PRELIMINARY RESEARCH ON 7E LEARNING CYCLE MODEL-BASED MODULE DEVELOPMENT OF THE INTEGRATED TECHNOLOGICAL KNOWLEDGE

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PENELITIAN PENDAHULUAN PENGEMBANGAN MODUL BERBASIS MODEL BELAJAR SIKLUS 7E PENGETAHUAN TEKNOLOGI TERINTEGRASI

ARTICLE HISTORY	ABSTRACT
	Abstract: This paper describes data from the preliminary research stage, which will be used as a basis for the development of an Elementary Natural Science Learning module based on the learning cycle 7e model integrated with technological knowledge. The development model used is the Plomp model, which is mainly focused on the preliminary research stage. Data collection instruments are interviews, questionnaires, and observation. The research subjects involved two lecturers and 51 students who took Elementary Natural Science Learning courses. The preliminary research that was carried out included the analysis of RPS, analysis of problems and lecturer's needs, and analysis of problems and students' needs. The results of the research indicate that based on 9 materials for Elementary Natural Science learning subjects, it was still found problems with learning resources, learning implementation, and teaching materials. In addition, 100% of lecturers' and students' responses dealt with developing teaching modules for Elementary Natural Science Learning courses. The research conclusion implies that the results of the preliminary research can be used as a basis for the development of an Elementary Natural Science module based on the learning cycle 7e model integrated with technological knowledge. *Keywords: preliminary research, elementary natural science module, 7e learning cycle model, integrated technological knowledge*
	Abstrak: Tulisan ini mendeskripsikan data tahap *preliminary research* yang nantinya akan dijadikan sebagai dasar untuk mengembangkan modul IPA SD berbasis model *learning cycle 7e* terintegrasi *technological knowledge*. Model pengembangan yang digunakan adalah model *Plomp* yang difokuskan terlebih dahulu pada tahap *preliminary research*. Instrumen pengumpulan data berupa wawancara, angket, dan observasi. Subjek penelitian melibatkan dua orang dosen dan 51 orang mahasiswa yang mengambil mata kuliah pembelajaran IPA SD. *Preliminary research* yang dilakukan mencakup pada analisis RPS, analisis permasalahan dan kebutuhan dosen, serta analisis permasalahan dan kebutuhan mahasiswa. Hasil penelitian menemukan bahwa dari 9 materi untuk mata kuliah pembelajaran IPA SD, masih terdapat permasalahan pada sumber belajar, pelaksanaan pembelajaran, dan materi ajar. Selain itu, 100% tanggapan dosen dan mahasiswa setuju untuk dikembangkannya modul ajar untuk mata kuliah Pembelajaran IPA SD. Kesimpulan dari penelitian menunjukkan bahwa hasil dari *preliminary research* dapat dijadikan sebagai dasar untuk mengembangkan modul IPA SD berbasis model *learning cycle 7e* terintegrasi *technological knowledge*.
	Kata Kunci: preliminary research, modul SD IPA, model learning cycle 7e, technological knowledge terintegrasi

INTRODUCTION

Teachers are professional educators in charge of educating, teaching, guiding, directing, training, and assessing. Although it is not explained in detail about classroom teachers, as is known the term classroom teacher is only known at the elementary school level. Class teachers have the task of teaching almost all subjects that subject teachers cannot teach (Minsih & Galih, 2018; Pamela et al., 2019). Therefore, it is important for prospective elementary school teaching students to master the basic concepts of all subject matter, including science subjects.

Elementary science learning is one of the compulsory subjects that must be studied by students of the PGSD FKIP UIR study program. This course is intended so that prospective elementary school teacher students have knowledge about science learning and understand the relationship of each science material so that they are finally able to apply it in the implementation of learning in elementary schools. Science as a product should be able to produce facts, data, concepts, principles, and theories, while science as a process should be used as a way of thinking in solving problems in the environment (Imran et al., 2021; Mustika et al., 2020). In science learning, it is necessary to developa curiosity to investigate and find the concepts to be studied (Walid Ahmad, 2017).

The results of observations made by researchers in the Elementary Science Learning course are known that learning has not been carried out optimally. During learning, the dominant student only listens and rarely has an opinion. The initial analysis that the researcher conducted by involving 60 students of the PGSD FKIP UIR study program found that the students already had good technological knowledge. Students know various web and learning software (Mustika et al., 2022). However, when students are given assignments, there are still many students who often do not refer to valid sources. As a result, there is often a misunderstanding of the desired goal. Lecturers have tried to provide learning resources in the form of PowerPoint presentations to be used as additional material for student learning. However, these materials have not been able to review science learning more specifically. This problem can be overcome by using a learning module that is to the needs of the Elementary Science Learning course.

The module is one of the learning resources that are arranged systematically with the aim that students can study independently (Gunawan et al., 2017). The module contains a series of learning activities that are formulated with clear objectives and are the realization of individual differences and teaching. The benefits of using modules in learning are (1) helping to form a sense of responsibility for the material to be studied; (2) learning is more effective and efficient because learning is according to understanding and ability; (3) encouraging students to study independently; and (5) help equalize understanding of the material for each student (Darwis et al., 2020; Istikomah et al., 2020). To be more efficient, modules can be developed using appropriate learning models. An alternative learning model that can be used in development is the 7e learning cycle model.

The 7e learning cycle model helps provide opportunities to optimize learning methods and helps improve critical and creative thinking skills (Dina Nur Adilah & Rini Budiharti, 2015). The advantages of the 7e learning cycle model include (1) helping students remember and link with previous material, (2) motivating students to be active and full of curiosity, (3) training students to find concepts through experimentation, (4) training students to convey concepts what has been learned, (5) provides opportunities for students to think, seek, find and explain examples of the application of concepts and (6) provide opportunities for lecturers and students to carry out complementary learning stages (Marfilinda et al., 2019; Rawa et al., 2016).

The 7e learning cycle model consists

of seven stages, namely elicit, engage, explore, explain, elaborate, evaluate, and extend. (Insani & Widjajanti, 2019; Rawa et al., 2016; Rusydi & Kosim, 2018) explains the implementation of each stage of the 7e learning cycle model, namely the elicit stage, which is the stage of bringing students' initial knowledge by asking questions. The engage stage is a stage aimed at focusing attention, generating interest,and providing motivation which can be done through discussion, rea,ding or other activities. The explore stage is the stage for the acquisition of knowledge and experience that can be done with cooperation in small groups. The explain stage is the stage of providing opportunities for students to explain themselves, provide facts, clarify explana,tions and listen to other explanations. The elaborate stage is a stage aimed at enabling students to apply concepts and skills to problems related to the experiences they have learned. Thevaluationte stage is the stage of assessing all student learning experiences. Thextendednd stage is the stage of thinking, searching, finding, and explaining examples of the application of concepts from the material that has been studied.

The module based on the 7e learning cycle model is an alternative effort to solve the problems that have been described. Module creation will also be integrated with technological knowledge to improve the quality of learning. The making of the module must of course be based on a needs analysis so that the resulting module is by the targeted goals. The problems in this study are in line with (Asrizal et al., 2017; Darwis et al., 2020) which state that in the lecture process, there are still students who are less focused on learning, the cause is thought to be due to unsupportive teaching materials so it is necessary to analyze the needs for the development of teaching materials using the 7e learning cycle model. (Yanti et al., 2016) also stated the same thing that a needs analysis is needed to update the

teaching module using a constructivism-based learning model. One of the learning models that can be used is the 7e learning cycle model. This research is important to do because this research seeks to analyze the needs for elementary science learning courses so that later it can be developed a module based on the learning cycle 7e model that integrates technological knowledge according to the needs of students and lecturers. Based on the explanation above, this study aims to identify and describe the results of the preliminary research on the development of a module based on an integrated learning cycle 7e model of technological knowledge for elementary science learning courses.

METHOD

This research is the initial part of development research. The development research used refers to the Plomp development model which includes three stages, namely (1) preliminary research; (2) prototyping phase; and (3) assessment phase. This study only discusses the preliminary research stage. The preliminary research stage is intended to determine what is needed in the development of the module (Putro et al., 2018). The analysis carried out at this stage includes the analysis of lesson plans, analysis of problems and needs of lecturers, and analysis of problems and needs of students.

The type of data in this research is qualitative. The object of the research consisted of lecturers and students of the PGSD FKIP UIR study program, who took the Elementary Science Learning course. The number of lecturers involved were 2 lecturers who became teachers of elementary science learning courses, while the student population was 340 people with a research sample of 15% of the total population, namely 51 students. Data collection techniques in the form of interviews, questionnaires, and observations. The indicators used in the preparation of this research instrument can be seen in table 1.

Table 1. Research Indicators and Sub-Indicators

No	Indicator		Sub Indicator
1	Learning Resources	-	Understand the material in the sources used
		-	Have a handbook
		-	Looking for materials from various sources
		-	Having adequate learning resources
2	Ability to use technology	-	Able to use technology
		-	Able to use the internet
		-	Able to use learning applications
3	Implementation of learning (7eLC model integration)	-	Presence of prior knowledge
		-	There is a motivational action to understand the material
		-	There is an opportunity to explain the concept yourself
		-	There is an opportunity to apply the concept
		-	There is an assessment
		-	There is a wider application of the new concept
4	The need for alternative teaching materials	-	The need for alternative teaching materials
		-	Approval of the integration of the 7e LC model in teaching materials
		-	Integration of technology in teaching materials
5	The need for teaching materials	-	The need for explanation of additional material

The data analysis technique was carried out in the following steps: (1) coded the data from the results of the questionnaire that had been distributed; (2) tabulation of data to classify the data that has been obtained; (3) qualitative data analysis by analyzing data by describing and connecting related data and information; (4) interpretation of the results of the analysis in accordance with the problems and research questions and draw conclusions. Interviews were conducted by asking questions and then conclusions were drawn according to the description of the answer information that had been obtained.

FINDING AND DISCUSSION

This study focuses on the first stage of the Plomp development model, namely the preliminary research stage. In general, the results obtained in this study include analysis of lesson plans, analysis of problems and needs of lecturers, analysis of student problems and needs. The following describes the results of the research that has been done.

First, the RPS analysis. Lecturers as the central holder in the process and achievement of educational outcomes are expected to be able to conduct a specific curriculum analysis which is summarized in the form of lesson plans or teaching materials to be used. The results of the analysis of the RPS for Elementary Science Learning courses can be seen in Table 2.

Table 2. Materials in Elementary Science Learning Courses

No	Materials
1	The nature of science and the concept of learning science
2	Science process skills and scientific attitude
3	Study the elementary science curriculum
4	Ruang lingkup dan gambaran materi pembelajaran IPA di SD
5	The concept of science practice activities in elementary school

No	Materials
6	Design of student worksheets for science subjects
7	Science learning assessment
8	Science lesson planning
9	Science learning simulation

In Table 2 it can be observed that the material in the elementary science learning course includes nine main materials. The results of the analysis also found that in the fourth material, the Elementary Science Learning course discusses four scopes which include living things and life processes, matter and matter, energy and its changes as well as the earth and the universe. The results of the RPS analysis are used to see their suitability with the study material being studied. This is intended to facilitate the achievement of lecture objectives that must be achieved by students in elementary science learning courses. (Yuliana et al., 2020) stated that RPS analysis can be carried out to determine the suitability of the content and lecture materials needed in module development.

Second, the analysis of interview problems and the needs of lecturers who are teaching science subjects in elementary school. The results of the interview analysis of the problems and needs of lecturers can be seen in Table 3.

Table 3. Results of lecturer interview analysis

No	Aspects you want to know	Analysis result
1	Availability of learning resources	Every lecturer has a handbook, but there are still deficiencies in the handbook because the book used is not in the form of a module and is not made by the lecturer himself.
2	Limitations and difficulties experienced	One of the two lecturers stated that it was difficult to arouse student interest in learning because of limited learning resources
3	Implementation of learning	The lecturer stated that the dominant learning was carried out by presentation and discussion activities. During the learning process students are less active and more silent than responding.
4	The need for alternative teaching materials	The lecturer stated that he needed teaching materials in the form of modules that could help support active and independent learning for students. The lecturer also agreed with the development of a module based on the learning cycle 7e model that integrates technological knowledge for elementary science learning courses.

Based on Table 3. it is found that in lectures, lecturers dominate because students do not have adequate learning resources. In making paper assignments, students often refer to sources whose validity is not clear, so that it often leads to misunderstanding of concepts. Although 1 out of 2 lecturers have provided material in the form of a powerpoint presentation, it is admitted that the material has not been able to meet all student learning needs. The material in the powerpoint presentation does not motivate students to be active in lectures, does not provide opportunities for students to think actively and does not provide opportunities for students to apply the concepts they have learned. The lecturer stated that it was necessary to develop teaching materials for elementary science learning courses. The approved solution is to develop an elementary science module based

on the 7e learning cycle model that integrates technological knowledge.

Third, the questionnaire analysis of the problems and needs of students. Questionnaire data were obtained from 51 students who took Elementary Science Learning courses. The recapitulation of the results of the student questionnaire analysis can be seen in Table 4.

Table 4. Recapitulation of the results of student questionnaire analysis

No	Aspects you want to know	Analysis result
1	Availability of learning resources	84% of students have difficulty understanding the material, 80% of students do not have handbooks, 50% of students look for material from various sources and 92% of students do not have sufficient resources to understand the material
2	Ability to use technology	94% of students are able to use technology in learning, 80% of students are able to find material from various webs on the internet, and 67% of students say they are able to use a variety of applications both online and offline.
3	Implementation of learning	51% of students stated that learning had not helped to explore prior knowledge, 43% of students stated that learning had not encouraged the desire to know more about the material, 57% of students stated that learning had not provided the opportunity for direct experience, 63% of students stated that learning had not provided an opportunity to explain concepts, 53% students stated that learning had not provided an opportunity to apply skills, 57% of students stated that learning had not been accompanied by a clear assessment, and 67% of students stated that they had not received guidance to apply concepts in new problems..
4	The need for alternative teaching materials	92% of students stated that they needed a special teaching module for elementary science learning courses, 96% of students agreed that the teaching module was developed using the 7e learning cycle model, 100% agreed if the teaching module was combined with the use of technology.
5	Teaching material needs	98% of students stated the need for additional material. The material records obtained are for the material of the cycle of living things, matter and matter, electricity, the water cycle, rotation and revolution.

Table 4 shows that most students experience problems in learning. Although most of the students stated that they had mastered the use of technology, in fact there were still many who had difficulties, especially in finding material. The learning that has been carried out has not been fully able to generate student interest and enthusiasm. In addition, students also need an explanation of additional material, especially relating to science material in elementary schools. It can be concluded that a learning module is needed that can help students to facilitate their understanding of concepts, especially in studying the material in the Elementary Science Learning course. Students stated that they agreed with the development of a module based on the 7e learning cycle model that was integrated with technological knowledge.

The results of the preliminary research analysis found that students and lecturers needed the development of modules for elementary science learning courses. In the learning process, there are supporting components including students, educators, teaching media, learning methods, and

teaching materials (Gunawan et al., 2017; Mustika, 2017). Modules are teaching materials that can be used to help students achieve specific learning goals. In addition, in line with the research results (Rini, 2020) lecturers need additional teaching materials to help carry out lecture activities. The 7e learning cycle model helps build students' thinking so that they understand the concepts being studied and can stimulate students to criticize everything they see, hear, and do. The module designed based on the 7e learning cycle model is proven to be effective in increasing learning activities and outcomes so that learning becomes more meaningful (Hariyati et al., 2018; Miftahuljannah, 2018).

The difference between the results of this study and the results of previous studies lies in the specification of the analysis that focuses on the needs of module design according to the stages of the 7e learning cycle model. In addition, this analysis also seeks to find out the ability of students to use technology as the basis for developing modules based on the integrated learning cycle 7e model of technological knowledge for elementary science learning courses.

CONCLUSION

Based on the data analysis of the preliminary research stage, it is known that students and lecturers need an elementary science module based on a learning cycle 7e model that integrates technological knowledge to assist in the implementation of the elementary science learning lecture process. The follow-up of this research is expected to be realized in accordance with the results of the needs analysis that has been carried out.

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