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Procedia Social and Behavioral Sciences 2 (2010) 3463–3467

Procedia
Social and Behavioral Sciences

WCES-2010

The social and science teacher candidates' creativity on material using and designing

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Received October 30, 2009; revised December 8, 2009; accepted January 15, 2010

Abstract

The purpose of this research is to determine the creativity on material design of science and social teacher candidates. For this purpose, 38 students were selected from science and 39 students were selected from social teacher candidates from a government university in Istanbul. This work is a case study. As a means of data collection by researchers, developed by taking 3 experts opinion polls are used. Pilot studies before application of principles of survey can be done is not obvious statements were corrected and brought to final form questionnaire. Data tables using percentage and frequency and content analysis were evaluated.

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Keywords: Creativity; material designing; social teaching; science teaching; teacher training.

1. Introduction

The main purpose of today's education system must be to teach basic skills to reach the information rather than transferring the available information (Vincent & Hofstein, 1982). It requires criticizing the upper level intellectual skills, acquisition rather than memorization, solving problems in newly met situations and using scientific method processes (Kaptan & Korkmaz, 2001; Korkmaz, 2000).

Our country has had an education process in which teacher is the main factor in teaching and the approaches used in teaching mostly refer to our auditory senses. However, with modern education approaches and techniques, it is necessary to use adequate sources, equipment, experiments, observations, investigation, analysis, projects and applications to reveal the creativity of students and giving them opportunities to use the scientific methods (Vincent & Hofstein, 1982).

Primary School education is an important process in which the individual first comes across education, gain critical and scientific conceptual skills and learn analyzing the situations in an order by carrying out various observations and deductions. Among the subjects which help students gain these attainments, science and social subjects are of primary importance (ABD-El-Khalick, 2004). In particular, as science subjects are learnt through living and learning, they are not only the mostly interested subjects by teachers and students but also the subjects which arouse the desire to learn in students (Jones, 1998).

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In science and technology lesson, the teacher is required to teach students the unit contents and acquisitions by using any educational equipment and activities considering the facilities of the student, the school and the environment. Moreover, the student has to use any technological devices, including the internet, to reach the knowledge about science and technology and believe the necessity of this and utilize various resources affectively. (M.E.B., 2000). As the social sciences is the subject which necessitates students to learn plenty of oral info, concepts and principles, students tend to memorize them unless they are made meaningful for them. In Turkey, this subject is considered to be the subject which involves excessive learning by heart by teachers, students and parents. This causes a trouble in students applying what they have learnt to life and a gap between the school and the real life. To avoid this disconnection, it is necessary to make the lesson more memorable by using various materials.

In books and articles there exist studies which prove that using material boosts the interest of students in the lesson. In the education process, teachers have to be able to use available materials of such importance and also have the ability to create and develop them by using their imagination (Çakmak, 1999). Creativity might be considered as not only a process but also an authentic product released at the end of this process. In creative thinking, process steps might change according to the structure of the possible problem. Generally, process steps can be realized as the realization of the problem and limiting it, making up hypotheses for solution, testing hypotheses, finding the result, accepting, refusing or troubleshooting in scientific creativity (Soderberg & Price, 2003).

In this study, some comparisons are made regarding the material development of science and social sciences teachers in education by using their creative thinking, their tendency of using materials in their lessons and their material preferences and by taking the results into considerations some suggestions are made.

2. Approach (Method)

Our study has been carried out in an education faculty of a state university located in Istanbul in 2009-2010 educational year. Our working group is composed of 38 science and 39 social sciences teacher trainees. All the students in the study have had material development lesson. The study is designed as a qualitative case study. In the study scanning mode is used. The survey which includes five questions developed as a data collection tool of randomly chosen sample study is shaped by 3 learned opinions. Incoherent statements are revised as a result of a pilot study carried out prior to main study, the surveys revised in the study have been given to students. In the analysis of the data, the content analysis method is applied and the findings are expressed with percentage and frequency tables.

3. Findings

Table 1. The classification and the percentage of the answers given by the students studying science and social sciences teaching to the question of 'Do you think material use is efficient in the course of a lesson? Why?'

Question	Reply	Answers	Science Teacher Candidates (%)	Social Teacher Candidates (%)
1	Existing	Yes	Visualize is more efficient in learning.	25.6
			Materials appeal to sense organs.	15.4
			Abstract knowledge becomes concrete.	0.0
			Material use enables meaningful and permanent learning.	35.9
			Drive the student's interest.	7.7
	No		0.0	0.0
	Meaningless		0.0	7.7
	Absent		0.0	7.7

In Table 1, the answers given to the first question are classified. While 27.9 % of students studying Science state that 'visuality is more efficient in learning?', this percentage is 25.6 % among students studying social sciences. 18.6 % of the science teaching trainees say that 'Materials appeal to sense organs' whereas 15.4 % of the social sciences teaching trainees say that. While 27.9 % of science teaching trainees state that 'Abstract knowledge becomes

concrete’, social sciences teaching trainees have not stated that. More of the social sciences teaching trainees express that ‘material use enables meaningful and permanent learning’ compared to science teaching trainees.

Table 2: The classification and the percentage of the answers given by the students studying science and social sciences teaching to the question of ‘When you have become a teacher, which of the following materials and approaches are you planning to use? You can choose (tick) more than one.

	Modal	Cartoon	Poster	Educational Cd	Experiment Materials technique	Picture	Board	Tey	Concept Map	Drama	Graphic	Puzzle	Analogy	Computer use	Scheme	The Other
Question 2 Science Teacher Candidates (%)	86.8	65.8	65.8	78.9	89.5	76.3	50.0	18.4	100.0	63.1	60.5	78.9	44.7	89.5	71.0	2.6
Social Teacher Candidates (%)	30.7	38.5	51.3	58.9	30.7	56.4	41.0	15.4	66.6	41.0	56.4	46.1	12.8	82.0	43.6	2.6

As shown in table 2, all science teaching trainees and 66.6 % social sciences teaching trainees have stated the necessity of using ‘Concept Map’. But this percentage is the second mostly preferred technique among the social sciences teaching trainees. While 89.5 % of science teaching trainees consider applying ‘computer use’, this rate is 82 % among the social sciences teaching trainees and this is the mostly preferred technique among themselves. While the rate of using ‘Experiment Materials technique’ is high with 89.5 % among the science teaching trainees, this is 30.7 % among social sciences teaching trainees. As to the other approaches shown in Table 2, there is no big differences between science teaching trainees and social sciences teaching trainees.

When the answers given to the question of ‘Do you think the National Education Ministry should give you the material to be used in the classroom? Why?’ are analysed, the rate of total number of students believing that the materials to be used are not necessarily to be given by the National Education Ministry is 7.8 %. The 5.3 % of this rate is composed by Science teaching trainees and the rest 2.5 % by Social Sciences Teachings trainees. Among the Science Teaching trainees who say ‘no’ to this question put forward the idea that ‘More than one simple material can be prepared for a particular topic’ while the 2.5 % of Social Sciences Teachings trainees say that ‘Teachers themselves should provide the material because of social and regional varieties’ The teaching trainees who support the idea that the National Education Ministry should provide the material needed argues mostly the ‘economic hardships’ as the main reason. 10.4 % of the trainees, with close proportion, request that ‘education should be completely supported by the government.’ While the proportion of Science Teaching trainees who argue for ‘an equal chance for each school ‘ and therefore National Education Ministry should provide the material needed is 5.3 % , the rate of Social Sciences teaching trainees is 2.5 %. 5.1 % of Social Sciences teaching trainees reckon ‘Materials won’t arrive at underdeveloped regions’; however, Science teaching trainees do not bring this reason forward. Whereas 2.7 % of Science teaching trainees state that ‘there should at least be a standard model’, Social Sciences teaching trainees do not state anything like that.

While the rate of Science teaching trainees who believe that they will have adequate knowledge and equipment to develop lesson material and therefore will be able to develop materials at the end of their undergraduate study is 52.6%, the rate of the rate of Social Sciences teaching trainees is 30.7 %. 5.1 % of Science Teaching trainees answer this question as ‘originality is required’ whereas 2.1 % of Science Teaching trainees believe the same. Although 5.1 % of Social Sciences teaching trainees suggest that teachers have to make an effort, Science teaching trainees do not express such an idea. The 5.1 % of Social Sciences teaching trainees who reply this question as ‘Partially / partly’ say that ‘experience is associated with practice and successes whereas none of the Science teaching trainees have given such an idea. While the rate of Science teaching trainees who believe that ‘They will not be able to develop all the materials’ is 10.5 %, the rate is 7.7% among Social Sciences teaching trainees. 7.8 % of Science teaching trainees indicate that ‘They have to improve themselves’ whereas Social Sciences teaching trainees have not stated such a thing.

While the rate of Science teaching trainees who answer the question of ‘Do you think it is important for a teacher

to be able to develop material? Please state your reasons' as 'teachers have to think creatively and be able to develop material' is 31.5 %, the rate of Social Sciences teaching trainees is 38.4%. The rate of Science teaching trainees who assert that 'Teachers know their students better, so they have to develop materials accordingly' and 'Teachers are models for students, so they have to be able to prepare materials' is 13.1 % whereas Social Sciences teaching trainees do not have such answers. While the rate of Science teaching trainees who reply as 'Teachers have to make contributions with limited facilities' is 10.5 %, Social Sciences teaching trainees have not answered like that. Although 18.4 % of Science teaching trainees believe that 'Material development is required to be able to teach your lesson best and make it concrete, 10.2 % of Social Sciences teaching trainees think the same.

4. Comment and Discussion

Considering the results of Table 1, it is possible to comment that as teacher trainees of both field studies state that materials appeal to sense organs and visuality is more helpful in teaching, science and social sciences subjects, two different disciplines, might be considered as subjects which will be more influential (effective) with material use. Material is also vital for students to learn concepts more easily and interpret the events in a more systematic thought. In books and articles it is stated that as using various materials (such as casts, models etc.) in Science and Technology lessons help students associate the things they have learnt with the real life situations; also in Social Sciences lesson, materials related to real life help lessons reach their targets more than the course book and bring the society and school together and make learning more effective (Sönmez, 1992). The idea expressed by Social Sciences teaching trainees that material usage ensures meaningful and long lasting learning comply with this belief. For Science teaching trainees who believe that materials embody abstract knowledge, it can be stated that they are aware of the necessities of their fields of study and with this finding so they can appeal to their sense organs.

In the process of Science and Technology teaching and learning, another important point, which is as important as material development, is the selection and the preparation of visual materials. It is highly likely that Science and Technology teaching trainees prefer to use models, caricatures, posters, educational cds, experiment materials, concept maps, drama, graphics, crossword puzzles, computers and charts as materials and methods in their lessons. This finding can be interpreted as that teaching trainees have the sufficient information to design the sort of education they want to carry out in their professional lives. But, Social Sciences teaching trainees mostly prefer to use educational cds, pictures, concept maps, graphics and computers, which shows that they have the ability to choose the required materials for the lesson. İzci (2004) indicates that the characteristics of the students, the features of teachers, the targets of teaching, the number of students and physical situations should be taken into account in the selection of equipment in teaching. Taking this into consideration, with the selected materials, appropriate education acquisitions may be achieved.

The students who believe the National Education Ministry should supply the required material for the lesson especially indicate that 'more than one sort of material can be prepared for a specific topic' and 'because of regional differences; teachers themselves should prepare their own materials' because, teaching trainees may not necessarily find well – equipped classrooms in the schools they teach. They have to get some missing equipment from 'Provincial Education Services Central Directorate'. This situation solves the problem of obtaining difficult-to-do and costly equipment. Furthermore, according to the available findings, with their own creativity students can also design lesson materials and with the troubleshooting abilities they have learnt, they can obtain the necessary materials themselves.

Refence11 indicates that some teachers hesitate even using a simple device they have for the reason that they do not know how that device works. It can be interpreted that although there is a discrepancy in the rate between Science teaching trainees and Social Sciences teaching trainees who state that 'They will have adequate knowledge and equipment to be able to develop lesson materials at the end of their post graduate degrees and so they can build up materials', they can build the gap by learning the unknown materials either during their study or by searching for them to learn how they work

The findings to the question of 'Do you think it is important for a teacher to be able to develop materials? Please, explain in short' show that the idea that 'Teachers must think creatively and have to develop material' is the mostly preferred thought for both groups of trainees.

5. Results and Suggestions

According to the findings of the research, although it can be stated that Science Teaching trainees and Social

Sciences Teaching trainees use different materials in their own lessons, generally speaking, while developing their own materials, they will use their creativity as well. In this phase, Education Faculty students' preparing activities that can boost their creativity help them design more effective education materials. In addition, how each material will be used for which purpose should be thought to students in details, seminars about new technologies should be held from time to time to equip students. Students should also be informed about the importance of material usage in their lessons and be encouraged to use materials in their lessons. If this research is repeated with a big working group and branch teacher trainees, it is thought that it contributes to education faculty programmes.

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