A conceptual model of the integrated science learning quality assurance

A Mustikasari*, Wiyanto, S Ridlo and E Susilaningsih

Doctoral Program of Science Education of Postgraduate Studies, Universitas Negeri Semarang, Indonesia

*Corresponding author: ardianim@gmail.com

Abstract. The purpose of this study was to: 1) an understanding of quality assurance in science teachers; 2) implementation of the integrated science learning quality assurance; 3) a conceptual model of the integrated science learning quality assurance. The Integrated science learning quality assurance model is a systematic, planned and sustainable process to ensure that learning is carried out according to process standards. This study use evaluation research. The research approach was quantitative descriptive. The data collected by test, observation, documentary study, and literature review. Based on study result, a conceptual model of the integrated science learning quality assurance was proposed. The conclusion of the research is both the understanding of science teachers on quality assurance tends low. Integrated science learning both in planning and implementation shows low scores. A conceptual model of the integrated science learning quality assurance was proposed with implementation of quality procedures application. These activity are analysis of graduates competencies - core competencies - basic competencies, analysis of integrated science, mapping of basic competencies, preparation of indicators net, development of syllabus, preparation of lesson plans, ensure of learning preconditions, implementation of learning, and implementation of assessment.

1. Introduction

Population Education has the challenges of globalization. School quality assurance is an important activity to face the challenges of globalization. School quality assurance can be implementing with quality management system.

The model of education quality management system, especially for integrated science learning is still very limited. Researches and journals about the quality of education were aimed for e-learning and learning in general subject matter. That is necessary to develop a conceptual model of integrated science learning quality assurance.

Study about Integration of Strategic Management and Quality Assurance has been carried out in the Romanian Higher Education. Document are used as quality assurance tools. Developing of operating procedures and activities based on domains, criteria, standards and performance indicators [1]. The existence of quality assurance procedures and policies is one of the criteria in the quality management [2].

Quality criteria for schools in Indonesia are education national standards. Based on quality report data, schools that meet the standards are 0% [3].

Schools are said to be qualified if all activities are in accordance with standards. In junior high school, science learning is carried out through integrated learning. This is according to the process standard. Most teacher are not implemented integrated science learning yet [4]. Supervision result by the Central
Java Education Quality Assurance Agency indicate that the planning, implementation and assessment of integrated science learning in junior high schools has not been well implemented. The application of integrated science learning is still a problem for junior high school teachers. Science learning is still taught separately [5].

The problems that arise are 1) how have been understanding of integrated science learning quality assurance in science teachers?; 2) how have been implementing integrated science learning quality assurance?; 3) how is a conceptual model of the integrated science learning quality assurance? The study purpose was to analyze: 1) an understanding of quality assurance in natural science teachers; 2) implementation of the integrated science learning quality assurance; 3) a conceptual model of the integrated science learning quality assurance.

2. Method
This study used evaluation research. The research approach was quantitative descriptive. The data collection technique was described as follows. Document study, observations, interviews, and study literature to deepen the findings and analyze the conceptual model of integrated science learning quality assurance. Data were collected in quantitatively and qualitatively. Data analysis were analyzed descriptive [6, 7].

3. Results and Discussion
The science teacher's understanding of the quality assurance of integrated science learning tends to be low (figure 1). Less category is 40%. Enough category is 60%.

![Figure 1. Graph of teacher understanding regarding integrated science learning quality assurance](image)

Low understanding of science teacher is due to only 20% of schools that have been facilitated about the quality assurance system in 2018. Science teachers who took the test were taken randomly. Science teachers come from schools that have not yet obtained the facilitation of a quality assurance system.

Understanding of quality assurance policies is important. One aspect of quality management is implementing a quality policy. In order to implement a quality policy begins with an understanding of existing [1,8]. Theories about quality assurance and quality assurance steps need to be understood to give rise to internal motivation so that all school citizens will create a quality-oriented environment. Understanding of quality assurance is very necessary because the implementation of quality assurance requires environmental support that recognizes that quality is a work value [8,9].

The results of document studies, observations and interviews on the implementation of quality assurance for integrated natural science learning in one junior high school are shown in Figure 2. Lesson plan gets high scores on aspects of lesson plan component, graduates competencies - core competencies - basic competencies analysis, scientific, and character habituation. Midle scores on aspects of literacy and HOTS. Low scores on integrated learning, 21st century skills, and authentic assessment. The learning process gets high scores on aspects of lesson plan component, graduates competencies - core competencies - basic competencies analysis, and scientific. Midle scores on aspects of character
habituation, literacy, 21st century skills and HOTS. Low scores on integrated learning and authentic assessment.

Science teachers have been able to compile lesson plan and implement learning with a high degree of conformity to process standards. High compatibility in lesson plan component, graduates competencies - core competencies - basic competencies analysis, designing scientific learning and character habituation. This capability needs to be continually improved in order to reach or exceed standards.

Integrated science learning both in planning and implementation shows low scores. The score of aspect of integrated natural science learning lesson plan is 37 and the implementation of integrated natural science learning is 25. The learning steps in lesson plan have not shown integration among subjects. Science learning implementation was delivered separately in biological, physical and chemical material in each learning process. Some studies show that science learning is based on fragmented subjects. Teachers' understanding and skills in implementing integrated science learning are still low [10].

The interview results in the preparation of integrated science learning plans showed that science teachers had not analyzed integration. Integrated learning are ten models. They are networked, immersed, integrated, threaded, webbed, shared, sequential, nested, connected, and fragmented [11]. Integration can be done by implementing STEAM. STEAM is integration of science, technology, engineering, art and mathematic [12]. Integrated science learning can integrate concepts, integrate aspects to be achieved, integrate real-world experiences, integrate with the context of the existence of schools [11,12].

Integrated science learning needs to be applied because science is complex. Each science subject is not separate from one another. Separation causes science teaching not to reflect natural truth. Integrated science learning has been implemented for a long time in the United States and several Asian countries, such as China and Korea [13].

Integrated science learning has not been implemented. Middle school science teachers do not come from integrated science backgrounds. For this reason, it is necessary to increase the ability of teachers to manage integrated natural science learning through the implementation of a quality assurance system.

Quality assurance carried out through the stage of quality mapping, quality fulfillment, planning, implementation of quality fulfillment, evaluation and new standard setting by schools. The step of quality assurance was carried out by the school in accordance with applicable policies [1].

![Graph of implementation of integrated science learning quality assurance](image)

**Figure 2.** Graph of implementation of integrated science learning quality assurance
Some theories of quality assurance state that standard fulfillment is carried out by implementing quality management [1,8,14]. The study results of The effect of students’ perceived service quality and perceived price on student satisfaction indicate that the implementation of quality management allows universities to consistently produce quality services to students [8].

Quality management includes quality control, quality assurance, and quality improvement. Quality control is an activity to identify that service or activity processes meet quality standards. Quality assurance is an activity to ensure that the quality of a product or service and process has been carried out in accordance with manuals, procedures and instructions. Quality improvement is an activity to improve the quality of a product or service. The identified findings indicate that there are differences between activities have been carried out with activities should be carried out (standards). The findings when quality control (QC) must be immediately analyzed, followed up, and prevented from recurring. Implementation of quality fulfillment does not have to wait for the upcoming fiscal year or year [1]. School quality assurance that has been carried out in several countries was found to be not learning oriented. Prioritizing institutional aspects rather than student aspects and learning [15].

The understanding and implementation of integrated science learning quality assurance currently underlies the conceptual model of integrated science learning quality assurance. The conceptual model is a model that is formed after the conceptualization process that represents a system to help people know, understand, or simulate integrated science learning quality assurance [8]. The conceptual model of integrated science learning quality assurance is described in figure 3.

The application of an integrated science learning quality assurance system is expected to be able to familiarize character, literacy, critical thinking skills, creative, communicative, and collaborative. Study results of the implementation of integrated science learning can improve the achievement of student outcomes including attitudes, knowledge and skills [11,16].

Implementation of integrated science learning quality assurance to be done with developing quality documents. Quality documents consist of integrated science learning quality procedures and formats. Quality procedure contains of integrated science learning activities [13]. These activity are analysis of graduates competencies - core competencies - basic competencies, analysis of integrated science, mapping of basic competencies, preparation of indicators net, development of syllabus, preparation of lesson plans, ensure of learning preconditions, implementation of learning, and implementation of assessment [17].

Analysis of graduate’s competencies - core competencies - basic competencies was needed to analyze the suitability of learning with graduate competency standards and content standards. Learning to fulfillment graduate competencies standard includes the development of the domain of attitudes, knowledge, and skills. Fulfillment attitude competencies through the character strengthening of religiosity, nationalism, independence, integrity, mutual cooperation. The development of attitude competency is also through strengthening literacy so that students become lifelong learning. Competence of knowledge includes factual knowledge of science, conceptual science, procedural science, metacognitive science. Skills competencies include critical, creative, communicative and collaborative thinking.

Integrated analysis of science learning can integrate concepts, integrate aspects to be achieved, integrate with real-world experience, integrate with the context of the existence of the school. The model of cohesiveness is in accordance with forgatty or STEAM [10,11,16]. Integration is made of a matrix of connectedness between basic competencies from several integrated subjects. The connectedness matrix to show the relationship between themes/topics with basic competencies or between basic competencies with one another that can be integrated is basic competencies mapping activities [11].

Every Basic Competency was translated into indicators of learning achievement. The relationship between indicators of each basic competencies was outlined in the indicator net. The next step was to develop an integrated science learning syllabus. Syllabus is developed from various indicators in the field of science studies or other subjects that have integration or relevance [17].
The lesson plan was based on syllabus. Integration is developed in learning strategies. Lesson plan is a realization of the learning experience of students that has been determined in syllabus. Minimal criteria of lesson plan is consist of learning objectives, learning steps, and learning assessment.

Ensuring of learning prerequisites is carried out before the implementation of learning. The prerequisites for learning include face-to-face time allocation is 40 minutes per lesson, the maximum number of students is 32 people per study group, textbooks are available as needed for all students, and classroom management by the teacher. The implementation of learning includes introductory, core and closing activities. The implementation of science learning is integrated by applying various learning models, namely discovery learning, problem-based learning, or project-based learning [3,16].

Assessment of the defense process uses authentic assessment. Assessment was carried out thoroughly on aspects of attitudes, science knowledge and science skills. Assessment was carried out by process and outcome assessment [16].

The application of integrated science learning quality assurance is carried out by applying quality documents. The application of quality documents requires an environment that can create a conducive and quality-oriented atmosphere. Quality as work value [8,9].

![Conceptual model of integrated science learning quality assurance.](image)

**Figure 3.** Conceptual model of integrated science learning quality assurance.

4. Conclusion
The understanding of science teachers on quality assurance tends low. The conclusion of the research is both the understanding of science teachers on quality assurance tends low. Integrated science learning both in planning and implementation shows low scores. A conceptual model of the integrated science learning quality assurance was proposed with implementation of quality procedures application. These activities are analysis of graduate’s competencies - core competencies - basic competencies, analysis of integrated science, mapping of basic competencies, preparation of indicators net, development of syllabus, preparation of lesson plans, ensure of learning preconditions, implementation of learning, and implementation of assessment.
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