

Analysis of Learning Resources Biology Book by Neil A. Campbell for class X SMA / Equivalent

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Abstract

This study aims to determine the results of content analysis in the Biology book by Neil A. Campbell for class X SMA / equivalent using Science Literacy. This research method is descriptive qualitative with the research subject is the Biology book by Neil A. Campbell for class X SMA / equivalent. The research instrument is a book suitability analysis. Data collection is based on the results of the analysis conducted by researchers on Biology by Neil A. Campbell for class X SMA / equivalent based on science literacy content. Based on the analysis, the suitability of the Biology book by Neil A. Campbell for grade X SMA / equivalent seen from science literacy is categorized in the Science book as a body of knowledge (a body of knowledge).

1. Introduction

If we take a more global perspective, then science should be seen as a way of thinking to gain an understanding of nature and its characteristics, how to find ways to explain natural phenomena, as a body of knowledge) that comes from human curiosity. By using an understanding of these fundamental aspects, a science teacher can be helped in conveying to students a more complete and comprehensive picture of the world of science (Aswasulasikin, 2008).

According to the Organization for Economic Co-operation and Development (OECD, 2003), scientific knowledge is defined as the ability to use scientific knowledge, identify questions, and draw conclusions based on facts, to understand the universe and make decisions from human-induced changes. It is important for students to master scientific knowledge on how students can understand the environment, health, economy and other issues faced by modern societies that are highly dependent on technology and scientific progress and development (Yusuf, 2003).

In PISA 2000, the average score of the scientific knowledge component of Indonesian children was 393, lower than the ability scale, placing Indonesia in 38th place out of 41 countries, below Thailand whose average score was 436, in 32nd place. . At this level of competence, students are usually only able to recall scientific facts, terms and laws and use general scientific knowledge to draw and evaluate conclusions (Hayat, 2003). According to Darliana (2005), the weakness of science learning in Indonesia mainly lies in the knowledge of how to perform procedural and directed skills of science learning.

According to Weiss et al. (1989), 90% of advanced science teachers use textbooks. Blystone (1989) estimated that 75% of textbooks are used for classroom teaching and 90% for homework. This is related to previous research showing that textbooks are used by 90% of all science teachers and 90% of their time is allocated to study (Stake & Easley, 1978). Existing textbooks emphasize the content aspect rather than the process and contextual aspects required by PISA (Firman, 2007), which is believed to cause the low level of science literacy of Indonesian children. Therefore, through the selection of appropriate textbooks, it is expected that there will be an increase in scientific understanding which in turn can increase students' scientific knowledge. To be able to select good textbooks, a method of analyzing books related to aspects that contain scientific culture, namely content, process and context is needed.

In addition, to help facilitate the learning process, one of which is in the form of printed teaching materials, of course, student books are arranged systematically according to the 2013 curriculum. In this

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case the student book in question is a textbook or more commonly known as a textbook, a packaged book is a collection of sheets of paper bound with thick paper.

The student book is understood as a description of efforts throughout the learning process, both inside and outside the classroom, which must be done by a student. This is consistent with what Shield & Dole (2013:183-199) that during learning takes place both inside and outside the classroom, textbooks are one of the efforts to strengthen students' knowledge of each subject, including Biology. The Biology book by Neil A. Campbell is a learning resource that is not mandatory but needs to be analyzed whether it is really needed by class X SMA / equivalent.

Science Literacy

Science literacy consists of two words: literature and science. Literacy literally comes from the word Literacy which means literate movement (Echols & Shadily, 1990). Meanwhile, the term science comes from the English word Science which means knowledge. Pudjadi (1987) states that: "Science is a collection of knowledge about natural objects and phenomena obtained from the thoughts and research of scientists conducted with experimental skills with scientific methods."

Science literacy is the ability to use scientific knowledge to identify problems and draw conclusions based on evidence in order to understand and make decisions about nature and changes made to nature through human activities (PISA, 2000). Science literacy according to National Science Education Standards (1995) adalah: *Scientific literacy is knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity. It also includes specific types of abilities.*

Science literacy is a knowledge and understanding of science concepts and processes that will enable a person to make a decision with the knowledge they have, and get involved in matters of state, culture and economic growth, including their specific abilities. Science literacy can be defined as an understanding of science and its application to the needs of society (Widyatiningtyas, 2008).

Categories for Analyzing Science Textbooks

Chiappetta, Fillman & Sethna (1991b) in A Quantitative Analysis of High School Chemistry Textbooks for Scientific Literacy Themes and Expository Learning Aids mentioned several categories to analyze science textbooks as follows:

1. Science as a body of knowledge.

This category is used if the purpose of the text in the analyzed book is:

- a. Present facts, concepts, principles and laws.
- b. Presenting hypotheses, theories and models.
- c. Asking students to recall knowledge or information.

2. Science as a way of investigating

This category is used if the purpose of the text in the analyzed book is:

- a. Requires students to answer questions through the use of materials.
- b. Require students to answer questions through the use of graphs, tables, etc.
- c. Requires students to make calculations.
- d. Requiring students to explain answers.

- e. Involving students in experiments or thinking activities.

3. Science as a way of thinking

Science is a human activity characterized by a thinking process that occurs in the mind of anyone involved in it. The work of scientists, which is related to reason, illustrates human curiosity and their desire to understand natural phenomena. Each scientist has attitudes, beliefs and values that motivate them to solve the problems they encounter in nature. Scientists are driven by immense curiosity, imagination and thought in their investigations to understand and explain natural phenomena. Their work manifests in creative activity where ideas and explanations about natural phenomena are constructed in the mind.

This category is used if the purpose of the text in the analyzed book is:

- a. Describe how a scientist conducts an experiment.
 - b. Show the historical development of an idea.
 - b. Emphasizes the empirical nature and objectivity of science.
 - c. Illustrates the use of assumptions.
 - d. Shows how science proceeds by inductive and deductive reasoning.
 - e. Provides cause and effect relationships.
 - f. Discussing facts and evidence.
 - g. Presenting scientific methods and problem solving.
4. Interaction of science, technology, and society This category is used if the purpose of the text in the analyzed book is:
- a. Describing the usefulness of science and technology for society,
 - b. Showing the negative effects of science and technology for society,
 - c. Discuss social problems related to science or technology, and
 - d. List careers and jobs in science and technology.

2. Method

This research includes descriptive research. The object of this research is the material in the Byology book by Neil A. Campbell which is analyzed. Where compared and matched with the material that should be in the biology textbook class X SMA / equivalent. The instrument used as a tool to help capture the necessary data is an observation sheet containing indicators of the science literacy category described above.

3. Result and Discussion

Indicators of grade X Biology material according to the Merdeka curriculum	Material in Byology by Neil A. Campbell
<ul style="list-style-type: none"> • Scope of biology • Biodiversity • Classification system of living things and determination key 	<ul style="list-style-type: none"> • Volume 1 <ul style="list-style-type: none"> ✓ Chemistry of Life ✓ Cells ✓ Genetics

<ul style="list-style-type: none"> • Viruses • Bacteria • Protista • Fungi • Plantae • Animalia • Ecosystem • Environmental change 	<ul style="list-style-type: none"> • Volume 2 <ul style="list-style-type: none"> ✓ Evaluation Mechanisms ✓ History of Evolution Biological Diversity ✓ Plant Form and Function • Volume 3 <ul style="list-style-type: none"> ✓ Animal Form and Function ✓ Ecology
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Table 1. The content of the material in the Biology Book by Neil A. Campbell and the mandatory material that should be in the biology course class X SMA / Equivalent

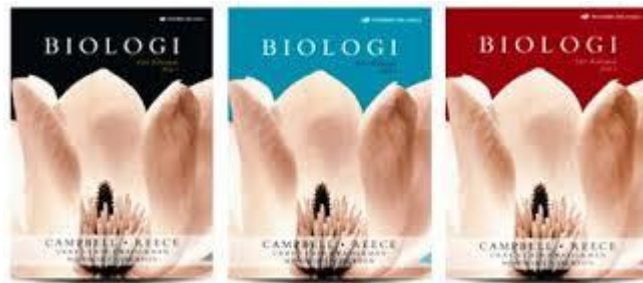


Figure 1. The book Byology by Neil A. Campbell All Volumes.

From the table above, it can be seen that all material in class X SMA / equivalent is contained in all Biology books by Campbell, even in the book not only describes things that are in the textbook, there is also a lot of other knowledge that helps to deepen the material, it is also the reason why this book is also used on campus. For example, in the chapter on biodiversity, Campbell's book is not only about diversity but also the history of why it happens. So that not only the basics are known by students, but also new insights that make them better understand events in the world of biology.

In general, the books analyzed present a lot of scientific knowledge, namely presenting facts, concepts, principles and laws, hypotheses, theories and models and claims, students memorize knowledge or information. This is in accordance with Anderson's (1990) research which analyzed the content of material in three high school biology textbooks. The topic covered at the broadest textual level is the content-oriented continuum of science (Lumpe and Beck, 1996). Chiapetta, Sethna & Fillman (1991 & 1993) analyzed life science and high school chemistry textbooks; they concluded that high school chemistry and life science textbooks focus more on the acquisition of scientific knowledge.

If we look at the truth on the ground; our students memorize very well, but are less able to apply the knowledge they have. This may be related to the tendency to use mnemonics as a means of mastering knowledge, not thinking skills. It appears that science education in Indonesia places more emphasis on abstract conceptualization and less on the development of active experimentation, whereas the two should be proportionally balanced (Pusbuk, 2003). Research on the scientific nature of the three books analyzed was relatively weak. This is consistent with Jablon's (1992) research that biology texts do not use appropriate strategies (such as STS, processing skills, and cooperative learning in the introduction) and laboratory activities, so students do not have the opportunity to become active researchers. Overall, the three books did not engage students in scientific inquiry as demonstrated in their scientific process skills. According to Nur (1982), process skills are skills needed to become or work as a scientist. Harlen (1980) suggests that there is a close relationship between knowledge acquisition and processing skills, concepts are mastered through the development of processing skills. The emphasis on learning concepts with a process skills approach aims to further emphasize mastery of concepts by developing various process skills. Thus, the nature of science as a product and process can be developed in programmed science learning.

Furthermore, Nur (1995) points out that only presenting products in science textbooks is not enough. Presentation of material using PKP (Processing Skills Approach) does not directly provide answers or conclusions in the guidebook. Students must develop their own thinking skills, seek and transform complex information themselves, and examine new information according to the law.

The three Campbell books analyzed reflect science as a way of thinking and the interaction of science, technology and society, but in a relatively small proportion to scientific knowledge. Text-oriented teachers are more content-oriented and spend less time focusing on science-technology-society (STS)/science-technology-society, individual needs and professional conscience (Gottfried and Kyle, 1992). Carin and Sund (1993) define science as systematic or regularly organized knowledge that is widely accepted and in the form of a set of observational and experimental data. Scientific activities are always associated with experiments that require ingenuity and ingenuity. Simply put, science can also be defined as what scientists do. Therefore, science is not just a collection of knowledge about objects or living organisms, but also a way of working, a way of thinking, and a way of solving problems. Scientists are always interested and intrigued by natural events, always curious about what, how and why about natural phenomena and causal relationships.

Most biology textbooks do not integrate 4 sets of books together, which can represent the nature of science in general and scientific content regardless of the nature of science used by scientists to develop ideas and theories. The text part not only contains biological content, but also provides opportunities for students to explore on their own, understand the important role of biology in our society, and explain how scientists, in their own business, develop an understanding of certain topics. . Biology textbooks should bring together all aspects related to science, including the study of the nature of science, the interaction of science, technology and society, and science as a medium.

4. Conclusion

Biology textbooks should bring together all aspects related to science, including the study of the nature of science, the interaction of science, technology and society, and science as a means of recognition, formalizing the text directly rather than in separate sections. In this case, the analyzed book brings together all aspects of scientific culture, thus reflecting scientific culture, but the proportion of scientific culture topics presented is disproportionate, only one scientific culture theme stands out, scientific knowledge.

From the three books analyzed based on scientific knowledge, the results show that the proportion of scientific knowledge topics is as follows; Science knowledge dominates, research on the nature of science exists but little, there is a discussion of science as a way of thinking. Also Science, technology and social interaction are tucked into each chapter of Campbell's Biology book.

References

- Arikunto, Prof. Dr. S. 2013. *Manajemen penelitian*. Rineka Cipta.
- Arikunto, S. 2002. *Prosedur Penelitian Suatu Pendekatan Praktek Edisi Revisi V*. Jakarta: PT. Rineka Cipta.
- Azizah, R. 2015. *Analisis buku teks matematika kurikulum 2013* penerbit kementerian pendidikan dan kebudayaan untuk SMA kelas XI pokok bahasan statistika berdasarkan kriteria bell.
- Bell, F. H. 1978. *Teaching and learning mathematics (in secondary schools)*. Wm. C. Brown Company Publisher.
- Beni, I. G., Trapsilasiwi, D., & Kristiani, A. I. 2013. *Analisis buku matematis for junior high school grade VIII 1 st semester (bilingual) berdasarkan kriteria bell*. KadikMA, 4(2).
- Chiappetta, E.L, Fillman, D.A, dan Sethna, G.H. 1991. "A Quantitative Analysis of High School Chemistry Textbooks for Scientific Literacy Themes and Expository Learning Aids". *Journal of research in science teaching*. 28, (10), 939-951.
- Chiappetta, E.L, Fillman, D.A, dan Sethna, G.H. 1993. "Do Middle School Life Science Textbooks Provide a Balance of Scientific Literacy Themes?". *Journal of research in science teaching*. 30, (2), 787 - 797
- Chiappetta, E.L, Fillman, D.A, dan Sethna, G.H.1991. "A Method to Quantify Major Themes of Scientific Literacy in Science Textbooks". *Journal of research in science teaching*. 28, (8), 713-725.
- Cochran, W.G. 1991. *Teknik Penarikan Sampel Edisi ketiga*. Jakarta: Universitas Indonesia (UI-Press).

- Direktorat Pendidikan Madrasah Departemen Pendidikan Agama. 2007. Tor Lomba Penulisan Buku Pelajaran "Mipa". [Online]. Tersedia: www.depag.go.id. [15 Juli 2008].
- Echols, J.M dan Shadily, H 1993. *Kamus Bahasa Inggris-Indonesia Indonesia-Inggris*. Jakarta: Gramedia.
- Firman, H. 2007. *Analisis Literasi Sains Berdasarkan Hasil PISA Nasional Tahun 2006*. Jakarta: Pusat Penilaian Pendidikan Balitbang Depdiknas.
- Fajriatin, A. 2017. Analisis buku matematika kelas IX kurikulum 2013 berdasarkan kesesuaiannya dengan materi matematika menurut kriteria bell dan pendekatan saintifik. *PROSIDING*, 67.
- Hayat, B. 2003. *Kemampuan Dasar Hidup: Prestasi Membaca, Matematika, dan Sains Anak Indonesia usia 15 tahun di Dunia Internasional*. Jakarta: Pusat Penilaian Pendidikan.
- Ikhwandi, I., Dafik, D., & Suciati, S. 2015. *Telaah kesesuaian buku guru matematika kelas X kurikulum 2013 berdasarkan pendekatan saintifik*. *Pancaran Pendidikan*, 4(1), 117-128.
- KBBI, K. B. B. I. (2014). *Kamus bahasa indonesia edisi terbaru*. Pandom Media Nusantara.
- Leonard, W.H dan Penick, J. E. (1993). "What's Important in Selecting a Biology Textbooks?". *Journal of The American Biology Teacher*. 55, (1), 14 - 19.
- Lumpe, A. T dan Beck, J. (1996). A Profile of High School Biology Textbooks Using Scientific Literacy Recommendations". *Journal of The American Biology Teacher*. 58, (3), 147 - 153.
- Nur, M. 1995. *Pemahaman tentang IPA dan Keterampilan Proses Sains Mahasiswa Jurusan Biologi, Fisika dan Kimia FPMIPA IKIP. Disertasi doktor*. Bandung: SPS IKIP.
- OECD. (2003). Chapter 3 of the Publication "PISA 2003 Assesment of framework - mathematics, Reading, Science and problem solving knowledge and skills. [Online]. Tersedia: <http://www.oecd.org/dataoecd/38/29/33707226.pdf>. [18 Juni 2008].
- PISA. (2006). *Science Competencies for Tomorrow's World Volume 1-analysis.OECD*. [Online]. Tersedia: www.oecd.org/statistics/statlink. [8 Juli 2008].
- Ramda, A. H. (2017). Analisis kesesuaian materi buku teks Kemendikbud matematika kelas VII dengan Kurikulum 2013. *Pythagoras: Jurnal Pendidikan Matematika*, 12(1), 12-22.
- Shield, M., & Dole, S. (2013). Assessing the potential of mathematics textbooks to promote deep learning. *Educational Studies in Mathematics*, 82(2), 183-199.
- Yusuf. S. (2003). *Literasi Siswa Indonesia Laporan PISA 2003*. Jakarta: Pusat Penilaian Pendidikan. [Online]. Tersedia: <http://www.p4tkipa.org>. [18 Juni 2008].