English Abstract

A Descriptive Study for the Role of Assessment Instruments in Developing Eight Grade Students' High Cognitive Skills in Science

The study aimed to describe and analyze assessment instruments contained in parts one and two of the science textbook for the 8th grade in order to capture the focus on higher-order thinking skills included in these questions. In addition, this study aimed to shed light on educational practices from classroom discussions and midterm and final tests established by Palestinian science teachers, and its focus on developing higher-order thinking skills among the Palestinian students of the eighth grade.

In order to achieve the study objectives, the researcher created the following three research questions:

1- To what extent do the exercises in science curricula for eighth-grade focus on higher-order thinking skills?
2- To What extent do the current instructional practices and classroom discussions offered by Palestinian science teachers in their classes share in the development of higher-order thinking skills among the students of the eighth grade in science ?
3- To what extent do the exams prepared by Palestinian science teachers for eighth-grade focus on higher-order thinking skills?

To answer the first and the third questions, quantitative data were collected through analyzing the assessment items included in the science textbook for the 8th grade, as well as the midterm exams, prepared by the participating science teachers, and unified final exam prepared by the district office. The items were analyzed based on the cognitive level they measured, and were classified into one of three categories: knowledge, application, and reasoning. These three categories are similar to what is used in the International Trends of the Mathematics and Science study (TIMSS, 2011). In order to answer the second question, To What extent do the current instructional practices and classroom discussions offered by Palestinian science teachers in their classes share in the development of higher-order thinking skills among the students of the eighth grade in science, qualitative data were collected through conducting 29 classroom observations for science teachers who participated in the study.

The study population consisted of two groups, the first one consisted of the assessment questions that are contained in the first and second part of 8th grade science curriculum, and the second group included all science teachers that teach science for the 8th grade in all public schools in Ramallah for the academic year 2013 – 2014, whose schools participated in TIMSS, 2011 which equal eleven schools. A purposive sample of five science teachers from these schools was selected to participate in the study that represented different school levels in terms of their students' achievement in TIMSS 2011. The study indicated the following result:

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- The assessment items which measure the level of knowledge of the science textbook of 8th grade has got the highest average of all assessment items, where the average rates ranged between (62.2% - 85.9%) of the first part , while for the second part, the average of the knowledge level was between (42.1% - 87.7%). Regarding the level of direct application, the averages of application questions in the first part of the science textbook ranged between (33.8% - 9.3%), while for the second part the averages ranged between (6.5% -51.3%). The rate of reasoning level got the lowest percentage in all the units of the textbook. In the first part it ranged between (0% -6%), while in the second part it ranged between (0.6% - 6.2%).
- Regarding the questions of midterm exams, the knowledge level got the largest percentage of the total questions in both the upper and lower schools. For application level, all schools got almost the same percentage. However, the percentage of reasoning questions in the higher performance schools was higher than the percentage of reasoning questions in low-performing schools. Regarding the analysis of final unified exam, the knowledge items consisted (57.8%) of the exam, while the application items consisted (38.4%) of the exam. Meanwhile the reasoning items have the lowest percentage with (3.4%) of the final exam.

The analysis of the qualitative data was done through finding patterns of the classroom practices which were observed by the researcher. The main output of these observations is:

- The assessment practices for the participating science teachers and the classroom discussions that happened in the classes were focusing on low order thinking skills which are (memorizing, , comprehension and direct application). The focus on higher order thinking skills such as analysis, synthesize, and evaluation was little especially in the lower performance schools.

In the light of the study results, some concrete recommendations were suggested such as the importance of developing the assessment tools used in schools and the necessity of using alternative assessment tools that address higher-order thinking skills. In addition, the necessity to train science teachers to employ higher-order thinking skills in their teaching and assessment practices.