Developing Science Process Skill Based Learning in Science for Children with Special Needs Course

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Abstract. The facts show that most of alumni of college are prospective workers. They are ready to train, not ready to use. Therefore, there were 944,666 educated unemployment (BPS, 2016). This phenomenon occurs because the learning system in universities is still dominant using lecturing methods rather than process skills. The consequence is that the cognitive level of students generally are at the level of knowledge and understanding, it is weak in terms of application, analysis, synthesis, and evaluation with divergent thinking. To overcome this phenomenon, the implementation of process skills for all subjects in universities, especially in science subjects for children with special needs in the Department of Special Needs Education is needed in integrated, comprehensive, and sustainable process. Therefore, it is necessary to develop science process skill based learning in the course of science for children with special needs that can improve the quality of process and learning achievement in the classroom.

1. Introduction
Many research conclude that the learning media which is interesting and used professionally will be able to increase the interest and motivation of the learners in the classroom. It is in the end can improve the quality of process and the learning outcomes in class significantly. Therefore, teachers in both formal and non-formal schools should be able to improve their skills using various learning media available in schools. It is including the use of science learning media for children with special needs. The media based on science process skill that can be used by science teachers or lecturers in department of special needs education on state or private college.

The development of learning instruments as a learning media of science for children with special needs course based on the science process skills is a must in college. It is because one of the demands of the higher education curriculum is to emphasize the learning process which is centered on the students, especially for the course that developing the processes of science in the learning process. These conditions can only be achieved by integrating science process skills into the science for children with special needs course in the curriculum of the Department of special needs education.

Since the scope of science for children with special needs course is broad, it allows lecturers freely choose and connect the type of science process skills with contents of the course. In addition, this strategy allows students to get many opportunities improving their science process skill which will be a strong base to support lecture activities in the following semesters. It is expected that students become active in learning by implementing the science process skill media in the course. This is in
line with the demands of the higher education curriculum that emphasizes the student-centered learning process, especially the sciences subjects that must reflect the processes of science [1].

Science learning plays an important role in developing students’ skills in problem solving, data analysis, critical thinking, and communication. They are have a direct impact on success of students’ careers in the future [2]. Caccavo [3] also stated that the best way to study science is by applying procedures in obtaining science also known as science process skill.

The implementation of science process skill in science for students’ with special needs should be supported by the availability of appropriate, efficient, and effective learning instruments. A certain types of science skill process must be appropriately linked to the content of the course. The implementation process is very complex and the students will face difficulties if the implementation stages are not well designed. In addition, during the implementation process, there is also a need for continuous evaluation of the student learning process, as a basis for the improvement of subsequent learning [4]. Therefore, it is needed to develop science process skill based media for children with special needs.

Learning instruments as curriculum documents have different structure and function. However, they are related to each other. Lesson Plan (SAP) serves as a guideline in learning for lecturers and students. Teaching materials play a role in assisting the lecturer in directing all their activities in the learning process, as well as a substance of competence that should be learned and mastered by the students (MoNE, 2008). Assessment instruments are used to measure the extent of achievement of students’ competences and to provide information for improvement of the next learning process. In this study, the three learning instruments were developed according to the topic in science for students’ with special needs and the types of science process skills applied.

The course in the Department of Special Needs Education covers some topics: (1) understanding of science, (2) the benefits of science, (3) the benefits of water (4) the benefits of air, (5) the circulatory system, (6) the respiratory system, (7) the reproductive system (8) the benefits of forest and (9) the solar system. These nine topics are highly relevant to be taught through science process skill. The Lecturer may select and link the topics with accordance to certain type of science process skill, including: (1) observing, (2) designing, (3) drawing, (4) classifying, (5) writing, (6) measuring, (7) predicting, (8) concluding (9) analyzing, (10) applying, (11) summarizing, (12) communicating, (13) evaluating, (14) synthesizing, (15) creating, and (16) solving problems.

Various studies have proved the advantages implementing science process skill in learning. Grumbine [5] stated that the activities of collecting, transforming, and describing data can provide a broad and real experience to students about the complexity of data in science. Holt and Pache [6] also found that implementing the science process skill can increase students' interest in science, improve critical thinking skills, and teach students how to solve a problem. Richardson and Hall (2012) also found that learning with science process skill is very important for students in understanding the science process.

1.1. Research Problems

1) How is the validity of the developed learning instruments including lesson plan, learning module, and assessment instrument of science skill process based learning for the course of science for children with special needs?

2) How is the students' response to the developed learning instruments including lesson plan, learning module, and assessment instrument of science skill process based learning for the course of science for children with special needs?

3) How does the influence of the developed learning instruments including lesson plan, learning module, and assessment instrument of science skill process based learning on the quality of learning process of students in the Department of Special Needs Education?

4) How does the influence of the developed learning instruments including lesson plan, learning module, and assessment instrument of science skill process based learning on students’ achievement in the Department of Special Needs Education?
The purpose of this study is to develop the learning instruments including lesson plan, learning module, and assessment instrument of science process skill based learning on 9 topics in the course of science for children with special needs, (2) the influence of learning instruments including lesson plan, learning module, and assessment instrument of science process skill based learning on the quality of learning process of students in the course of science for children with special needs, (3) the influence of learning instruments including lesson plan, learning module, and assessment instrument of science process skill based learning on the quality of students’ learning achievement in the course of science for children with special needs.

2. Literature Review
The development strategy of Science process skill based learning implements the learning steps that integrate the learning by engaging students actively and gives students understanding of the mechanisms of science work. In addition, the strategy can be developed by focusing on one stages of inquiry learning. Through this process, the lecturer can teach one or several science process skill without having to apply all of the inquiry steps [7].

Teaching the science process skill separately from all stages of inquiry learning enables students to learn the content of subject matter while developing their ability to perform scientific method stages in a more effective way [8]. In addition, The Lecturer may select and link the topics with accordance to certain type of science process skill, including: observing, designing, drawing, classifying, writing, measuring, predicting, concluding, analyzing, applying, summarizing, communicating, evaluating, synthesizing, creating, and solving problems [7][9].

Wilke and Straits [7] explains that by repeatedly applying the science process skill linked to learning topics, the students have many opportunities to practice and develop a specific science process skill. Students will also be easier to master the science process skill. The science process skill based learning instruments which developed are lesson plan, learning module, and assessment instrument in the course of science for children with special needs. The lesson plan is a design of learning activities that will be conducted by the lecturer and the students, consisting of several components, including: the identity of subjects, the standard and basic competencies, indicators of competencies achievement, learning materials, learning activities, assessment methods, time allocation, and learning resources (Permendiknas No 41, 2007). All of these components reflect the science process skill. Similarly, the learning module includes several components, namely the main part of the module include: front cover, introduction, table of contents, content, and reference list. The content consists of components: title, instruction manual, competence and learning objectives, description of learning materials equipped with exercise questions, students’ worksheets with the instructions, and formative tests with key answers [10].

The standard and basic competencies of the science for children with special needs course are translated into several indicators and learning objectives written down in the module contents section. The formulation of indicators and learning objectives emphasize on the type of science process skill that is applied and the mastery of the basic concepts of the course topics. The learning stages of science process skill based are described clearly and systematically described in the learning module. The learning steps reflect the activities undertaken by the students. Likewise with students’ worksheets, this component contains specific types of the science process skill exercises for students which have been linked the topics [10].

3. Research Method
The step to design the learning instruments used the Dick and Carey [11] learning development model. Dick and Carey's development model consists of 10 stages which are then adapted according to the needs and objectives of this developmental research which is 7 stages. All stages carried out in the first year to produce learning instruments which are lesson plan, learning module, and assessment instrument for the 9 topics in the course.
In the second year, the experiment method used to investigate the effectiveness of the developed learning instruments to improve learning process quality and learning achievement of students in Department of Special Needs Education, State University of Makassar. The subject of this study is a lecturer and students in the course of science for children with special needs, academic year 2016/2017. The development procedure is as follows: (1) the initial stage is to determine the standard competence, the basic competences, and indicators of achievement of competence as the output of learning; (2) developing lesson plan; (3) developing assessment instruments with scoring rubrics, (4) developing learning modules, (5) designing and giving formative evaluation of the learning instruments developed, (6) revising initial draft of the instruments based on formative evaluation data, and (7) designing and giving summative evaluation, aiming to assess the effectiveness of the learning instruments in improving students’ science process skill and the quality of students’ learning process and achievement.

3.1. Experimenting the instruments
Initial draft of learning instrument are tested as formative evaluation consisting of individual test that is content review, learning design review, response from the lecture of the course, small group test for 5 students, and experiment to one class of students of the science for children with special needs course. Formative evaluation stage aims to determine the quality and feasibility of learning instruments.

The learning instruments that have been through the process of implementation and revision in many times, then need to investigate how effective the instruments in improving the quality of students’ science process skill, the quality of learning process, and the student's learning achievement. The result of experimenting the learning instruments is an indication of the feasibility of the science process skill based learning instruments as a learning instrument that can improve the quality of students' science process, the quality of learning process, and the students’ learning achievement in the course of science for children with special needs.

3.2. Data Collection
The data collection instruments used in this study consist of (1) a validation questionnaire for experts, (2) a validation questionnaire for practitioners, (3) a student response questionnaire, (4) a science process skill test, (5) comprehension tests, and (6) implementation observation sheets of science process skill based learning. The data collection techniques are test and non-test (questionnaire and observation sheets) in line with the type of instruments to be used.

3.3. Data analysis
Data analysis used descriptive and inferential statistical techniques. Descriptive statistical analysis aims to process the data obtained in criteria score analysis in questionnaire the Likert scale and checklist list on the observation sheet. The inferential statistical analysis (t test) used to know the significance of the improvement in quality of science process skill, the students’ understanding, the quality of learning process, and student learning achievement in the course.

4. Conclusion And Recommendation

4.1. Conclusion
1) The learning instrument, the lesson plan of the course of science for children with special needs is valid and effective after going through the process of development and revision in improving the quality of science process skill of students in the Department of special needs education, state university of Makassar.

2) The learning instrument, the learning module is valid and effective after going through the process of development and revision in improving the quality of students learning process in the course of science for children with special needs.
3) The learning instrument, the assessment instrument is valid and effective after going through the process of development and revision in improving the quality of student learning achievements in the Department of Special Needs Education.
4) There is an improvement in the quality of learning process of the students after implementing the science process skill based learning.
5) There is an improvement in the quality of students' learning achievement after implementing the science process skill based learning.

4.2. Recommendation
It is recommended to all people who are concern to science education learning for children with special needs, particularly the lecturers in the course of science for children with special needs in the Department of Special Needs Education, Makassar State University, to use the instruments: the lesson plan, the learning module, and the assessment instrument of the course since it is effectively improve the quality of science process skill, the quality of learning process, and the quality of students’ learning achievement. It is also recommended to other researchers to examine similar study, in the Department of special needs education or in various institutions, both in public or private higher education.

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