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EVALUATION OF TEACHING AND LEARNING PROCESS IN CONTENT KNOWLEDGE COURSES IN TERMS OF CONSTRUCTIVIST APPROACH

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ABSTRACT
The aim of this study is to assess learning-teaching process in content knowledge courses and in Science Teaching licence programme by means of "Constructional Learning Approach". The study is in the descriptive scanning model. Working group of the study were the 2nd grade students studying in the department of Science Teaching at Pamukkale University, in the education-teaching year of 2011-2012. In the study, scale consisting of 6 dimensions in total by means of the features that are necessary for constructional learning and developed by Arkün and Aşkar (2010) as a device of gathering data. According to the findings obtained at the end of the study, it has been determined that learning-teaching process provided for preservice teachers in applied courses within content knowledge courses are more constructional than the learning-teaching process provided in theoretic courses.
Keywords: *Teaching and Learning Process, Content Knowledge Courses, Constructivist Approach.*

1. Introduction

Teaching-learning approach and theories determine teachers' roles, qualities necessary for them to have. For this reason, it is inevitable that approach and theories also affect the programmes of teacher training. Primary school education programmes developed based on constructional approach have been started to be applied since the education-teaching year of 2005-2006. This situation needs to train teachers to have qualities of applying the programmes based on constructional approach. In this case, it can be said that assessment and development of teacher training programmes are important in the context of teacher training to have required qualifications.

In Turkey, also, after 2000s, especially because of the negative results from international exams, a critical inquisition emerged. Since the teaching year of 2004-2005, new primary school programmes accomplished with pilot applications by MEB (Ministry of National Education), were completed in 2008 and elementary school programmes, studies in the quality of a range of reforms put into practise gradually about the system of Elementary School Preservice Teachers' Major and Professional Capabilities have still continued (Ekinci and Öter, 2010). Lastly, in 18th National Education Council performed in 2010, subjects like "Training, Employment and Professional Development of a Teacher" were dealt and pointed out that in institutions training teachers, it is necessary to provide students to graduate as having teacher capabilities (MEB, 2010). Components composing

capabilities that the profession of teaching requires were defined by gathering them in three dimensions. These are capabilities of general knowledge, major and education-teaching (MEB, 1973). When these capabilities are dealt according to learning stages, while major knowledge maintains its importance evenly, towards higher stages, general knowledge percentage decreases, the percentage of professional teaching knowledge (educating-teaching capability) increases (Celep, 2005).

Content knowledge maintaining its importance (%62,5) in each stage, the most necessary part of a teacher's knowledge limited by a few subjects during courses, is knowledge of the concepts needed to be taught. In the largest meaning, it includes subject context, headings, realities, definitions, methods, concepts, organizing patterns, performances, effects, reasons, truths and relations in research area (Davis, 2003; Akt. Özdemir, 2006). However, when considering features expected for a qualified teacher to have and perception of today's education as a whole, it has become inevitable to gather major knowledge given to preservice teachers in teacher training programmes and constructional perception together.

New primary school programme is a programme which is based on constructional learning theory dealing with how a student learns rather than what he/she needs to know, therefore focused on active learning and having the student in the centre with a teacher profile with qualifications of instructive, guide, providing environment organizing and motivating. Teacher is in the role of major actor being of the essence in reaching the goals of the programme. From this point, taking a step in this sense, in service and previous in training teachers, training teachers having all the qualifications to guide assessment and student-centred teaching based on activity and comprehending new perception and approaches in theoretic and application level are primary issues to deal in cooperation with the Ministry of National Education and Provincial Directorates for National Education (Ekinci and Öter, 2010). In a study report which the Ministry of National Education (MEB) EARGED (department of studying and developing education) prepared in 2005, it was stated that science couse success of students in the grades of 4, 5, 6, 7 and 8 in primary school where science courses were taught was below 50% throughout Turkey (MEB, 2007). When the averages throughout Turkey are analyzed, it can be said that there are important deficiencies of science education and the programmes of training science teachers in our country. Because practitioners of science education at schools are teachers, it is important to train them having contemporary knowledge, ability and attitudes and knowing new learning-teaching approach and theories in science education (Özmen, 2004).

At this point, the importance and necessity of programme assessment emerge. Constant assessment of the programmes which are the fundamental devices of the education outputs and developing them according to the results of this assessment are compulsory. When troubles and deficiencies of applied programmes are removed, they have organized again according to the changes in society and science fields, in other words, when programmes are developed, the quality of education is expected to increase. Being able to have correct decisions to make the programmes more effective depends on

researching bases of these decisions with scientific studies and the assessment of the applications (Erden, 1995).

When literature is analyzed, these are seen; Doğan (2007) assessed primary school science and technology (2004) course and acquisitions dimension of science (2000) course teaching programmes according to teachers' opinions comparatively; in the same way, Öz (2007) analyzed teachers' opinions about programmes of primary school science course of the year 2001 and primary school science and technology course of the year 2005. Besides, science courses were assessed in many ways like in the context of both the level of the class (Yavuz, 2000; Avşar, 2009; Akyol, 2011) and various units and subjects (Ergül, 2008) according to constructional perception. Also, studies about science preservice teachers and content knowledge courses like the assessment of preservice science teachers' knowledge about some subjects (Özdemir, 2006; Canbazoğlu,2008; Akçay, 2009), the assessment of preservice science teachers' attitudes towards majors of physics, chemistry and biology (Bakırcı, 2005) were encountered. Erişen (2001), on the other hand, carried out a study about the determination of quality standards related to the programmes of teacher training and the assessment of suitability of faculties for the standards and concluded that there were serious deficiencies about the practising determined standards in faculties and made some suggestions about developing the quality of teacher training programmes. Lastly, Taşgın (2010) assessed learning with capabilities of teaching and learning process from general capabilities of profession of teaching; capabilities of observing and assessing the development according to the opinions of class masters and preservice class masters. However, any study related to how much supportive quality education faculties educating teachers have for learning-teaching process in content knowledge courses of primary school Science Teaching programmes to make preservice teachers gain constructional teacher qualifications were not encountered.

The aim of this study is to assess learning-teaching process in content knowledge courses of Science Teaching licence programme in the context of "Constructional Learning Process". Therefore, in training preservice science teachers to be practitioners of constructional learning approach, contribution of learning-teaching process in content knowledge courses was tried to be determined. With this aim, preservice teachers' opinions about the process of learning-teaching in content knowledge courses were analyzed with these sub-problems:

- Are there any significant differences among content knowledge courses in the context of constructional learning setting?
- According to students' opinions, are there any significant differences between theoretic courses and applying courses in the context of constructional learning settings?
- According to students' opinions, are there any significant differences among dimensions of constructional learning setting in content knowledge courses?

2. Method

2.1. Working Group

Working group of this study consisted of 2nd grade students studying at the department of Science Teaching at Pamukkale University in the fall term of the education-teaching year of 2011-2012. Because all the students were reached, there was no need to take samples. Data was gained from chosen 5 courses (General Biology-I, General Biology Lab-I, General Physics-III, General Physics Lab-III and General Chemistry-III) as content knowledge courses.

2.2. Devices of Gathering Data

In this study, "assessment scale of constructional learning settings" consisting of 6 dimensions in total (student-centred, making you think, cooperative, related to life, being together of teaching and assessment and different points of view) in the context of features needed to be in constructional learning setting and developed by Arkün and Aşkar (2010) was used as a device to gather data.

3. Findings

In this part, findings gathered at the end of the achieved data analysis related to the sub-problems of the study have been explained by the help of the tables.

Sub Problem 1. Are there any significant differences among content knowledge courses in the context of constructional learning setting?

From the assessment scale of constructional learning setting, results of ANOVA used in order to determine whether there are some significant differences among content knowledge courses according to points gathered in accordance with students' opinions have been given Table 1.1:

Table 1.1. ANOVA Results of Assessment Scale Points of Constructional Learning Setting

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	100096,227	4	25024,057	34,708	,000*
Within Groups	329491,577	457	720,988		
Total	429587,803	461			

* p<0,05

At the end of the one-way variance analysis made, it has been determined that content knowledge courses by means of constructional learning setting has a meaningful difference at the significance level of 0.05 statistically (f= 34,708; p< 0.05). In other words, according to students' opinions, content knowledge courses differ by means of the

features of constructional learning setting provided in those courses. According to Scheffe test, one of the POST HOC processes suggested by Tukey, applied in order to determine in the direction of which course or courses this difference is, there is a significant difference in total point average of assessment scale of constructional learning setting of especially chemistry course when compared to other four courses ($f= 34,708$; $p< 0.05$). Descriptive statistics of total points averages of content knowledge courses have been presented in Table 1.2 :

Table 1.2.Descriptive Statistics Related to Total Point Averages of Content Knowledge Courses

Courses	N	Min.	Max.	Mean	Std. Deviation	Variance
General Physics-III	81	70	188	137,73	28,044	786,450
General Chemistry-III	104	45	177	110,79	29,394	863,994
General Biology-I	86	61	193	143,77	29,043	843,522
General Physics Lab-III	85	68	185	152,06	22,319	498,151
General Biology Lab-I	106	73	187	144,13	24,696	609,906
Total	462	45	193	136,89	30,526	931,861

As it is seen in Table 1.2, among content knowledge courses, chemistry course has the lowest point average (110,79) gathered from assessment scale of constructional learning setting, the highest point average is for physics laboratory course (152,06). Generally, average point of content knowledge courses has been calculated as 136,89.

Sub Problem 2. According to students' opinions, are there any significant differences between theoretic courses and applied courses in the context of constructional learning settings?

Results of Independent Samples T-Test used in order to determine whether there is a difference among constructional learning settings provided in theoretic courses and applied courses in content knowledge courses have been given in Table 2.

Table 2. T-Test Results of Average Points of Theoretic and Applied Courses

Content Knowledge Courses	N	Mean	Std. Deviation	sd	t	Sig.
Theoretic courses	271	129.31	32.375	460	6.656	0.00*
Applied courses	191	147.66	23.935			

* $p<0,05$

As it is seen in Table 2, a statistically significant difference at the significance level of 0,05 among learning settings of theoretic and applied courses within content

knowledge courses have been determined (t=6.656; p<0,05). When we look at point averages of the groups in order to understand whose benefit this difference is, it is seen that point average (129.31) of constructional learning setting assessment scale of theoretic courses is higher than the point average (147.66) of application courses. In other words, it can be said that learning settings of application courses have more features of constructional learning setting compared to learning settings of theoretic courses.

Sub Problem 3.According to students' opinions, are there any significant differences among dimensions of constructional learning setting provided in content knowledge courses?

Results of ANOVA used in order to determine whether there is a significant difference among dimensions of different points of view, student-centered, making you think, cooperative, related to life, being together of teaching and assessment of constructional learning setting have been given in Table 3 :

Table 3. Results of Variance Analysis Related to Significance of the Difference among Dimensions Averages of Constructional Learning Setting to the Content Knowledge Courses

General Physics -III		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	1,958	5	,392	,289	,919
	Within Groups	650,952	480	1,356		
	Total	652,910	485			
General Chemistry-III		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	18,802	5	3,760	2,412	,035*
	Within Groups	963,504	618	1,559		
	Total	982,305	623			
General Biology-I		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	9,207	5	1,841	1,288	,268
	Within Groups	729,255	510	1,430		
	Total	738,462	515			
General Physics Lab-III		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	8,671	5	1,734	2,002	,077
	Within Groups	436,617	504	,866		
	Total	445,287	509			
General Biology Lab-I		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	15,272	5	3,054	2,576	,026*
	Within Groups	747,144	630	1,186		
	Total	762,416	635			

* p<0,05

When Table 3 is analyzed, it is seen that constructional learning dimensions of physics (f=,289; p> 0.05), biology (f=1,288; p> 0.05) and physics laboratory (f=2,002; p> 0.05) courses do not have any statistically significant differences at the significance level. Besides, it is seen that constructional learning dimensions of chemistry (f=2,412; p< 0.05) and biology laboratory (f=2,576; p< 0.05) courses have a statistically significant difference at the significance level of 0.05. In order to determine among which dimensions this difference is, when average points belonging to learning setting dimensions of chemistry course are analyzed, "dimension of related to life" has the lowest (3,6851) and "dimension of being together of teaching and assessment" has the highest (4,23) average. Dimension having the lowest (4,99) average of biology laboratory course is "dimension of different point of view", dimension with the highest (5,44) average is "dimension of cooperative learning".

4. Conclusion

It has been determined that according to students' opinions, learning-teaching process in content knowledge courses has a significant difference among courses by means of having the features of constructional learning setting. When total points of "assessment scale of constructional learning setting" belonging to given courses are analyzed compared to general averages of content knowledge courses, it is seen that courses of General Biology-I, General Biology Lab-I, General Physics-III, General Physics Lab-III are slightly above the average, course of General Chemistry-III is below the average. In this case, it can be said that analyzed content knowledge courses do not have all the features of constructional learning setting.

However, when content knowledge courses are dealt as theoretic and applied courses, it has been determined that learning-teaching process set in laboratory courses which are applied courses is more constructive than the learning-teaching process set in theoretic courses. According to the application, in theoretic courses, setting related to how knowledge is constructed is not provided enough for students.

It has been concluded that courses of physics, physics laboratory and biology do not differ in themselves in the context of their dimensions of constructional learning setting; their all dimensions have similar features. It has been also concluded that in chemistry course, its dimension of "related to life", in biology laboratory course, its dimension of "different points of view" are both at lower levels than other dimensions.

According to these results, in order to provide constructional learning settings at a required level, all the dimensions of constructional learning setting should be considered in all content knowledge courses. In-service education should be given to develop instructors' abilities in organizing constructional learning setting.

References

Akçay, S. (2009). İlköğretim Fen Bilgisi Öğretmen Adaylarının Biyoloji Alan Bilgisi Yeterliliği. Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Doktora Tezi, Ankara.

Büyüköztürk, Ş (2010). Bilimsel Araştırma Yöntemleri. Pegem Akademi, Ankara.

Canbazoğlu, S. (2008). Fen Bilgisi Öğretmen Adaylarının Maddenin Tanecikli Yapısı Ünitesine İlişkin Pedagojik Alan Bilgilerinin Değerlendirilmesi. Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Yüksek Lisans Tezi, Ankara.

Celep, C. (2005). Meslek Olarak Öğretmenlik. Anı Yayıncılık, Ankara.

Doğan, S. (2007). İlköğretim Fen ve Teknoloji (2004) Dersi İle Fen Bilgisi (2000) Dersinin Öğretim Programlarının Kazanımlar Boyutunun Öğretmen Görüşlerine Göre Karşılaştırmalı Olarak Değerlendirilmesi. Çanakkale Onsekiz Mart Üniversitesi Sosyal Bilimler Enstitüsü, Yüksek Lisans Tezi, Çanakkale.

Ekinci, A. ve Öter, Ö. M. (2010). İlköğretim Öğretmen Adaylarının Mesleki ve Özel Alan Yeterlikleri, Eğitim Fakültelerinin Öğretmen Yetiştirme Kapasitesinin Güçlendirilmesi Projesi.(http://duabpo.dicle.edu.tr/oygem/dosya/Ogretmen_Adaylari_i%C3%A7_mizampaj.pdf). (15.08.2011)

Erden, M. (1995). Eğitimde Program Değerlendirme. Pegem Yayıncılık, Ankara.

Erişen, Y. (2001). Öğretmen Yetiştirme Programlarına İlişkin Kalite standartlarının belirlenmesi ve fakültelerin Standartlara Uygunluğunun Değerlendirilmesi. Ankara Üniversitesi Eğitim Bilimleri Enstitüsü, Doktora Tezi, Ankara.

MEB (1973). Milli Eğitim Temel Kanunu 1739 Sayılı Kanunu. (http://mevzuat.meb.gov.tr/html/88.html). (07.08.2011)

MEB (2007). İlköğretim Öğrencilerinin Başarılarının Değerlendirilmesi Fen Bilgisi Raporu (EARGED). (http://earged.meb.gov.tr/dosyalar/obbs/2005/fen_bilgisi.pdf) (07.07.2011)

MEB (2010). 18. Millî Eğitim Şûrası Kararları. (http://www.meb.gov.tr/duyurular/duyurular2010/ttkb/18Sura_kararlari_tamami.pdf). (10.07.2011)

Öz, B. (2007). 2001 İlköğretim Fen Bilgisi Dersi ve 2005 İlköğretim Fen ve Teknoloji Dersi Programlarına İlişkin Öğretmen Görüşleri. Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Yüksek Lisans Tezi, Adana.

Özdemir, Z. (2006). Fen Bilgisi Öğretmen Adaylarının Bazı Biyoloji Konularındaki Alan Bölgelerinin Değerlendirilmesi. Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Yüksek Lisans Tezi, Ankara.

Özmen, H. (2004). Fen Öğretiminde Öğrenme Teorileri ve Teknoloji Destekli Yapılandırmacı (Constructivist) Öğrenme. The Turkish Online Journal of Educational Technology – TOJET, ISSN: 1303-6521 volume 3 Issue 1 Article 14. (http://www.tojet.net/articles/3114.pdf). (01.07.2011)

Taşgın, A. (2010). Öğretmenlik Mesleği Genel Yeterliklerinin Sınıf Öğretmenleri Ve Sınıf Öğretmeni Adaylarının Görüşlerine Göre Değerlendirilmesi (Öğretme ve Öğrenme Süreci Yeterlikleri-Öğrenmeyi, Gelişimi İzleme ve Değerlendirme Yeterlikleri).Atatürk Üniversitesi Sosyal Bilimler Enstitüsü, Yayınlanmamış Yüksek Lisans Tezi, Erzurum.