An Assessment of End-of-Unit Questions in the Middle School Science Textbooks

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Abstract

Textbooks are indispensable constituent of teaching-learning process for both teachers and students, and have a great influence on students' learning. As for assessment, is a process of making judgements which is necessary for determining the effectiveness of teaching-learning process, and also to be able to effectively contribute to students' progress. Therefore, the measurement and assessment dimension of the questions in the science textbooks is significant so that cannot be disregarded. In this context, this study sought to determine the cognitive levels of end-of-unit questions in the middle school science textbooks according to Bloom's taxonomy, and also to reveal the views of teachers and students about these questions. The research is a descriptive study, and the data were collected from three different sources. At the outset, five Science and Technoloy textbooks used in the sixth, seventh and eighth grades at the Turkish middle schoolse were analyzed. Then, the semi-structured interviews were conducted with 20 Science and Technology teachers and 30 students in Edirne that were selected with through appropriate sampling method. Based on the research findings, there was a preponderance of knowledge level questions in science textbooks. While the questions at the comprehension level follows the knowledge level questions with smaller portions, the questions at the level of application, analysis, sythensis, evaluation were almost missing in the middle school science textbooks. Based on the interview results conducted with students and teachers, it is quite engrossing that the knowledge level questions are the most liked questions by students. While teachers emphasized the need for increasing the number of the end-of-unit questions, the students stated that the questions should provide opportunity for repeating, reinforcing what they have learnt before or preliminary for exams.

Key Words: Measure and assessment, Bloom's Taxonomy, Science and Technology textbooks.

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Extended Summary

Purpose

Textbooks are indispensable constituent of teaching-learning process for both teachers and students, and have a great influence on students' learning. As for assessment, is a process of making judgements which is necessary for determining the effectiveness of teaching-learning process, and also to be able to effectively contribute to students' progress. Therefore, the measurement and assessment dimension of the questions in the science textbooks is significant so that cannot be disregarded. In this context, this study sought to determine the cognitive levels of end-of-unit questions in the middle school science textbooks according to Bloom's taxonomy, and also to reveal the views of teachers and students about these questions.

Method

This research is a descriptive study, and the data were collected from three different sources: textbooks, teachers and students. Descriptive research is a type of research that is mainly concerned with describing the nature or the degree in detail of the existing situation (Creswell, 2003). At the outset, five different Science and Technoloy textbooks (three MEB publication and two private publication) used in the sixth, seventh and eighth grades at the Turkish middle schools during the academic year 2010-2011 were analyzed based on the Bloom's Taxonomy. For sixth and eighth grades, two different textbooks which are belong to different publishers (MEB and private publication) were analyzed. Bloom's Taxonomy is the most well known categorization in grouping questions as low level and high level questions: knowledge, comprehension and application, analysis, synthesis and evaluation questions. Then, the semi-structured interviews were conducted with 20 Science and Technology teachers and 30 students in Edirne that were selected with through appropriate sampling method.

Results

Based on the research findings, there was a preponderance of lower-level of questions in the science textbooks. A great majority of the end-of-unit questions in the middle school science textbooks consists of the knowledge-level questions. While the questions at the comprehension level follows the knowledge level questions with smaller portions, the questions at the level of application, analysis, sythensis, evaluation were almost missing in the middle school science textbooks. Based on the interview results conducted with students and teachers, it is quite engrossing that the knowledge level questions are the most liked questions by students. While teachers emphasized the need for increasing the number of the end-of-unit questions, the students stated that the questions should provide opportunity for repeating, reinforcing what they have learnt before or preliminary for exams.

Discussion

The research findings indicate that there is a lack of emphasis on application, analysis, synthesis and evaluation levels of questioning. This situation clearly shows the gap between the stated aims of new educational reforms and the science textbooks prepared in the light of these reforms. There is no doubt that the lower level questions may lead students to memorize scientific facts, and are likely to limit students' opportunities to develop meaningful understanding of science concepts. However, the higher level questions, especially analysis, synthesis and evaluation may play a crucial role in providing opportunities to make hypothesis, create models, design experiments and make critical judgments. Constructivist approach emphasizes student-centered learning, poses more responsibilities on the learners,

and requires them to be active participants in their own learning. At this context, the quality textbook questions have the major role in inquiry to make students behave as little scientists and keep their minds active during learning process.

Conclusion

Overall results reveal that the end-of-unit questions in the current middle school science textbooks are far from the stated expectations of the curricular reforms, especially from the vision of 2004 Science and Technology Program. The primary aim of science education today is not to teach students more scientific knowledge, but develop more their scientific reasoning ability and scientific literacy. Even though questioning lies at the heart of scientific inquiry and critical thinking, the higher order thinking skills are not elicited by the end-of-chapter questions in the Turkish middle school science textbooks. If we train students as scientifically literate and prepare for the challenges of new century, textbook authors need to give particular attention to the questions in science textbooks, and cover higher level questions within the end-of unit questions for developing higher level thinking skills of students.

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