Content Analysis of Mathematics Textbook of Elementary School Sixth Grade Based on Conceptual Pattern Aims of Iranian’s National Educational Curriculum

Sajjad Hatam,
Department of Educational Sciences, urmia Branch, Islamic Azad University; urmia, Iran
E-mail:sajjadhatam@yahoo.com

Ali Zeinali,
Department of Psychology, urmia Branch, Islamic Azad University; urmia, Iran

Leila Hatam
Ministry of Education, Education in West Azarbaijan, District 2 Education Urmia; urmia, Iran

Abstract
The present study was carried out to analyze the content of mathematics textbook of elementary school sixth grade in order to determine the compatibility of the content with the Conceptual Pattern Aims of Iranian’s National Educational Curriculum. To this end, all the pages of this textbook which were compiled in 2013 were analyzed. Data gathering tools of the inspection checklist prepared based on components of elements and areas of conceptual aim pattern were national educational curriculums. In order to describe the data, frequency, percentage of frequency and tables, and in order to analyze the data the relativity (z) test was used. The descriptive results showed that in total, 40% of elements and 50% of areas weren’t paid attention by the authors of the book. Testing the hypotheses also showed that the content of 6-grade mathematics curriculum in terms of five-elements and four-areas wasn’t in compliance with aim pattern of national curriculum. Therefore, incompatibility in the frequency of elements and areas and lack of attention to a number of elements and areas in the content of the book by the authors and programmers are seen which require munificence of attention in conformity of the content of books by authors and programmers in the next editions.

Key words: National educational curriculum, aim pattern, mathematics curriculum, content analysis, Mathematics Textbook the Sixth Grade.

Introduction
With implementation of strategies determined by the Fundamental Changes Document and the initial outputs of Iran’s National Educational Curriculum, the Organization for Research and Educational Programming in Iran decided to modify educational curricula of schools in the country. The important mission of Iran’s National Educational Curriculum is to prepare proper mechanisms to design, compile, implement and appraise educational curricula at national and regional levels so that the educational programs can be prepared for children and adolescents in a structured and systematic manner based on Islamic educational philosophy and a hilarious and amiable school environment can be created (The Secretariat for Designing Educational Curricula, 2012, pp 3‒4). In the National Educational Curriculum, the subject matter of different fields, skills and capabilities that should be acquired by students are specified in detail and the educational system should attempt to achieve those aims by completely observing the principles, contents and the recommendations of National Educational Curriculum. However, it is possible for significant gaps to exist between the recommendations of National Educational Curriculum and what happens in real situations in schools and classes, which are referred to as “implementation gap” by researchers. The gap can interfere with the implementation of educational curriculum and achieving the aims planned for (Betcher, 1989). All the students should learn the contents determined by the curriculum and undergo the assessments determined by the educational program. The National Educational Curriculum usually determines the content and educational mechanisms at several key stages, based on the age of the students (Kelly, 1990). Education is a process for changing and altering the behavior of students to achieve specific aims. In this wide area, different factors affect the processes; however, the major factor is the educational curriculum, which consists of aims, contents, methods and evaluations (Westburg, 1991, p.74). Considering its role in achieving the aims of the program, content is of particular importance. A textbook is in fact the written content of the curriculum. If the content of the textbook is not sufficiently
consistent with the aims of the program, it will not be possible to achieve the educational aims (Marashi, 1998). Textbooks reflect a specific and focused image of education. The aim of textbooks is to present content to individuals at a definite age by provision of exponential methods (Altback, 1995). A textbook is the focus of attention as a principal tool in projects to modify and improve educational curricula. Conventionally, a textbook which contains structured subject matter is considered a key medium among educational media because it guides learners (Tanner and Tanner, 1980). Textbook and training content in focused educational system is in the written form of education. Also, teacher and learner educational experience and activities are organized around the text books and needs. This research help the text books writers and authors to adopt textbooks wisely during editing, selecting of that textbook (Rasuli and Atashani, 2011). However, the results of international studies by Tames and studies carried out based on these studies in Iran, including those by Kiamanesh and Kheiriyeh, (2000), Kaldavi (1999), Mobasher (1999) and Karimi, Bakhshalizadeh and Kabiri (2012) have shown that although Iranian children are generally active in school and at home, they do not achieve good results in the studies carried out. In fact, it is evident that the education provided based on current educational curricula do not meet the capabilities required of citizens of the third millennium. In order to remove the obstacles to learning by students in different areas, including mathematics and to focus on new educational techniques which are consistent with the principles of national educational curriculum, the Ministry of Education of the Islamic Republic of Iran, prepared an educational curriculum for the first grade of elementary schools and implemented it all over the country in the 2011–2012 educational year. Subsequently, educational curricula were prepared for other grades of the elementary school. The second and sixth grade textbook in elementary school during academic year in 2012–2013 and the third grade textbook during 2013-2014 were editing due to the national curriculum. Since the mathematics curricula in the elementary school are new, there are a large number of questions in relation to the new content of the textbooks for researchers and education authorities, such as the following: Are the contents of mathematic textbooks consistent with the their new approaches? Are the contents of the textbooks consistent with the aims of the educational curriculum? Are the educational and evaluation methods which have been planned consistent with the aims and new contents of the textbooks? In relation to the evaluation of the contents of the new books which have been made consistent with the National Educational Curriculum, it might be claimed that the present study is one of the initial studies in relation to the analysis of the content of mathematics textbooks based on the conceptual pattern aims of the National Educational Curriculum. Therefore, in the present study the contents of the above-mentioned textbook were analyzed so that the weak and strong points of the textbook could be determined and a correct judgment could be made on the favorability of its content based on the final results.

Here two research questions and two hypotheses were proposed and tried to be answered.

Research questions
- Is there any significant attention to (thinking, faith, science, act and ethic) in the sixth grade mathematics textbook at elementary school, which is the goal of national curriculum?
- Is there any significant attention to four areas (relation with self, create, human) in the goals of national curriculum?

Research hypothesis
- There is an equal relationship between the frequency of fifth areas in the national curriculum and assumed frequency in each area of the sixth grade mathematics textbook content at elementary school. (there is not any compliance between them). In other words, according to the five areas, the sixth grade mathematics content is based on target pattern of curriculum. (there is a relationship between them).
- There is an equal relationship between the frequency of each of the four areas in targeted pattern and the assumed frequency of each of the areas in sixth grade mathematics content (there is not any significant relationship). In other word, the content of the sixth grade mathematics book regarding to forth area is based on targeted pattern of curriculum (there is a compliance).

Research methods
This study is descriptive and based on content analyses. So, the population was selected purposefully. Therefore, the population is the whole content of the sixth grade mathematics textbook in elementary school. Means, the whole textbook which is consisted of eight unite and 160 pages.

Instruments in this study was based on Czech list which was consisted of related component to each elements and fields in targeted paten of national curriculum and related component in Czech list and each four areas were: 1-the field of related to self (spiritual, mental and physical). 2- The field of relation t of God attribute of God developmental verse, canonization, prophets and saints. 3- The field of relation to people of
God (other human): family, friends, neighbors, quarters, cities, provinces and globe. 

- the field of relation to creating: nature (earth, water, space, the environment and ...) 
- Ultra-nature: eternal life, the hereafter nature and angles...

and the component related to each of fifth area provide in the Czech list were: 1- sense element: thinking, reasoning, inference, analyzing, criticism, discover and wisdom, creative and research.
2- Faith elements: believing, accepting, worshipping, heart commitment, interesting, affective evaluating.
3- Knowledge elements: get knowledge, insight and awareness in training.
4- Action elements: working, trying, obeying, endeavor, entrepreneurship, skill.
5- Ethic elements: affective, refinement and sensual.

Elementary textbooks were consisted of writing, exercise, questions and picture. Therefore, analysis books pages were included of all questions, exercise and pictures. According to reliably of Czech list it is necessary to focus on the propose of the research, i.e. investing the compliance of the sixth grade mathematics content with the goal goals targeted pattern of the national curriculum. Therefore, the reliability of Czech list which was based on purposeful national curriculum was accepted. To be sure of reliability analyses, obtained analysis units were done by three researchers' simontenously. Scot formula was used to determine the reliability. For this purpose, about 10% of the textbook with categories and subcategories codes were given to colloquies. The frequency y table was made. The percentages among these three encodes were calculated by frequency distribution table. The reliability as about .81.

To gather and analyzing data this procedure was used: 1- Basic study of national curriculum, the target pattern of the national curriculum and the sixth grade mathematics curriculum 2- Making check list (Czech list of content analysis) 4- training and justifying of the research college5- performance gauges 6- analyzing data. For analyzing data, descriptive statistics (frequency) was used to categorize data and Z score was used to find out the elements frequencies (achieved frequency) and assumed (expected frequency).

**Research results**

The first question – Is there any attention to fifth areas (thinking, faith, knowledge, action, and ethics) in targeted pattern of national curriculum in the sixth grade mathematics content of elementary school? 

To answer to this question, sixth grade mathematics textbook content was analyzed. The result was demonstrated that thinking and knowledge elements with frequency of 1211 were more emphasis than other elements. About 95% of it belonged to these elements. Action element with frequency of 146 was less emphasized than others. There was not any attention to faith and ethic element in the book. The probable reason of this contribution of fifth area in the sixth grade mathematics content was due to mathematics' nature: 1- focused on logic and rescaling (thinking element), 2- one of the strongest science based on discipline (science). These instances may be the main reason of differences in equal contribution of fifth areas. Indeed, textbooks authors should consider targeted pattern of national curriculum and faith, ethic elements, too. Lacks of these elements in that textbook content were very obvious.

**Table 1:** The compliancy of six grade mathematics textbook content with the fifth areas

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Picture tables</th>
<th>Percent</th>
<th>Exercise and questions</th>
<th>Percent</th>
<th>Text</th>
<th>Element</th>
<th>Book</th>
</tr>
</thead>
<tbody>
<tr>
<td>47.01</td>
<td>1211</td>
<td>16.12</td>
<td>415</td>
<td>26</td>
<td>669</td>
<td>4.93</td>
<td>127</td>
<td>Thinking</td>
<td>Sixth grade mathematics</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Faith</td>
<td></td>
</tr>
<tr>
<td>47.01</td>
<td>1211</td>
<td>16.12</td>
<td>415</td>
<td>26</td>
<td>669</td>
<td>4.93</td>
<td>127</td>
<td>Science</td>
<td></td>
</tr>
<tr>
<td>5.82</td>
<td>150</td>
<td>0.66</td>
<td>17</td>
<td>5.01</td>
<td>129</td>
<td>0</td>
<td>0</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>0.15</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0.15</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>ethics</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>2576</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

The first hypothesis: The frequency of fifth elements in targeted pattern of national curriculum is equal to each of element in the sixth grade mathematics textbook content (there is not a significant relationship). According to national curriculum, "educational curriculum should regard balance training and reject excess and wastage in educational goals and content and using different ways in designing teaching and evaluating" (The Secretariat for designing educational curriculum, 2012, p:3). According to specialist it is important all elements and fields in targeted pattern of national are based on these elements in the textbooks. Also, these elements have equal contribution in the books (equality). This should be considered by textbooks content authors. Each of elements of targeted pattern are about five. Therefore, the assumed
part for each of them in the whole mathematics textbook contents should be about 20% (the whole is 100%). To investigate the significant differences between expected frequency (assumed one) and observed one of the fifth areas in the content, ratio formula was used. The result was shown in table-2. As it demonstrated there is a significant between demonstrated frequency and assumed one. Therefore the hypothesis s rejected a null hypothesis is accepted. According to this table, sig is less than .05 and Z=1.96. There is a significant positive difference for thinking and science. While, there is a significant negative difference for action and ethic. In otherwords, I this book thinking and science elements were more focused than action and ethics. And, no place was for faith element. Therefore it can conclude that there is no equal contribution of fifth areas in targeted pattern of national curriculum in the sixth grade mathematics textbook. This textbook was not based on targeted pattern of national curriculum.

Table 2: The results of the Ratio formula, each of the five elements

<table>
<thead>
<tr>
<th>Z</th>
<th>assumed</th>
<th>Observed</th>
<th>elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.948</td>
<td>0.20</td>
<td>0.471</td>
<td>Thinking</td>
</tr>
<tr>
<td>-</td>
<td>0.20</td>
<td>0</td>
<td>Faith</td>
</tr>
<tr>
<td>6.948</td>
<td>0.20</td>
<td>0.471</td>
<td>Science</td>
</tr>
<tr>
<td>-7.888</td>
<td>0.20</td>
<td>0.058</td>
<td>Action</td>
</tr>
<tr>
<td>-99.5</td>
<td>0.20</td>
<td>0.001</td>
<td>ethics</td>
</tr>
</tbody>
</table>

The second research questions --- Is there an equal attention to the fourth areas of (relation to God, self, other human, nature) in the sixth grade mathematics textbook content in the targeted pattern national curriculum? To answer to this question, content of this book was analyzed. The result was shown in table -3. It demonstrated that there wasn't an equal contribution of each element in the sixth grade mathematics textbook content. The authors were more focused on relation to human and creation. It was about 93% of the whole text book. It demonstrated the lack of others two elements in this book.

Table 3: The compliance of sixth grade mathematics textbook content with fourth areas

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Picture tables</th>
<th>Percent</th>
<th>Exercise and questions</th>
<th>Percent</th>
<th>Text</th>
<th>Element</th>
<th>Book</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.87</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2.43</td>
<td>1</td>
<td>2.43</td>
<td>1</td>
<td>Thinking</td>
<td>Sixth grade mathematics</td>
</tr>
<tr>
<td>2.43</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2.43</td>
<td>1</td>
<td>-</td>
<td>0</td>
<td>Faith</td>
<td></td>
</tr>
<tr>
<td>51.21</td>
<td>21</td>
<td>7.31</td>
<td>3</td>
<td>43.90</td>
<td>18</td>
<td>-</td>
<td>0</td>
<td>Science</td>
<td></td>
</tr>
<tr>
<td>41.46</td>
<td>17</td>
<td>7.31</td>
<td>3</td>
<td>34.44</td>
<td>14</td>
<td>-</td>
<td>0</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

The second hypothesis --- There is an equal relationship between the frequency of each of the fourth area in the targeted pattern of national curriculum and Tasso med frequency of each element in the sixth grade mathematics textbook content. According to the first hypothesis; there should be an equal pat for each element in the whole book (25 % for each element). To investigate the significant difference between expected frequency (assumed one) and observed frequency of the fourth areas in the content, the formula was used. The result was shown in table-4. As it demonstrated there is significant satirical difference s between these amount of observed frequency and assumed one (expected frequency). Therefore the hypothesis was ejected and null hypothesis is cepted sig is less than .05 and Z=1.96. There is appositive significant and difference for creation and human elements and there is a negative significant difference for self and God elements. In other words, in content of this book was more focused of creation an human and less focused on self and God. Therefore distribution of frequency of fourth area of targeted pattern in e content of t sixth grade mathematics textbook content was not equal and was not based on national curriculum too.
The majority of curricula are subject-oriented and are mainly under the influence of expects' mastery of the subject and are communicational, official, general and advisory in nature (Salsabili, 2003). The mastery of the subject specialists on determining the aims of curriculum is attributed to the fact that the technical mastery of teacher on the subject, in most cases, is less than that of university professors. Therefore, in most cases, the main role is assigned to these specialists and the curriculum is deprived of many experiences, insights and vocational knowledge, which are considered the valuable and unique possessions of teachers and should be used along with thematic knowledge in decision-making for curricula (Mohammadi and Gouya, 2003). Yazdani and Hosseini (2011) evaluated the consistency of the aims of curricula in elementary and guidance schools with the aims ratified by the Supreme Council of the Ministry of Education. The discussions to reach a final conclusion based on the results showed that the aim attitudes

<table>
<thead>
<tr>
<th>Z</th>
<th>Assumed</th>
<th>Observed</th>
<th>elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>-12.625</td>
<td>0.25</td>
<td>0.048</td>
<td>Self</td>
</tr>
<tr>
<td>-18.833</td>
<td>0.25</td>
<td>0.024</td>
<td>God</td>
</tr>
<tr>
<td>7.717</td>
<td>0.25</td>
<td>0.512</td>
<td>human</td>
</tr>
<tr>
<td>4.315</td>
<td>0.25</td>
<td>0.414</td>
<td>creation</td>
</tr>
</tbody>
</table>

Result and conclusions
Training quality is a concern of educational system that for that. In recent years, remarkable affairs were done in many countries to improve training and curriculum, for reaching to goals for educational system. Indeed, there were many acts done in our countries. The remarkable ones, which were editing, were educational evaluation document, national curriculum document. The compliance of new plans especially new published book with these documents, is going to provide optimized performance of these plans in future. Thus, goals have a key role in the curriculums and activities. It can connect all the elements and fields together. The e compliance curriculum elements with these key elements specially in macro level, i.e. targeted pattern of national curriculum, are very important. The result in this research demonstrated there isn't an equal attention to fifth areas (thinking, science and ethic) in the content of sixth grade mathematics textbook. Arthurs focused more on thinking and science elements. Faith and ethic elements were neglected. On the other hand, frequency distribution of four areas (relation to self, relation to God, relation to human, relation to creation) in targeted pattern in the sixth grade mathematics textbook content was no equal. The authors focused human and creation elements more than other elements. Also, self and God elements were neglected. Results of formula these was shown for each elements. Frequency of thinking, science, creation and human elements were more than other elements. The sig is less than 0.05 and Z = 1.96. He first and second hypothesis were rejected and null hypothesis 1, 2 were accepted. The results of the present study are consistent with those of a study by Yazdani and Hassani (2011), who reported that of 935 major and minor aims of the teacher's guide of the educational curriculum, which were compared with the aims ratified for the elementary period, 77.63% of the aims of the educational curriculum conformed to the ratified aims and 22.37% did not conform to the ratified aims. Generally, the results of comparison of the aims of teacher's guides of the educational curricula of the elementary and guidance schools and have not been covered with any of the aims of the guidelines of the educational curricula of the elementary and guidance schools and have been neglected. It concluded that if all curriculum reached their goals, but about a quarter of the elementary and junior school's curriculum were not reached it. That was because of reasonably stay. Comparing the guides of elementary and junior school curriculum shows that it edited according to the special field and cover optimized target while other goals were rejected. Most of teachers in Rafipour and Gouya (2010) research interview said that Iranian mathematics book didn't focused on applicable problems and just a few of problems in that book were real problems. The results of the present study are consistent with those carried out by Nojavan (2012), indicating that curricula implemented and acquired and the newly complied mathematics textbook of the first grade of elementary school were not completely consistent with the intended curriculum and the implemented and acquired curricula exhibited the greatest gap and departure from the intended curriculum. Several factors may play a role in creating such gaps between the three above-mentioned curricula. The majority curricula are subject-oriented and are mainly under the influence of expects' mastery of the subject and are communicational, official, general and advisory in nature (Salsabili, 2003). The mastery of the subject specialists on determining the aims of curriculum is attributed to the fact that the technical mastery of teacher on the subject, in most cases, is less than that of university professors. Therefore, in most cases, the main role is assigned to these specialists and the curriculum is deprived of many experiences, insights and vocational knowledge, which are considered the valuable and unique possessions of teachers and should be used along with thematic knowledge in decision-making for curricula (Mohammadi and Gouya, 2003). Yazdani and Hosseini (2011) evaluated the consistency of the aims of curricula in elementary and guidance schools with the aims ratified by the Supreme Council of the Ministry of Education. The discussions to reach a final conclusion based on the results showed that the aim attitudes...
of the Supreme Council of the Ministry of Education were different from those of curriculum designers and programmers. The programmers designed aims based on a subject-oriented attitude; however, the aims ratified by the Supreme Council of the Ministry of Education have been prepared based as religious and national values and principles. Differences in attitudes might be a factor responsible for inconsistency between the aims. This result was the same as Hatam and Zeinali (2014). In their research “Content Analysis of Mathematics Textbook of Elementary School Second Grade Based on Conceptual Pattern Aims of Iranian National Education Curriculum”, it was demonstrated that about 75% of elements in topic pages and about 85% of elements in non-topic pages in second grade mathematics book were neglected. In “Evaluation of the Content of Mathematics Textbook of the Second Grade of Elementary School Based in the Aims of Ian’s National Curriculum and Opinions of Teachers” researchers concluded that about 68% of elements in the topic pages and about 75% of elements in non-topic pages neglected by the authors. Since the importance of related elements with the elements of targeted pattern in editing national curriculum and their effects on education and improving training and learning of students (improving of skilled and usefulness), it suggested that planners and authors pay more attention to the balance of elements and fields in the detailed targeted pattern in order to have higher output in the content performance. Since national curriculum and specially targeted pattern is anew topic, it is necessary that researchers investigate more about these topics to fix the failure in this pattern and provide an effective detailed targeted pattern for each textbooks content.

References