A comparison of the current and former chemistry programs for 9th grade

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Abstract

The objective of this study is to compare current chemistry teaching program and former program in terms of their basic qualities for 9th grade. These basic qualities are related to questions on what is thought why and how, student acquisitions, teaching applications, measurement and evaluation, topics and length, topic and concept order, relations with other topic fields and paying regard to personal differences of students. In present research, data will be obtained via document analysis method which is one of the qualitative research methods. To that end new chemistry teaching program effectuated in 2007 and the former program which invalidated after the new program began to be implemented. Obtained data will be categorized according to context analysis. It is considered that present study will enable a comparison between old and new chemistry teaching programs with respect to their qualities.

Keywords: 9th grade old chemistry teaching program; 9th grade new chemistry teaching program; comparison of programs; basic qualities of programs.

1. Introduction

A rapid and dynamic change in science, technology and social life is being experienced around the world. Nations, which want to adapt themselves to this change and have adopted continuous advancing as a principle, attach special importance to science education (Ayas, 1995; Ünal, 2003). It is for sure that quality of education programs is a determinant in quality of science education. Therefore, it seems that innovative and enterprising changes to be done in science education may become possible if education programs are contemporized. To raise quality of science education, studies on program development should be continuous and innovations in science and trends in education area should be taken into consideration during this process (Ayas et al., 1993). In this information and technology age we live, in the face of traditional learning methods that have fallen short in meeting the expectations, Constructivist Learning Approach has taken the stage. Due to this necessity in 2004 MNE (Ministry of National Education) based teaching programs on constructivist approach and in line with this approach, the Ministry started renewing programs in primary and secondary levels of education. As an outcome of these attempts; secondary education new chemistry program for 9th grade has been developed and put into action in 2007.

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However, in Turkey previous experiences gained from earlier program development studies are not effectively used as a guide. A program that has not received praise or in-need of change is completely invalidated and a new program is put into practice. Throughout this process, it becomes impossible to establish a bridge between programs and actualize the improvements under the light of former experiences (Çalık & Ayas, 2008; Ünal et al., 2004). That is the reason why new program development attempts should be based on the experiences that will be obtained through an evaluation of the current program by independent authorities and include modern innovations as well. Driven by these motives, in present study the objective is to compare old and new chemistry programs for 9th grade with respect to their basic qualities.

2. Method

In this study the data have been gathered via document analysis method which is one of the qualitative research models. The new chemistry program that was put into action in 2007 and old chemistry teaching program have been used for 9th grade. Obtained data have been categorized by context analysis. These categories are; What shall we teach in chemistry?, Why shall we teach?, How shall we teach? and teaching practices, measurement and evaluation, topic and concept order, associating with other topic fields and paying regard to personal differences of students.

3. Findings and Discussion

Table 1 shows a comparison of basic qualities of the former and new chemistry teaching program for 9th grade (MNE, 2007):

<table>
<thead>
<tr>
<th>Basic Qualities of the Program</th>
<th>Former 9th Grade Chemistry Program</th>
<th>Current 9th Grade Chemistry Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>What shall we teach in chemistry?</td>
<td>Within the objectives of program which consists merely of topic list, basic data students will use in solving problems in future and the necessity of teaching learning methods are given.</td>
<td>For individuals who will be dragged to different spheres of life common and most general and essential chemistry concepts and principles are focused on. Also information that will contribute to the learning processes of people who will select chemistry-related professions is also provided.</td>
</tr>
<tr>
<td>Why shall we teach chemistry?</td>
<td>To convince students that the source of science is laboratory. Although preparing the student for higher education on chemistry or a related discipline is amongst the aims of program, in this program which merely covers topic list, objective behaviors and acquisitions are not stated.</td>
<td>The objectives are gaining knowledge and understanding about basic concepts, raising awareness on the historical process of these concepts, their effects on social, economic and technological world and interaction with the environment, gaining the ability to pass from simple abilities such as observation, experiment and data gathering to problem solving problem and adaptation to high-level communication skills are amongst the objectives. Acquisitions directed to this objective are stated in this program.</td>
</tr>
<tr>
<td>Science literacy</td>
<td>Not only in their main philosophy but in teaching and learning activities of the teaching programs as well, constructivist approach is taken into center.</td>
<td>Since constructivist approach advocates that learning-teaching activities all together structure the knowledge in the mind of student, teaching is naturally student-centered.</td>
</tr>
<tr>
<td>In terms of teacher practices</td>
<td>Although expressions such as student-centered teaching are indicated in the objectives of program it is possible to assert that program is mostly teacher-centered.</td>
<td>In the program daily problems of students, ability to prepare solution methods with the information and skills they gained through teaching process or in other words, evaluation activities that enable their skills of transferring their chemistry acquisition to real life are given.</td>
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<tr>
<td>Alternative measurement and evaluation approaches (Process evaluation)</td>
<td>In the program expressions such as encouraging students to work individually, participate in discussions, look for new methods and techniques and implement them and evaluate their success. However in the program there is not any evaluation activity about how to perform evaluation.</td>
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As seen in Table 1, when the programs are examined within the scope of “What shall we teach in chemistry?” for students who will not continue higher education in implemented program information that may answer the question about the use of chemistry is given. Moreover for diversified set of professions a sub-structure of chemistry concepts is being prepared. For that reason in the program Development of Chemistry, Components, Chemical Transformations, Mixtures and Chemistry in our Life units are added. Besides concept lists of these units, acquisitions and teaching elaboration are explained in detail. In the objectives of this program that is out of use now, the necessity to give basic information to students and to teach learning methods are stated. In this program which includes only the topic list; Material and its Characteristics, Separation of Materials, Elements and Compounds, Structure of Material units are present however in the program topic list, acquisitions and teaching elaboration of these units are not stated. Therefore it is possible to assert that current program has the capacity to answer the question “What shall we teach in chemistry?”

As shown in Table 1, when the programs are examined within the scope of question “Why shall we teach chemistry?” it is possible to deduce that current program considers preparing the students for the future by creating basic chemistry knowledge as a priority. “Our Life is Chemistry” unit constitutes an example to this situation. In that way students can, in current program, easily find an answer to the question “What will be the use of chemistry I have learnt?” and this is also a requirement of the program. However in the formerly used program there is not an equivalent of this unit. Within this scope it is seen that current program gives an answer to the question “Why shall we teach chemistry?”

As illustrated in Table 1, as the programs are examined within the scope of the question “How shall we teach chemistry?” in terms of teaching practices; in constructivism based program student-centered learning and teaching activities are given place. It would be right to state that the other program which merely included topic list and lacked acquisitions. The activities is also teacher-centered.

As illustrated in Table 1, when the programs are examined within the scope of “measurement and evaluation” expressions focusing on the necessity to evaluate the success of students are given place. However in the former program measurement and evaluation activities were not present whereas in the current program different evaluation activities that enable evaluating high-level skills of students are also stated. In addition to tests that include short-answer, long-answer, multiple-choice, true-false, matching exercises, performance evaluation tools such as observation-follow up, poster, interview, project, performance duty are also amongst these evaluation activities.

As shown in Table 1, when the programs are examined within the scope of “topic and concept order” in both programs it is stated that the order of topics is determined by considering teaching simplicity. However in the current program it is also underlined that this order is merely a suggestion and the decision to implement is reserved to the textbook author and the teacher. Considering the fact that nationwide exams are held, a change in topic order should be avoided by teachers.

As seen in Table 1, when the programs are examined within the scope of “attaching importance to associating with other topic fields”, in the former program while there was no connection with other fields, in the current program in acquisitions on other fields such as physics and biology there are open statements indicating this connection. In “Chemistry in our Life” unit in the current program the presence of acquisition “Student realizes the vitality of photosynthesis in plants and respiration of all living things for ecological balance” is a clear indication of the connection established with biology.
As seen in Table 1, when the programs are examined within the scope of “paying regard to personal differences among students” in the former program differences among students were disregarded whereas in the current program this factor has been considered in learning and teaching activities. In topic elaboration and activities in the current program, allowing place for expressions such as “discussed by employing visual objects and a discussion environment is created” set examples.

4. Results and Suggestions

In the objectives and causes of the former program it was advocated that teaching should be student-centered and students should be taught the learning methods and how to learn by themselves. However in this program which merely includes topic list there are no sections about the acquisitions directed to objectives and causes, context, teaching techniques, measurement and evaluation activities etc.

In the objectives and causes of current program, since the program is based on constructivist approach, it is emphasized that student-centered teaching and paying regard to personal differences in teaching-learning activities, which are the benefits of this approach, should be paid heed to. Moreover giving more significance to the most necessary, general and common concepts and principles of chemistry for the students who will follow different spheres in life, giving sufficient chemistry knowledge to students who will select chemistry related professions in the future, enabling students to put their theoretical chemistry acquisitions into real life practices are also some of the expressions stated in the program. In the implemented program acquisitions that match with these expressions, context, teaching activities, measurement and evaluation activities sections are also present. It is possible to assert that in that aspect, the current program partially compensates for the lacks in the former program. Although the current program on the whole contains the same basic qualities, some parts such as teacher guide, student workbooks, laboratory booklets which are requisites in a program, are missing. It is proposed that this deficiency should be eliminated by the program developers as soon as possible. Moreover the freshness of implemented program brought with itself the necessity of alternative materials applicable to the program. It is considered that developing alternative materials for the use of chemistry teachers by chemistry instructors will fulfill this lack, although partially, and contribute to chemistry teaching.

During the implementation process of programs, a continuous evaluation should be conducted neutrally and elaborately to see whether or not insufficient or irrelevant elements are present, if yes, to detect the origin of failures and to implement required corrections. To that end, it is of great importance that attempts be directed to this objective.

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