

Examination of Presenting Contents of Science and Life Categories in Science Course Books of Elementary Period Published in 2014

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Abstract:

the aim of the present study was to investigate the extent of using active presentation in contents of texts and pictures related to titles of “science and life” parts in science course books of elementary period, published in 2014. Initial examination showed that there parts titled “science and life” in science course books of second, third and sixth grades in elementary period. Since the third and sixth grade are at the end of the first and second grades of elementary period, respectively, examination of realm of educational program in these grades has a special importance.

Given the study aims, the statistical population consisted all texts of science and life parts in science course books of the third and sixth grades, but due to limitation of population size, sampling was not performed. Therefore, contents of the total statistical population were analyzed through William Rummy’s technique. To this, sentences and pictures in addressed parts were considered as the analysis unit. Involvement coefficient of the texts in science and life parts of the third and sixth grades were 0.13 and 0.58, respectively, showing that these parts are not actively offered in elementary period, where as students can participate actively in science and life categories at the last year of this period. The base of involvement coefficient in both grades was zero. In other words, pictures of science and life parts in elementary period but do not activate student’ participations in offered topics.

Keywords: experimental sciences, science and life, elementary period, content analysis, course book.

Introduction

Today, developing countries try to promote scientific technologic literacy in their societies. According to a common definition, scientific technologic literacy refers to a set of knowledge and skills in science and technology filed that all individuals need them to live up. This definition is basically associated with aims of educational system and considered by course program planners. Therefore, planners choose materials and contents of course program in different academic levels among proper sciences. Among sciences, experimental science is related to daily life because of its nature. So, quality of teaching science course can have a

significant impact on scientific technologic literacy level. Kiamanesh (2002) believes that experiments of countries who have transformed their educational systems far long before us, show that the best point for beginning evolution in quality of general education in each country is changing the science course.

In recent decades, no other course is changed as much as science course in universal level. Contents of experimental science course lead to growing progress of human knowledge per se and help children to improve the ways of knowing their surrounded world; therefore, they have to acquire concepts which assist them in relating learnt materials to real situations. They also should learn ways of accessing to and organizing information, as well as their application and examination.

As Harlen (Hosseini Yazdi and Ahmadian, 2014: 134) and Lider and Raysh (Soltani, Sharif and Rokni Zadeh, 2012: 2) state, association between science course and children's various life experiments improves their abilities in perceiving the world, making more conscious decisions and solve life problems more effectively.

This act not only strengths students' abilities in understanding the world, but also helps them to make more conscious decisions and dispel their difficulties more efficiently (Harlen, 1995 quoted by Hosseini Yazdi and Ahmadian, 2014: 134). Leader and Raysh opine that a major reason for perceiving the science nature is that it enables learners to make more informed decisions on subjects in their lives related to science (Leader and Raysh, 1999; quoted by Soltanim Sharif and Rokni Zadeh, 2011: 2). Given previous studies, if students' former experiments are considered and their active participation is encouraged, a chance for relating old information into new one is provided. So, learnt materials and life experiences will be joint, that in its turn, leads to creation a permanent mental image (Amini, Morseli and Ahmadian, 2012).

There is no doubt that this process requires proper selection and organization of course books contents. This has a special importance in Iran which course books are the main sources of learning. In fact, efficiency and effectiveness of course books in educational system of Iran equals to desirability of the educational system, while their flaws means inefficacy and weakness of this system. Hence, attending contents of course books, observing scientific principles in codifying them, considering educational needs, and coordinating them with learners' needs are so vital that time and attendance of many professionals and planners have been focused on it (Yousefi, 2012; quoted by Hosseini Yazdi and Ahmadian. 2014: 134).

Iran also began the new plan for training science course book in 1993 (Physic group, 1999). This plan has three goal, "transforming necessary knowledge", "establishing and improving necessary skills" and "establishing and improving necessary attitudes" for teaching science course in different majors from the first grade of elementary period. These goals were classified

into three general groups including knowledge, skill and attitude, and value. Among these, application of scientific approach for some concepts of science course is one of the goal of skill group. Maleki (2010: 125) describe general aims of the educational system and emphasis that: since the final goal of human being in Islamic training system is to reach the divine closeness, this goal is divided to doctrinal, ethical, scientific-educational, cultural-artistic, social, biological, political and economic. Extending individuals and the society needed sciences and skills is a scientific educational goal and biological goals include: providing a proper situation for meeting physical as well as mental health, enforcing the tendency to observing general hygiene and preserving the environment, and improving the spirit of attending to sport as a way for spiritual progress.

Students are more interested in sciences that relate to their lives than abstract theories. One of the programs designed based on this approach is call "science of life and living" that emphasizes on three aspects of "science as a way for knowing", "technology as way for acting" and health as way for behaving" (Parvizi (Zahar), Khalili niya, and Parvizi (Ali Asqar) , 2013). Planning in educational systems is a filed that programmers select contents based on the pre-determined goals. Science course books of elementary period are the most primitive filed for relating science and life together.

Hosseini Yazdi and Ahmadian (2014) analyzed the contents of science course books of elementary period to find the extent of dealing with various course questions. They found that convergent questions were used more than divergent ones. Divergent questions address creative thinking, while convergent questions stimulate logical thinking. Convergent questions are used to prepare students to achieve higher levels of thought, while divergent questions make students' responses more precise and analytical and enforce critical and creative thinking. Pour Ehsan (2013) investigated life categories in physic and laboratory course book (1) and reported that training the science course book via an applicable method and its enforced association with the surrounded environment, facilitates learning and aids students to be more creative, and preserve learnt information for a longer time. Therefore, it is better that contents of science course book make students more familiar with their surrounded environments and be effective for them as a citizenship in their daily lives.

Amini, Morseli and Amadi (2012:3) performed a study on realization of attitude goals about science nature and the application of science in daily life. They investigated questions including if scientific knowledge and approaches are restricted to thinking in classroom and laboratory framework, if the application of science in daily life is tangible, and if application of science in students' daily lives, regardless of their own interest, depends on advantages, goals, and non-epistemological factors. Progressed beliefs in this scope indicate that people are able to apply

learnt concepts and principles from courses in non-laboratory environments in order to solve their daily life problems.

Amir Ahmadi, Iravani and Sharafi (2012:93) in a study titled "Content analysis of science course book of the fifth grade in elementary period based on Dewey's pattern of problem solving" announced that: general approach of the fifth grade science course book to problem solving, regarding both problem orientation and skills and problem solving steps, is improper and weak, while skills and steps of problem solving have a mutual enforcing association. The results of Ghsemi and Jahani's (2009) research titled " Evaluation of goals and contents of science course book in elementary period through Plsek's model of creativity training" showed that near 6.5% of the goals were in creation classification and the involvement coefficient was less than 0.25.

Ghaderi (2000) compared course books and teachers' guidelines of elementary period in Iran and America according to Bloom's classification of cognitive scope. He came to this conclusion that although the educational aims of science course in elementary period in Iran in application level have been reported 14% more than that of the America, more opportunities for applying learnt material in real situations is provided in course books of America, and educational system of this country enforces divergent thinking and attending situations more powerfully.

The outcomes of Ahqar's study (2004) titled "content analysis of science course book of the fifth grade in elementary period and its proportion with mental abilities of students in Tehran city" revealed that: content of science course book of the fifth grade in elementary period is designed with semi-active approach and confirms non-involvement of students in learning the book concepts.

Question statement:

Growing volume of science and new discoveries has faced students with a great deal of information and scientific news, and has changed their life styles. The necessity of changing the science content in the present ear with increase of information volume has attracted attentions of professionals in educational system to this question: what materials should we, as the planners of science course books, teach our students that be effective for their future which is so vague for us (Amani and Mo'tamedi, 1998). Mending the quality of learning science course book can be achieved via many ways including improvement of teaching methods, training the teachers and etc. However, the role of course books contents and questions they create in learners' minds has a significant gravity. The role of content in course books of elementary period, regarding students' mind and personality flexibility, should be attended more carefully, since whatever learnt in childhood will be used in adulthood (Hosseini Yazdi and Ahmadi, 2014: 136).

Given the effective role of application of science and life categories in improving training quality, it is expected to carefully select the contents of science course books in elementary period and make them coordinate with science progress. Investigation of available sources show that the place of science and life categories is not determined in elementary period educational program. Therefore, this study aims to find if contents of science course book of elementary period in science and life part encourages the learner's creative involvement. So, "examination of presenting contents of science and life categories in science course books of elementary period published in 2014" is the aim of the current research which is not previously investigated.

Method

William Rummy's technique is a proper tool for analyzing science course books contents. Based on the study aims, the statistical population consisted all test of science and life parts in science course books of the third and sixth grades, and due to limitation of population volume, sampling was not performed. Therefore, contents of the total statistical population were analyzed by William Rummy's technique. To this, sentences and pictures in addressed parts were considered as the analysis unit. To analyze the data, the formula presented by William Rummy was used and lessons texts were coded as the follow: code (a) reality statement sentences; (b) stating results or total principles; (c) definitions; (d) answered questions; (e) analytical questions; (f) stating results of activities done by students; (g) doing experiments and analyzing their outcomes; (i) students' observations of pictures or steps of an experiment and generally, those sentences which are not included in the mentioned codes; (j) questions related to meanings. Among the 10 mentioned categories, a, b, c, and d are inactive, and e, f, g and h are active; i and j are natural categories with little importance in book evaluation, and therefore, can be overlooked in the evaluation process. Coding of the pictures was in this way: (k) describing and stating a certain subject; (l) inviting students to conduct a certain experiment; (m) describing the way of gathering needed tools for experiments; (n) pictures which are not included in the mentioned codes. Categories k and l are inactive and m and n are neutral which do not play a critical role in determination of involvement coefficient. To calculate the involvement coefficient, the sum of active categories should be divided on the sum of inactive ones (Choobineh, 2001).

Formula of a student involvement coefficient with the text or picture: involvement coefficient = $\frac{\text{sum of active uuus}}{\text{sum of inactive uuus}}$

To interpret the results, involvement coefficient between .4 to 1.5 is good and shows that the book in the investigated text or picture is active; however, involvement coefficient less than 0.4 is inactive and that higher than 1.5 is extremely active and indicates the improperness of the text (Rummy, 1968).

Findings

According to Table 1, science course books of the third and sixth grade in elementary period have totally 201 pages and 225 pictures.

Table 1: number of pages and pictures of science course book of the third and sixth grade

Grade	Third	Sixth	Sum
Pages number	106	95	201
Pictures number	294	260	554

Given Table 2, the texts related to "science and life" parts were included in 29 pages of the two books, meaning 14% of the pages. It should be remembered that most of the categories were written in one or two sentences.

Table 2: sentence of the text and pictures of "science and life" parts of the third and sixth grade books in elementary period based on: various categories.

Science course book of the third grade				Science course book of the sixth grade				Sum
Various categories	classes	Pages	frequency	Percentage	Pages	Frequency	Percentage	
Inactive text	A	-10 -18 -44 73	5	56/56	74-54- 12	4	19/00	9
	B	-18 -39 44	3	33/33	54-48- 12	4	19/00	7
	C	39	0	0	12	2	9/5	2
	D	0	0	0	40	2	9/5	2

Active text	E	0	0	0	50-40	2	9/5	2
	F	0	0	0	-39 -40 94-68	4	19/00	4
	G	0	0	0	73	1	5	1
	H	106	1	11/11	0	0	0	0
Neutral text	I	0	0	0	68-74	2	9/5	2
	J	0	0	0	0	0	0	0
Sum		7	9	100	10	21	100	29

According to the aim of the present study, this questions arises if texts of science course books in science and life parts, at the end of the first and second elementary period (the third and sixth grades), is written in an active way based on the William Rummy's technique. As table 2 indicates there were 8 inactive and 1 active categories in addressed parts of the science course book at the end of the first period (the third grade). In other words, 89.89% of categories of science and life texts are inactive and only 11.11% encourages active involvement. The number of inactive categories are eight times more than of active ones. Based on the formula of involvement coefficient in William Rummy's pattern, the sum of inactive categories was divided on the sum of active ones and the involvement coefficient for the third and sixth grade was obtained 0.125 and 0.58, respectively. This coefficient in the third grade is less than the minimum (.4) and between the minimum and maximum (1.5) for the sixth grade. Totally, the involvement coefficient at the end of both periods was computed .67.

Given data of Table 3. From the total 554 pictures in science course books of the third and sixth grades, 22 pictures, i.e. those of the "science and life" parts, exit only in 4% of the books pages .Based on the study goals, this question comes to mind whether pictures of science and life parts of science course books in the third and sixth grades in elementary period enforce learners' participations given the William Rummy's formula of determining involvement coefficient. Again, as William Rummy's formula of determining involvement coefficients states, the sum of active categories of pictures was divided on the sum of the inactive ones and the result was zero, meaning that all pictures in addressed parts in both grades were among inactive categories.

Table 3: pictures in the science and life parts of the third and sixth grades in elementary period based on: various categories

Science course book of the third grade					Science course of the sixth grade			
Various categories	classes	Pages	frequency	percentage	Pages	Frequency	Percentage	Sum of the third and sixth grades
Inactive texts	K	-39 44	8	100	-12 -48 -50 -54 -73 94	14	100	22
Active texts	L	0	0	0	0	0	0	0
Neutral text	M	0	0	0	0	0	0	0
	N	0	0	0	0	0	0	0
Sum			8	100	Sum	14	100	22

Discussion and conclusion

Since the contents of science and life parts in elementary science course books do not have a desirable involvement coefficient and involvement coefficient of (a) pictures is zero, it can be concluded that science course books in elementary period do not encourage students' active participations, although application of scientific approach in life was considered as one of the aims of skill scope since 1993. Maleki (2010:125) in describing general goals of educational system of Iran, exception of individuals needed skills and science as one of the scientific-educational goal. Findings of Amini, Morseli and Ahmadi's study (2012) confirmed that the

association between learnt material and life situations leads to a permanent mental picture of scientific concepts in students' minds. On the other hand, (Parvizi (Zahra), Khalilinia and Parvizi (Ali Asqar) (2013) emphasizes that: Students are more interested in sciences that relate to their lives than abstract theories. One of the programs designed base on this approach is lifescience and living and as Pour Ehsan (2013) mentions, applicable training of science course and its enforced association with the environments, facilitates learning, increases creativity and stays for a longer period in students' minds.

Findings of the present study are in line with those of Amir Ahmadi, Iravani, and Sharafi (2012: 93), Ghasemi and Jahani (2009), Ghaderi (2000) and Ahqar (1383). These researchers has emphasized on inactiveness of science course books in elementary period. Involvement coefficients obtained via William Rummy's formula show that science course books of elementary period have not covered what researchers and professionals consider as the outcome of science training effect on applicable issues like increasing creativity, facilitating learning, upgrading citizenship life and etc.

Suggestions

It is suggested that authors of science course books present applications of science in life in a way that encourages students' active participations.

It is also proposed that future studies investigate the extent of (in)activeness of science and life categories with those of other parts like questions, science history and etc.

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