Developing Elementary Science Online Learning Content Using Schoology

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ARTICLE INFO	ABSTRACT
	The development of science and technology can make students interested in participating in the learning process it can increase student competence. This research began when researchers discovered gaps in conditions in the field that teachers were still not using technology enough so that learning was less varied. The aim of the research is to produce online learning content using Schoology in elementary school science learning that is practical, valid and effective to increase student competence. The research uses the ADDIE model which consists of analyze, design, development, implementation, and evaluation. This research produces online elementary science learning content using schoology. The results of the research show that based on the expert assessment of the material, language and media the learning content developed was declared highly valid, very practical based on the responses of students and teachers, and effective in increasing students' competence.

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1.   INTRODUCTION

Education has a very important role in facing current technological advances (Haleem et al., 2022; Kulik, 2002; Salmi, 2002). The presence of the internet has shifted conventional views in teaching and learning activities (Andrijati, 2016). The widespread use of the internet has great potential in developing

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learning media with online systems (Putri & Usmeldi, 2020). As times progress so rapidly, learning methods have also experienced many changes and developments, both learning methods, learning media, and learning processes.

The concept of elementary science education is one of the main subjects that plays an important role in the advancement of science and technology at the elementary level (Amini, 2015). In reality, students' critical thinking abilities in science and physics learning are not as expected. The low critical thinking ability in science and physics learning is because learning activities are still conventional and students are rarely trained to solve problems (Ade Mayasari, Asrizal, Usmeldi, 2023).

The form of use of information technology applied in the world of education is electronic learning (e-learning). Other terms for e-learning are online learning, virtual learning, distributed learning, virtual class or web-based learning. E-learning platforms that are widely used include Edmodo, Schoology, Moodle, Quipper School, Dokeos, and dotLRN. Another similar e-learning method, Schoology, has the same concept as Edmodo and supports almost all the facilities supported by Edmodo.

The advantage of using e-learning is that students are required to be more active compared to conventional learning, where students are given space to study independently so that students can hone their own abilities.

The reality in the field is that there are still many teachers who have not used schoolology-based online learning because of a lack of information. Teachers are less creative in developing teaching materials that suit the characteristics of students. The teaching materials used by teachers tend to be teaching materials that are already available, without paying attention to the characteristics and subject matter (Usmeldi, Amini Risda, 2022).

Based on observations at SDN 20 Kurao Padang on January 28 2020. Researchers found a problem where the school already had computer facilities and a WiFi network, but its use had not been maximized and was only used by high class students. So there is a need for a solution to this problem. Currently developing technology provides facilities that make it easier for teachers to organize, design and implement learning. Through a Learning Management System (LMS) which provides interesting learning activities so that the learning process is more popular with students.

Schoology is a site that combines social networking and LMS. So with Schoology we can interact socially and learn at the same time. However, in supporting online learning, schoology provides many resource options, can accommodate types of questions (question bank), availability of attendance facilities, messages and analytics (N. Cavus and M. S. Alhih, 2014). With the rapid development of technology, Edmodo learning, which can only be used by teachers, students and parents, is developing by involving the active role of lecturers at universities, the feature is called Schoology (Tigowati, n.d., 2017). The features of schoology are Courses, Groups, Resources (Learning Resources). The advantages of Schoology are that it can improve learning achievement, get positive responses, increase learning activities, and can increase learning independence (Sigit Haryanto, 2018). Furthermore, the advantage

of this online schoolology media is that students can access learning easily from virtually anywhere with internet access, students can save time and transportation costs without having to travel to the learning location (Tinschert, 2006).

The aim of this research is to produce online learning content using school science in elementary school science learning that is practical, valid and effective for increasing student competence.

2. METHOD

This research uses ADDIE model development research which consists of five stages, namely analysis, design, develop, implement and evaluate (Wei, 2018). The analysis stage includes: needs assessment, identification of goals, tasks, context, objectives, and skills analysis. The Design Stage includes: development of objectives, test items, and learning strategies. The Development Stage includes the preparation of teaching materials. The Implementation stage includes activities to support the delivery of instructions. The assessment stage includes: formative assessment and summative assessment (Andika et al., 2019; Frey & Schmitt, 2010; Turner, 2014). Product trials were carried out on grade 2 students at State Elementary School 20 Kurao Pagang, Padang. Research instruments include observation sheets, interview guides, questionnaires and learning outcomes tests. The data analysis technique is a descriptive analysis technique to determine the validity, practicality and effectiveness of the product being developed.

1.1. Development Model

This development research refers to the ADDIE model. The ADDIE development model is a model developed by S. Raiser and Mollenda. This model is systematically arranged in an effort to solve learning problems related to learning resources according to the needs and characteristics of students (Desyandri & Vernanda, 2017). The ADDIE development model has five stages, namely analysis, design, development, implementation, and evaluation (Aulia & Masniladevi, 2021). The ADDIE development model was chosen because these five stages or steps are very simple when compared to other design models, structured, and systematic. This design model is easy to apply and suitable for developing development products such as multimedia, textbooks, learning videos, learning modules, and so on (Hydayat & Ariani, 2022).

1.2. Research Procedure

The steps to develop the learning media can be seen in Figure 1. The following is an explanation of the media development steps carried out (Ranuharja et al., 2021; Sugiyono, 2009):

1.2.1. Analysis Stage

The analysis carried out is a needs analysis, curriculum analysis, and material analysis. After carrying out observation visits and interviews, the author identified that learning activities using learning media have not been carried out optimally. The use of schoology has also never been used in schools.

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The characteristics of students and the experience gained in the process of learning activities also need to be considered.

1.2.2. Design Stage

At this stage, the design of the learning process is carried out consisting of learning objectives, learning materials displayed in the text and supported by learning videos, assignments, and quizzes.

1.2.3. Development Stage

Schoology-based learning that has been designed, redeveloped based on the results of validation by experts. This stage includes validation of schoology-based learning design by experts consisting of material experts, linguists, and media experts. The goal is to obtain input from experts on the design that has been made. If the developed learning media is not valid, then revisions are carried out. But if it is valid, then schoology-based learning can be continued to the implementation stage.

1.2.4. Implementation Stage

The implementation stage is the stage to test the product in the learning process that has been designed and validated. This stage begins with preparing all the necessary facilities and infrastructure and conditioning the classroom environment that is adapted to current conditions. Once everything is available, the author can use the developed product into the learning process. After the learning media is tested on students, then a practicality test is carried out using a teacher response questionnaire and student responses.

1.2.5. Evaluation Stage

This stage is the final stage in the ADDIE model. At this stage, an evaluation of the developed learning media is carried out. Whether or not a learning is successful or not will be seen in the questionnaire given to teachers and students. Then the effectiveness of learning media is assessed from the learning outcomes of students.

1.3. Data Analysis Techniques

The data analyzed is data taken from the results of validity, practicality, and effectiveness of schoology-based learning:

1.3.1. Analysis of Learning Validity Data

The data results obtained from the analysis of the learning media were analyzed into all sections in the form of a table using a Likert scale. The results of the validation percentage can be grouped into score criteria according to the Likert scale so that the criteria for determining the level of validity are obtained as follows (Zainil and Masniladevi, 2019):

Tabel 1. Validity Categories

Category	Score
81,0% - 100%	Highly Valid
61,0% - 80,9%	Valid
41,0% - 60,9%	Less Valid
21,0% - 40,0%	Invalid

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1.3.2. Data Analysis Learning Practicality

Practicality analysis is useful for measuring the practicality of the learning media developed by analyzing the data from the observation of the response questionnaire of students and teachers. The categories of multimedia practicality obtained based on the final score can be seen in the following table (Putri and Reinita, 2023):

Tabel 2. **Practical Categories**

Category	Score
>75% - 100%	Very Practical
>50% - 75%	Practical
>25% - 50%	Less Practical
0% - 25%	Impractical

1.3.3. Analysis of Learning Effectiveness Data

The effectiveness of product development is determined from the results of the pretest and posttest given. The KKM score used is 75, if the student manages to get a score equal to or more than 75, it is declared complete. The calculation according to Arikunto (in Fareza & Zuhdi, 2023) is as follows: Number of students with a score

$$P = \frac{Number\ of\ students\ with\ a\ score\ \geq 75}{Number\ of\ students} \times 100\%$$

The results of these percentages will then be used to determine the criteria for achieving material understanding by students as shown in the following table (Fareza and Zuhdi, 2023)i:

Tabel 3. Student's understanding Categories

Category	Score
81,0% - 100%	Excellent
61,0% - 80,9%	Good
41,0% - 60,9%	Not Good
21,0% - 40,0%	Bad

Furthermore, to find out the improvement of student learning outcomes from the pretest and posttest, it will be calculated using the N-Gain value as follows:

$$N - Gain = \frac{Posttest - pretest}{100 - pretest} \times 100\%$$

The results of the calculation obtained are then used for categorization based on the following table, modification of Muliati (2023):

Tabel 4. Effectiveness Categories

Category	Score
$N - Gain\ > 70\%$	High
$30\% < N - gain < 70\%$	Keep
$N - gain > 30\%$	Low

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3. RESULTS & DISCUSSION

3.1. Lesson Plan Analysis

The results of the Analyze stage are Title and Author Details (1) Front end analysis; This analysis was carried out based on the results of observations at SDN 20 Kurao Padang on January 28 2020. Researchers found a problem where the school already had computer facilities and a WiFi network, but its use had not been maximized and was only used by high class students. (2) Analysis of student characteristics; Class II students are in the age range of 7-9 years, who still enjoy playing and like concrete objects and have an active psychomotor level. (3) Concept Analysis; In SBdP learning, Basic Competency 3.2 understands simple rhythm patterns through children's songs. KD 4.2 Showing simple rhythm patterns through children's songs. In KD 3.4 learning, get to know vocabulary and concepts about healthy environments and unhealthy environments in the surrounding environment as well as how to maintain environmental health in Indonesian or regional languages through written, spoken and visual texts. KD 4.4 Presents the correct use of Indonesian vocabulary or regional languages as a result of observations about healthy and unhealthy environments in the surrounding environment as well as ways to maintain environmental health in the form of written, spoken and visual texts. KD 3.9 Explain line segments using concrete models of flat shapes and spatial shapes. KD 4.9 Identify line segments using plane shapes and space shapes.

Formulation of learning objectives; The learning objectives derived from the indicators carried out by researchers are: (1) By listening to examples from the teacher, students can differentiate long and short sounds in children's songs using symbols correctly; (2) By imitating the teacher's example, students can play the long and short sounds in children's songs correctly; (3) With questions and answers, students can state the contents of the text they read relating to a healthy environment using spoken language correctly; (4) With assignments, students can record the contents of texts related to a healthy environment using written language correctly; (5) By observing the picture, students can determine the line segments that limit the flat shape model correctly; (6) With the assignment, students can identify the line segments that limit the flat shape model correctly.

3.2. Product Design

The results of the Design stage are product development steps, namely:

- Create a schoology account as a teacher by opening the website www.schoology.com on Google search.

Figure 1. Initial appearance of the website

- Create a class in schoology by selecting course on the tab bar, then clicking create class. After that, fill in the class identity.
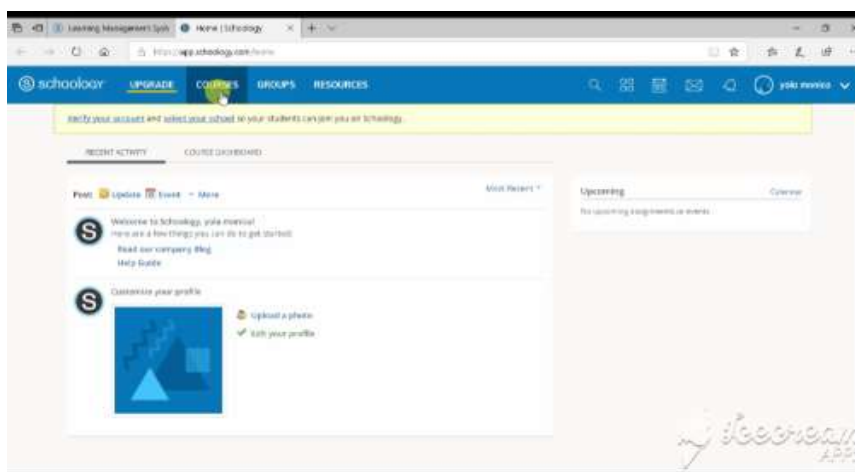

Figure 2. Initial view of class creation

- Develop and design learning materials in schoolology classes, by clicking on the addpage to write down core competencies, basic competencies and learning materials.

Figure 3. View of designing KI

Figure 4. Final view of KI

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- Add a learning video by clicking add media/link
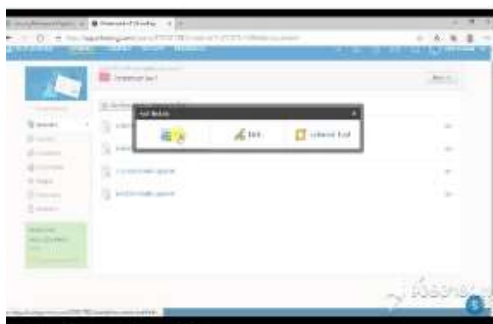

Figure 5. Add file display

Figure 6. Display of the uploaded video

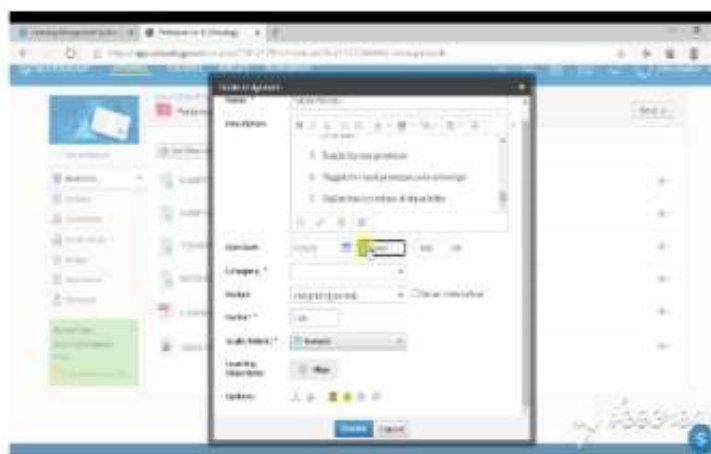- Create an assignment by clicking Add Assignment

Figure 7. Add assignment format
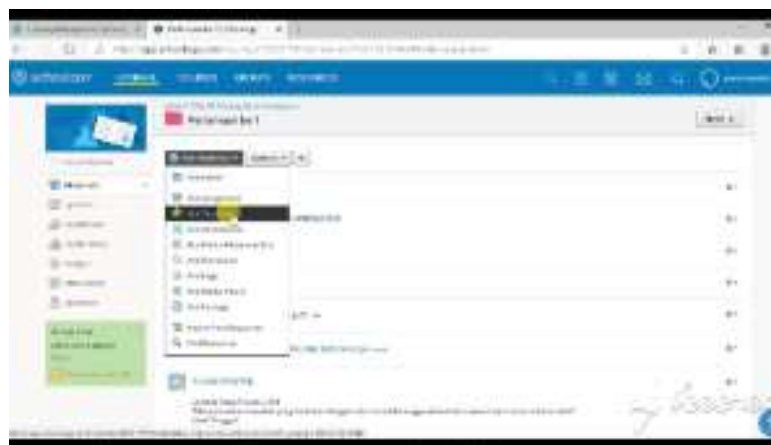
- Create a quiz by clicking add assignment

Figure 8. Display of the add quiz menu

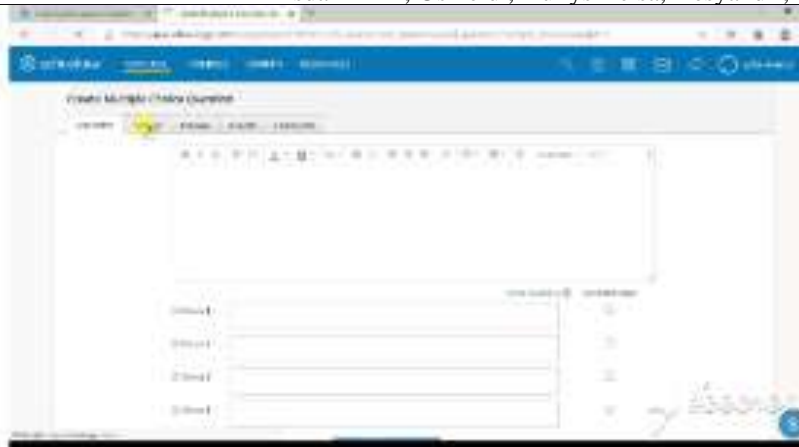Risda Amini, Usmeldi, Yullys Helsa, Desyandri, Refiona Andika

Figure 9. Question format

The results of the Development stage are validation of the product by 3 validators, namely content or material validation, language validation, and media validation. The results of the three validations can be seen in table 5.

Tabel 5. Overall Media Validation Results

No	Validated aspects	Percentage	Category
1	Material	92,50%	Highly Valid
2	Language	83,75%	Highly Valid
3	Media	89,07%	Highly Valid
Average		**88,44%**	**Highly Valid**

The results of the Implementation stage are in the form of product trials on students in the learning process. The practicality test results of student and teacher responses to the product being developed can be seen from table 6.

Tabel 6. Results of practicality test of teacher and student responses

No	Rated aspect	Percentage		Category
		Teacher	**Student**	
1	content and purpose	90 %	90,5%	Very Practical
2	Techique	92%	91%	Very Practical
3	instructional learning	88%	89,5%	Very Practical
Average		**90%**	**90,33%**	**Very Practical**

The results of the product effectiveness test in terms of students' learning completeness showed that 80% of students completed their learning. Products can be declared effective based on students' classical learning completeness. Based on the results of the gain score test, it was found that student learning outcomes increased by 57% so that the product was effective enough to be used in learning.

Based on the results of the research that has been carried out, we can see that the process of developing elementary science online learning content using schoolology is in accordance with the

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development model applied. This research uses the ADDIE development model which consists of 5 stages, namely the Analyze, Design, Development, Implementation and Evaluation stages. The ADDIE model was chosen because it has systematic steps and is easy to understand. Assessment of online elementary science learning content using schoolology is good and appropriate. The validity test consists of three experts, namely, material experts, language experts and media experts.

Based on the validation results, it can be concluded that the SD science online learning content using the developed schoolology can be said to be valid. Practicality data was taken from teacher and student response questionnaires. Based on the results of analysis from teacher and student questionnaires, it is known that this learning content is practical in its application. Based on the research results, we can see that the use of online elementary science learning content using schoolology can have a positive impact on learning and provide benefits, including increasing students' understanding of learning concepts regarding data presentation material. Elementary science online learning content using schoolology is suitable for use in the learning process because it helps students in learning activities at school and at home.

3.3. Discussion

3.3.1. Validate online elementary science learning content using schoology

Valid is often interpreted as authentic. Trianto (2010:255) valid is an assessment of the accuracy of a media being developed. Elementary science online learning content using schoology is declared valid if it meets the specified requirements in terms of both content and construct (Connors-Kellgren et al, 2016). The components of validity must also be related to each other consistently or what is usually called construct validity (Slavit et al, 2016). Based on the results of validation data analysis by learning content experts, it is classified as valid for use in the learning process.

3.3.2. Practicality of online elementary science learning content using scholoogy

Learning content is said to be practical if teachers and students can apply online elementary science learning content using schoology in the learning process well (Aldila, 2017 in Anggraini, 1999). Based on the analysis of the practicality test results, the practical category was obtained because students felt enthusiastic about learning activities (Udil, 2020).

3.3.3. Effectiveness of online elementary science learning content using scholoogy

Effectiveness can be achieved if the elementary school science online learning content using schoology is valid and practical. Assessment is used to determine the effectiveness of the learning process after using schoology. Assessment is carried out based on the results of students' pretest and posttest. Based on the results of the students' learning completeness and gain score test data, it proves that online elementary science learning content using schoology is effective for the learning process.

The research results show that learning use schoology effectively to improve student learning outcome (Utami, et.al, 2017; Supratman & Purwaningtias, 2018; Febriani, et.al, 2022; Trisnawati, 2022)

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4.   CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that: (1) Digital learning developed based on schoolology can make it easier for students to understand learning. Expert validity results with an average percentage of 88.44% are in the valid category so they can be used in the learning process in elementary schools; (2) Digital learning developed based on schoolology can help students understand material concepts. The teacher's practicality test results obtained a percentage of 90% and the students' practicality test results obtained a percentage of 90.33% in the practical category so that it has been declared practical for use in the classroom in teaching and learning activities.

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