The Analysis of Syllabus Suitability and Learning Materials In Science Teaching

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Abstract: The course "Integrated Science" is expected to equip the students of Integrated Science in sights that can be used as a complement to the knowledge of mathematics. Books-used books are books that contain the content of physics, chemistry and biology separately. This is of course contrary to the nature of the "Integrated Science" itself. Learning "Integrated Science" should be taught with the theme-a theme that is familiar with daily life -the day in the form of social science issues. With the research method of literature review found that the adjustment between the syllabus and the books used by the theme of the book "The sciences an integrated approach to" produce 17 chapters that will be taught in the mathematics department of the university students I researched. Need to develop theme-the theme of the nuances of local knowledge in accordance with the conditions of residence of students in the hope that Science learning integrate diversified science will be increasingly attractive.

Keywords: Analysis, syllabus, Integreted science, science books

1. Introduction

Mathematics study program at PGRI University of palembang has been opened since the academic years of 1984/1985. The curriculum of this course had changed in several times, as the development of the era. The obtain curriculums nowadays were 2006 and 2011. Based on the revise discussion meeting of this two curriculums, there were some revisions, namely: 1) add the course of " integrated science" at first semester by considerate to follow the existing middle school’s curriculum: 2) the course of “ Environmental Science “ was deleted because has same contents with the integrated science.

The course of integrated science expected to equiped the university students about this knowledge and can be used as the complement of the mathematical science. In this realization of this curriculum (academic years 2011/2012 until now), the students of this science has separated between the subject’s content of physics, chemistry and biology. The using books were books that contained physics, chemistry, and biology separately. This matter directly incompatible with the substance of “ integrated science “ itself.

The students of this science should be taught by using the familiar themes in their daily life in the form of science issues. The social scientific issues that close in society life was useful to open the student’s knowledge. The example of this issues are biotechnology, cloning, provision genetics engineering, environment issue ( global warming, acid rain and etc ) and so on. These issues have been familiar in this era. This is important to choose the guide book to teach this “ integrated science”, and it may not allow to use the handout beside use exist books that has concentrated that content in one theme. The one of a book that can be used is “ The sciences an integrated approach ”(Trefil, 2010).

The choosing of this theme aimed to students be aware with science (science literature), easy to understand and applying the science in their life. The phenomena such as landslides, flood, the pilling up of fields to build the housing that does not consider the environment condition and bad habit as throwing the cigarette and rubbish carelessly, etc. Sure it can prevent if the students want to understand about science literation. The right understanding about this science will open the student’s eyes to understand the natural process and doing right in term of treat the nature and around the environment.

According to OECD, science, literature defined as: "The scientific knowledge of someone and its uses to identify a question, procure the new knowledge, describe the scientific phenomenon and collect the conclusion based on the facts about science issue and understanding about science characteristics as a form of human knowledge and investigation, an awareness of how science and technology can form a material, intelectual environmnet, and our culture, and also a willingness to be mixed up with the science issues, and related ideas science, as an reflection of citizen". (OECD, 2009)

Referring to a background explanation above, so it can be formulate that the problem need to solve through this study was about how a suitability of syllabus of integrated science against to used science teaching materials by that, so the aim of this paper was to analized a suitability between syllabus in the cirriculum with the teachin materials used on the “ intergrated science “ course. Meanwhile the retrived advantage of this study was as the input to a completeness of intergrated IPA implementation in Palembang PGRI University.

2. Method

The methods used in this study was the literature study, because the data analysis and teaching material has done by collecting the material and document as study source. So that, this study begin by collecting all related documents with the intergrated science study in formed of curriculum,
sylabus, and books/ teaching material that used by the lectures. After all study sources collect, it doing the deep analysis to know the suitability between the sylabus in the curriculum with the teaching material used. So the offered the datas held by the analytics descriptive pattern.

3. Data and discussion

Table 1: Syllabus Of “Integrated Science” Course

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<td><strong>No</strong></td>
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Table 2: Content That Contains In A Teaching Material Of “Integrated Science”

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>Chapters</strong></td>
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<tr>
<td>Physics</td>
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<td>Chemistry</td>
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<td>Biology</td>
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<td>Astronomy</td>
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<td>Geology</td>
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1. Science Theme: science is the way to ask and answer a question about physics thing in around of universe.
2. Role of Nature Theme: the newton’s law about motion and gravity can be predicted a behavior of things in earth and space.
3. Energy Theme: there are many forms of different energy can be switched, and amount of total energy in an isolated system was eternal.

Chapter 4. Calor and The Second Thermodynamic Laws. Theme: calor is a form of energy that flew from a hot place to a cold place.

Chapter 5. Electrics and Magnetics
Themes: electrics and magnets are two different aspects and electromagnetic energy.

Chapter 6. Wave and Electromagnetic Radiation.
Theme: when a things containing electrics be accelerate, so it will produce a raditaion energy and electromagnetics wave that run by light acceleration.

Chapter 7. Albert Einstein and Relativity Theory.
Theme: all observation, do not care whether them framework references, to see a same universe law.

Chapter 8. Atom
Theme: all things in around of us made from an atom, a construction block of chemistry in our world.
Chapter 9. Quantum Mechanics
Theme: in substomics scale, all things quantitated, every measuring on significant scales altered an measured object.

Chapter 10. Atom in Combination: Chemistry Bond
Theme: atom bonded collectively in chemist reaction by doing a electron resets.

Theme: a materials was a result of the arrangement of atoms and arrangement of chemist bond that bonded atom collectively.

Chapter 12. Core of Atom
Theme: nuclear energy depends on a period conservation become an energy.

Chapter 13. Final Structur from a Materials.
Theme: all materials made from quark and lepton, those are basic construction blocks from whole universe we knew.

Chapter 14. Stars
Theme: sun and other stars used a nuclear fusion reaction to altered a mass to be energy, and finally, when a nuclear fuel a stars have used up, the stars could be burned out.

Chapter 15. Cosmology
Theme: the universe started a million years ago through a big bang explosion, and have developed since that time.

Chapter 16. Earth and Another Planet.
Theme: earth, the one of sun orbiting planet. Formed 4.5 million ago from a dust cloud.

Chapter 17. Tectonic Plates
Theme: earth altered because a slowest convection from a warm stones in a belly of earth.

Chapter 18. Sycles that Happened in Earth
Theme: all things under and in underneath of ground moving in a cycles.

Chapter 19. Echology, Ecosystem and Environment
Theme: ecosystem is a each dependent community from kind things that recycling a materials, meanwhile energy flew from organism.

Chapter 20. Living Strategy
Theme: organism used a different strategy to handle kinds of problems to get and use a material and energy.

Chapter 21. A Parts of Cell and Living
Theme: living realized by chemist compound, and it happened in cell.

Chapter 22. Living Molecule
Theme: main parts of cells formed from simple blocks molecule construction.

Chapter 23. Classic Genetics and Modern.
Theme: all organism used same genetics code to guide a chemistry reaction in every cell.

Theme: our new understanding about genetics mechanism that directed to a great advancement technology in mediacal parts and others that influence our living aspect.

Chapter 25. Evolution
Theme: all organism in earth evoluted from single cell organism because the natural selection.

Table 3: The Suitability Between Syllabus With The Theme In Teaching Material of “ Intergrated Science “

<table>
<thead>
<tr>
<th>Current Valid syllabus</th>
<th>Each chapter themes in the teaching material of “ The sciences an integrated approche”</th>
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<tbody>
<tr>
<td>Chemistry: Scientific Knowledge</td>
<td>Chapter 1: science&lt;br&gt;Theme: science is the way to ask and answer a question about physics in around of universe.</td>
</tr>
<tr>
<td>Biology: Biology as a knowledge, characteristics of science and scientific method</td>
<td>Chapter 2: The root of universe&lt;br&gt;Theme: the newton’s law about motion and gravity can be predicted a behavior of things in earth and space.</td>
</tr>
<tr>
<td>Physics: Newton Laws and its Application</td>
<td>Chapter 3: Energy&lt;br&gt;Theme: there are many forms of different energy can be switched, and amount of total energy in an isolated system was eternal.</td>
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<td>Chemistry: Meaning of thermochemistry, exotherm and endotherm reaction, black law, caliometers. Calor reaction.</td>
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</tr>
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<td>Physics: eternal law, energy</td>
<td>Chapter 5: Electics and Magnetics&lt;br&gt;Themes: electrics and magnetics are two different aspects and electromagnetic energy.</td>
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<td>Chapter 6: Wave and Electromagnetics Radiation&lt;br&gt;Theme: when a things containing electrics be accelerate, so it will produce a radiation energy and electromagnetics wave that run by light acceleration.</td>
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<td>Chapter 7: Albert Einstein and Relativity Theory&lt;br&gt;Theme: all observation, do not care whether they framework references, to see a same universe law.</td>
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<tr>
<td>Chemistry: meaning of atom, atom</td>
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concept, periodic systems, electrom filling role, period deciding and group.  

| Theme: all things around of us made from an atom, a construction block of chemistry in our world. |

Chemistry: meaning of atom, atom concept, periodic systems, electrom filling role, period deciding and group.  

| Chapter 9. Quantum Mechanics  
Theme: in subtopics scale, all things quantitated, every measuring on significant scales altered an measured object. |

Chemistry: meaning of energy, energy conservation, and kinds of energy.  

| Chapter 10. Atom in Combination: Chemistry Bond  
Theme: atom bonded colectively in chemist reaction by doing an electron resets. |

Chemistry: meaning of atom, atom concept, periodic systems, electrom filling role, period deciding and group.  

| Chapter 11. Materials and Its Characteristics.  
Theme: a materials was a result of arrangement of atoms and arrangement of chemist bond that bonded atom colectively. |

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| Chapter 12. Core of Atom  
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| Chapter 13. Final Structur From a Materials.  
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Theme: earth, the one of sun orbiting planet. Formed 4, 5 million agon from a dust clouds. |

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| Chapter 20. Living Strategy  
Theme: Organism used a different strategy to handle kinds of problems to get and use a material and energy. |

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| Chapter 21. A parts of Cell and Living.  
Theme: living realized by chemist compound, and it happened in cell. |

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Theme: main parts of cells formed from simple blocks molecule construction. |

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| Chapter 24. Science Concerned to New Living.  
Theme: our new understanding about genetics mechanism that directed to a great advancement technology in mediacaal parts and others that influence our living aspects. |

Biology: basic principle of characteristic inheriting, gender determining chromosome, genetics materials, genetics code, protein syntetics, genetics engineering.  

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### 4. Discussion

In chapter 1 of general role, point one number 19 UU RI Number 20, year 2003 about national education system, stated that the meaning of curriculum is a set of plan and set about goal, contain and learning material, along with the way used as the guide in implementing a learning activity to obtain a certain goal. Curriculum included all activities that aimed to give a education experience to students. There are 3 form of curriculum organizing (Dakir, 2010):

1. Separate subject curriculum: Curriculum contents arranged in a separate content.
2. Correlated curriculum: The curriculum contents arranged by a same contents that grouping in a subject, e.g IPA arranged by a content: physyc, chemistry and biology.
3. Integrated curriculum: The contents of curriculum have not showed each contents yet. Integrated curriculum created by focussing a content to certain problem that need to be solve by giving a material or teachin material from a science or contents.

A focussing of problems on integrated curriculum held by deciding a theme/issue/problem that appointed in discussion of content material. The way to mixing of content into a theme/issue/problem introduced by Forgarty (Forgarty, 1991) in a models of intergrated IPA development. The one of intergrated IPA learning form was a intergrated learning in Webbed model. In a book of “ The sciences an integrated approache” (Trefil, 2010) a model of intergrated IPA development that choose by author was a form of Webbed, where all contents related by one appointed theme.

![Figure 1: Webbed map digram (Fogarty,1991)](image)

To get any suitable material on learning integrated science, author tried to intergrating exist syllabus with each explanation theme in a book of “ The sciences an integrated approche”. So it will deciding wheter chapter will use in learning. Themes and appointed content on that book explained in Table 2. In this table can be seen if every chapter of book “ The sciences an integrated approche” tied up in a theme with each contents. The appointed konent in every chapter are physyc, chemistry, biology, mediacal and savety, environment, astronomy, geology, and technology. there are some chapters that were not entering all content. This is because that theme was not need that content.

For example in chapter 15 that explained about cosmology with only entering four contents namely physyc, chemsitry, technology, and astronomy. In a existing syllabus was only contained a physyc, chemistry, and biology in separately (Table 1). Table 3 showed a suitability between syllabus and chapeter in this book “ The sciences an integrated approche”. From Table 3 it can be conclude that the suitability topics with the current syllabus are: science, universe rule, energy, calor, and second thermodynamics, atom and atom in combining: chemist society, materials and its nature, atom core, final structure, and a material, stars, cycles hapened in earth, echnology, ecosysytem, and environment, living strategy, cell’s parts of organism, molecular of organism, clasic and modern genetics, science concerned to new life.

In curriculum 2013 stated that the orientation science learning is the ability of applicative, developing the ability to think, learn, curiosity and attitude development funds out its social and natural environment. IPA is also devoted to the introduction of the biological and the surrounding natural environment, as well as the introduction of the various advantages of the archipelago. Through an integrated learning science, students can gain hands-on experience, so as to add strength to accept, store, and apply the concepts they have learned. Thus, students are trained to be able to find themselves a variety of concepts studied thoroughly (holistic), meaningful, authentic and active.

How learning experience designed packaging teachers influence on the meaningfulness of the experience for the learner. Experience shows the links to learn more conceptual elements will make the learning process more effective. Conceptual linkages are studied by the relevant scientific field of study will form a cognitive schema, so that children acquire knowledge integrity and roundness. Obtaining the integrity of science learning, as well as the roundness views on life, the real world and natural phenomena can only be reflected through integrated learning.

According Trefil, James and Robert Hazen (2007: xii), an integrated approach (an integrated approach) involves a scientific process, organizing principles, organizing the natural integration of scientific knowledge and its application in everyday life. In addition, in an integrated approach is also expected to link the students in other fields include physics, astronomy, chemistry, geology, biology, technology, the environment, health and safety. Therefore, the lack of compatibility between the syllabus and the books/instructional materials are used, there should be concrete measures for adjustment. This is need to be done so that the teachers" integrated science" has a clear and accurate guidelines.
5. Conclusion

From explanation above, so it can be conclude that:

1. The use of theme in integrating science teaching or integrating IPA were a necessity, because that integration was a power of its science. Science learning whether in separate or does not use any theme was incompatible with the nature of integrating science itself.

2. The suitability between syllabus and syllabus book with the theme in book of “The sciences an integrated approach” created at least 17 chapters will be teach to students of mathematics study courses in observed university.

6. Recommendations

1. Its need to be develop the local wisdom theme that suitable with the condition of students place, by hope this learning material will be more interesting.

2. This local wisdom theme will be interesting observation thing and produce the students and a integrating science book of indonesian or local wisdom.

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Author Profile

Sulistiawati, is a lecturer at the University of PGRI foundation Palembang. He obtained a degree in 1992 in Palembang, Sriwijaya University, majoring in chemical engineering in 1998 graduated fund masters at the University of Indonesia, majoring in chemistry. Currently, she is pursuing a doctorate at the Indonesia University of Education in Bandung. Subjects who hold is "Basic Chemistry 1and 2", "Environment Knowledge" and "Thermodynamika". As for the field of research is the study of scientific literacy.

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Wahyu Sopandi is a lecturer in the department of chemistry education in FPMIPA University as Pendidikan Indonesia(UPI) Bandung. He obtained his Bachelor of Chemical Education in Teachers' Training College London in 1989 and obtained his Master's degree from the College of Education, Ohio State University, Columbus, USA in 1995, after which he continued his education at FB Chemieund Pharmazie, West faelische Wilhelms Universitaet, Muenster, Germany and obtained his PhDin200areas of study/research is on chemical education and scientific literacy.