at SDN 13 Payakumbuh, SDN 35 Payakumbuh, and SDN 07 Payakumbuh. It was found that the teaching materials used did not fully contain HOTS skills because only teaching materials in the form of teacher and student books were used. Furthermore, in the same school, an interview was conducted with the fifth-grade teacher, and the teacher complained when students answered the questions given because the answers were concise. Students are less able to analyze specific questions given by the teacher. And less able to provide arguments when question-and-answer activities take place. In the learning process, teachers are less varied in providing teaching materials as learning resources, so they have not been able to bring out students' analytical, critical and creative thinking skills. It can be seen that the teaching materials used only contain material and practice questions at the level of remembering, understanding, and applying, which are still at the Low Order Thinking (LOTS) level.

Then the researcher also analyzed the need for teaching materials through a questionnaire sheet given to teachers and students. The needs analysis questionnaire of teaching materials for students contains seven statements with three answer options: agree, doubt, and disagree. The statements include: 1) availability of teaching materials in the classroom, 2) enjoy learning with teaching materials, 3) enjoy teaching materials that contain reading texts that arouse curiosity, 4) enjoy interesting teaching materials, 5) like teaching materials in printed form, 6) like teaching materials that provide questions in writing and electronic form, 7) like challenging practice questions. Based on the statement above, students

answered with a percentage answer of 97% in statement 2 and 100% for the answer to statement 5. This shows that students are happy with the teaching materials in the classroom in printed form. As for other indicators in the agreed category, with percentage results showing more than 83%. Categories or answers to doubt and disagreement generally show a percentage of less than 10%.

In comparison, the questionnaire for analyzing the needs of teaching materials for teachers was also conducted in three schools with three teachers. The analysis of the needs of teaching materials for teachers shows that all teachers agree with the existence of teaching materials. This can be seen in the questionnaire presented. The teacher checked to agree on all existing statements. So from both, the questionnaire analysis of the needs for teaching materials for teachers and students based on the answers indicated that teachers and students need teaching materials to improve students' higher-order thinking skills.

Based on the explanation above, teaching materials that are not yet HOTS in elementary schools are a problem that needs to be resolved. Based on research conducted (Mufit & Wrahatnolo, 2020), low literacy causes students to lack HOTS skills. This is also reinforced by the PISA (*Program for International Student Assessment*) study, which shows that Indonesia's literacy results in the last three years are still low, namely ranking 2nd last out of 65 countries in 2012 with a score of 396. (Lia, 2015) & (Fuadi et al., 2020) and Indonesia in 2015, with a score of 379 ranked 64th out of 72 countries (Department of Education, I. P. A., & Hamka, 2018).

Thus, a solution is needed regarding teaching materials that can improve students' higher-order thinking skills, namely teaching materials developed using the RADEC model with the abbreviations Read, Answer, Discuss, Explain, and Create (Pohan, A. A., Abidin, Y., & Sastromiharjo, 2020). This learning model has a syntax according to its name, making it easier for teachers to remember the stages of the learning process. Previous research by (Mubiar Agustin., 2021) & (Triska Rindiana, and Muh. Husen Arifin, 2022) resulted that one of the positive effects of the RADEC learning model is the ability to think at a high level. Because of the RADEC model, students must be able to analyze and create. In this research, the development of teaching materials is carried out, which has novelty so that it is different from previous research. The novelty lies in the presentation of exercise questions as an online quiz using Barcode. This online quiz is suitable for application in the current technological era and is considered capable of providing innovation in learning.

Therefore, it is essential to conduct research entitled "Development of Teaching Materials Based on *RADEC* Model to Increase HOTS of Grade V Elementary School Students." The formulation of this research problem is the validity of the development of teaching materials based on the *RADEC model* to increase the HOTS of fifth-grade students in elementary schools. The purpose of this study is to develop teaching materials based on the *RADEC* model to increase the HOTS of fifth-grade students in elementary schools that are valid.

Research Methods

This type of research is development or R&D (*Research and Development*) (Sugiyono, 2013). The 4-D model used in this study was proposed by Thiagarajan and Semmel (Trianto, 2014) which includes four stages, namely. First, the *define* stage includes needs, student, and curriculum analysis. Second, the design stage includes preparing instruments and designing teaching materials. Third, the *development stage includes lesson plans*, teaching materials, and

validity testing. Third, the disseminate stage includes distribution to teachers' working groups in grade V elementary schools.

The data collection techniques of this research are observation, interview, and questionnaire. Observations were made to see the conditions in the field with an observation sheet, interviews were conducted with teachers and students directly with interview questions, and a questionnaire sheet was used to collect data. This research was conducted in November 2022 at SDN 07 Payakumbuh, SDN 35 Payakumbuh, and SDN 13 Payakumbuh. The subjects of this study were fifth-grade elementary school students totaling 61 students. The data source in this study is primary data obtained directly from the first source. The instrument of this research is to use a validation sheet to test the validity of teaching materials from 5 experts: three material experts, one language expert, and one media expert.

Data from expert validators, such as criticism, input, and suggestions, are analyzed and used as a reference to make teaching materials better. The validity (feasibility) of the development of teaching materials that have been developed can be seen from the validation sheet that the validator has filled in. The measurement scale uses a 4 (four) scale. Each statement has a score: 1 = less, 2 = enough, 3 = good, and 4 = very good.:

After the experts conduct validation, the results in the form of percentage scores obtained are interpreted based on the criteria on the validity test score with the category feasible or not feasible. In comparison, the technique in analyzing the data of this study is using quantitative descriptive techniques.

Results and Discussion

RADEC Model-Based Teaching Materials to Improve HOTS of Grade V Elementary School Students is one way to overcome the problems regarding teaching materials that need to be improved so that students have HOTS abilities. Therefore, it is necessary to develop *RADEC* mode teaching materials which previously in relevant research has been proven to be able to overcome the above problems. The *RADEC* model teaching material development stage is carried out using four stages known as the 4D learning model (Define, design, develop, and disseminate).



The first stage is defined by analyzing student needs, student analysis, and curriculum analysis. Needs analysis includes analyzing teaching materials circulating following the 2013 curriculum. Student and LKS books are the only ones used as a benchmark by teachers in the learning process. Student analysis includes the number of grade V students in the three schools where the research was conducted, SDN 07 Payakumbuh, totaling 21 students. SDN 13 Payakumbuh totaling 20 students and SDN 35 Payakumbuh totaling 20 students.


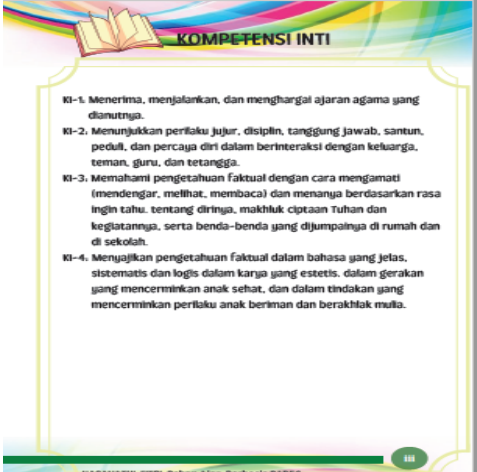

Meanwhile, the age of all students is 11-12 years old or children who have learning characteristics in the concrete stage. Generally, grade V students like to play and have an enthusiastic attitude. However, in the learning process, students are not accustomed to learning in groups and being invited to think critically. Furthermore, students cannot express opinions individually or in groups. This activity can be seen when the teacher asks students to stand in front of the class to convey things related to the learning at that time, but the student points to another friend to go to the front of the class. It can be indicated that students do not dare to present something. Then, very few students in the learning process properly pay attention to the teacher. Also, when the teacher gives students questions, students answer with short answers, and it seems that students are accustomed to relaxing and only copying short answers from the reading text that has been provided without being able to analyze and evaluate them. This defining stage is done by analyzing the curriculum and the essential

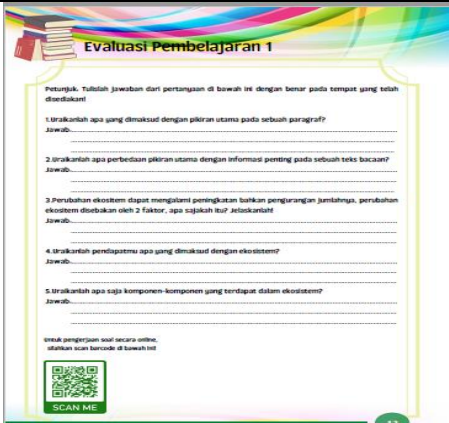
competencies in formulating indicators. Based on the indicators that have been analyzed, the learning objectives that students will achieve are formulated. Then, the results of the formulation of these indicators follow the content standards in the 2013 curriculum used for developing teaching materials on theme 5, "Ecosystem" and Subtheme 1, "Ecosystem Components" in the semester I.

The second stage is *design*, namely compiling instruments and designing teaching materials. The instrument prepared is a validation sheet to assess the validity of the teaching materials developed and assessed by experts or expert validators. The validation instrument consists of material, language, and media validation instruments. They were designing teaching materials in the form of designing teaching materials that are adjusted based on the analysis of KD and materials previously carried out. Researchers made the overall content of teaching materials. Researchers use images from the internet to support the concreteness of the material in teaching materials. The font type in this teaching material is *Loyola* which is available in the Canva application because it is attractive, suitable, and easy to read by teachers and students. The font size varies according to the teaching materials' readability. The teaching materials contain KD, indicators, material titles and characteristics of the RADEC model, exercises, and evaluations. Researchers used the Canva application to design teaching materials as a whole. The following teaching material design can be seen in table 1.

Table 1. RADEC-based Teaching Material Design

No	Design	Description
1		<p>The cover aims to provide information about the description of the contents of the teaching materials as a whole. The author's name is also written on the cover as a form of appreciation for completing teaching materials with the Loyola writing type. Then the name of the supervisor and the identity of the owner of the teaching materials are also included to make it easier for students to use.</p>
2		<p>The preface tells the author's purpose in making teaching materials. The preface provides a brief description of the purpose of the teaching materials designed.</p>

<p>3</p>	 <p>PETUNJUK PENGGUNAAN</p> <p>Apa kabar anak – anak hebat kelas 5?</p> <p>Bapak Ibu Guru harap anda sehat selalu dan tetap semangat dalam menuntut ilmu.</p> <p>Nah, anda semua, pada kegiatan ini kita akan mempelajari Tema 5, Sub tema 1 yang di dalamnya terdapat beberapa konsep pengetahuan dan keterampilan yang harus anda kuasai.</p> <p>Mari kita perhatikan petunjuk penggunaan bahan ajar di bawah ini!</p> <p>Berdoalah sebelum dan sesudah membaca bahan ajar ini!</p> <p>Bacalah petunjuk terlebih dahulu!</p> <p>Kerjakanlah setiap tugas yang ada dalam bahan ajar ini dengan sungguh-sungguh!</p> <p>... Selamat Belajar ...</p> <p>HASANATUL FITRI-Bahan Ajar Berbasis RADEC</p>	<p>Instructions for use are designed to facilitate students in using teaching materials. These instructions contain things that students should pay attention while using this teaching material.</p>
<p>4</p>	 <p>KOMPETENSI INTI</p> <p>KI-1. Menerima, menjalankan, dan menghargai ajaran agama yang dianutnya.</p> <p>KI-2. Menunjukkan perilaku jujur, disiplin, tanggung jawab, santun, peduli, dan percaya diri dalam berinteraksi dengan keluarga, teman, guru, dan tetangga.</p> <p>KI-3. Memahami pengetahuan faktual dengan cara mengamati (mendengar, melihat, membaca) dan menanya berdasarkan rasa ingin tahunya tentang dirinya, makhluk ciptaan Tuhan dan kegiatannya, serta benda-benda yang dijumpainya di rumah dan di sekolah.</p> <p>KI-4. Menyajikan pengetahuan faktual dalam bahasa yang jelas, sistematis dan logis dalam karya yang estetis, dalam gerakan yang mencerminkan anak sehat, dan dalam tindakan yang mencerminkan perilaku anak beriman dan berakhlak mulia.</p> <p>HASANATUL FITRI-Bahan Ajar Berbasis RADEC</p>	<p>Core Competencies to find out what students must achieve in each lesson, as well as to tell the benefits of learning the material they are studying.</p>
<p>5</p>	 <p>KEGIATAN BELAJAR Subtema 1 PB 1 Pemetaan Pembelajaran</p> <p>Tujuan Pembelajaran</p> <ul style="list-style-type: none"> Dengan pengisian, siswa mampu menguraikan konsep-konsep yang saling berkaitan pada teks nonfiksi dengan benar. Melalui diskusi, siswa mampu menyimpulkan konsep-konsep yang saling berkaitan pada teks nonfiksi dengan benar. Dengan pengisian, siswa mampu membuat tulisan non fiksi yang membandingkan dua jenis hewan berdasarkan jenis makanannya dengan benar. Melalui diskusi, siswa mampu menganalisis hubungan antar komponen ekosistem dan jaring-jaring makanan di lingkungan sekitar dengan teks. Melalui pengamatan video tentang ekosistem, siswa mampu menyimpulkan penyebab dan akibat perubahan terhadap keberlangsungan hidup komponen ekosistem ditinjau sebagai jaring-jaring makanan dengan teks. Dengan pengisian, siswa mampu untuk menganalisis jenis-jenis hewan berdasarkan jenis makanannya. Melalui diskusi, siswa mampu membuat klipring tentang pengelompokan hewan berdasarkan jenis-jenis makanannya dengan benar. <p>HASANATUL FITRI-Bahan Ajar Berbasis RADEC</p>	<p>Learning activities begin with an explanation of learning mapping and learning objectives.</p>

6	 <p>Evaluasi Pembelajaran 1</p> <p>Perhatikan. Tulislah jawaban dari pertanyaan di bawah ini dengan benar pada tempat yang telah disediakan!</p> <p>1. Urutkanlah apa yang dimaksud dengan pikiran utama pada sebuah paragraf? Jawab:</p> <p>2. Urutkanlah apa perbedaan pikiran utama dengan informasi penting pada sebuah teks bacaan? Jawab:</p> <p>3. Perubahan ekosistem dapat mengalami peningkatan bahkan pengurangan jumlahnya, perubahan ekosistem disebabkan oleh 2 Faktor, apa saja? Jawab:</p> <p>4. Urutkanlah pendapatmu apa yang dimaksud dengan ekosistem? Jawab:</p> <p>5. Urutkanlah apa saja komponen-komponen yang terdapat dalam ekosistem? Jawab:</p> <p>Untuk pengisian soal secara online, sambungkan ke QR code di bawah ini!</p> <p>SCAN ME</p> <p>HASANATUL FITRI- Bahan Ajar Berbasis RADEC</p>	<p>The evaluation contains questions that students and additional quiz using barquiz will answer which is the novelty of the developed teaching material product.</p>
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The third stage is *developed* by validating lesson plans and validating RADEC-based teaching materials. When developing lesson plans, researchers made 6 lesson plans based on the RADEC model. Each meeting consists of one lesson plan with sequential learning. The first lesson plan is for lesson 1 with Indonesian language and science content. The second lesson plan is for lesson 2 with the Indonesian language, SBDP, and science content. Third lesson plan for lesson 3 with Indonesian language, social studies, and civics. Fourth lesson plan for lesson 4 with Indonesian language, social studies, and civics. Fifth lesson plan for learning 5 with the subject content of Indonesian language, SBDP, and science.

Meanwhile, the lesson plan for learning 6 contains Indonesian, SBDP, and PPKn. Furthermore, developing teaching materials by validating the materials that have been designed and then validated by expert experts. These results can be seen in table 2 below.

Table 2. Material, Language, and Media Expert Validation Results

No	Expert Validation	Percentage
1	Material Expert	94%
2	Linguist	95%
3	Media Expert	93%
	Average	94%

Based on the table above, it can be concluded that the validity results obtained from the material expert validator are 94%, meaning the teaching materials are "very valid." The validation results obtained from linguist validators are 95%, meaning the teaching materials are "very valid." The validation results obtained from the media expert validator are 93%, meaning the teaching materials are "very valid." The overall validation average is 94%, which is in the "very valid" category. So it can be said that the RADEC model-based teaching materials to increase the HOTS of grade V elementary school students are declared valid and feasible to be used as teaching materials for elementary school students. This conclusion follows the results of previous research by (Triska Rindiana, Muh. Husen Arifin, 2022) that RADEC is a model that can be applied in improving students' higher-order thinking skills with syntax reading-answering questions-discussing-presenting-creating. The steps or stages in the model can build students' higher-order thinking skills because students in the learning model must be able to analyze and create. Furthermore, the results of research from (Tulljanah, R., & Amini, 2022) showed that one of the learning models that can be used to improve students' high-level thinking skills in science learning in elementary school is RADEC.

Then, the fourth stage, namely *disseminate* or dissemination of teaching materials, can be done when teaching materials have been tested or practicing teaching materials. Practicality

can be done through a practicality test instrument for teachers and students on teaching materials that have been used. When the results of practicality are in the practical category, then *disseminate* or spreading teaching materials can be done through the Working Group of Teachers of grade V elementary school.

Conclusion

Based on the results and discussion above, the development of *RADEC-based* teaching materials to increase the HOTS of elementary school students shows the results of the validity test on the material aspect with a score of 94% with the category "very valid" the language aspect with a score of 95% with the category "very valid", and the media aspect with a score of 93% with the category "very valid". So that the development of teaching materials based on the *RADEC* model to increase the HOTS of grade V elementary school students is declared valid (feasible) to be used as teaching materials in the learning process for grade V elementary school students

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