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Pre-Service Biology Teachers' Attitudes towards ICT Using In Biology Teaching

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Abstract

The aim of this study is to determine the pre-service biology teachers' attitudes towards ICT using in biology teaching in terms of various variables. The research group consist of 70 students who studying at Department of Biology Education of Ziya Gökalp Education Faculty in Dicle University. "Information and Communication Technology Attitudes Questionnaire-IAQ" (Kubiatko and Haláková, 2009) which includes 28 items was used as data collection tool. Cronbach's Alpha internal consistency coefficient of the scale was calculated to be 0.82. It was used SPSS 15.0 package program in the analysis of the data. The analysis of the data were made by t test and ANOVA techniques. Significance level was taken to be .05. The results indicate that; pre-service biology teachers have positive attitudes toward ICT using in biology teaching and although their attitudes do not differ regarding gender and class.

Keywords: Pre-service biology teachers, ICT, biology teaching.

1. Introduction

Current explosion of information has led to fundamental changes in education. These radical changes are seen especially in education systems. Memorization-based education systems designed within the framework of the information-loaded individual model are now replaced with systems that require research and interrogation. Today, what is important is not the information itself but how to access it. Thus, the fact that we live in a world of information and communication technologies has increased the

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importance of this situation. In this respect, the need for information and communication technologies that allow accessing, questioning and evaluating the information is of great significance (Özmusul, 2008).

The term "Information and Communication Technologies" refers to transferring, storing, revealing and sharing technology or accessing information. Information and communication technologies include radio, television, video, DVD, phone (fixed and mobile), satellite systems, computer and network equipment and software as well as the equipment and services provided by these technologies (such as video-conference and electronic mail) (UNESCO, 2006). Use of information and communication technologies (ICT) for instructional purposes has become a need for training individuals that constitute the information society. This need has made it compulsory to carry out teacher-training applications with a contemporary viewpoint, which is one of the most important dimensions of the social education process. Pre-service teachers are supposed to acquire the skills and knowledge necessary for ICT use in the pre-service learning processes and to use them for such different purposes as professional development both in their pre-service education period and in their professional life. In this respect, Pre-service teachers should be provided with opportunities to use technology in different contexts throughout their education (Çuhadar and Yücel, 2010). If our teachers, who are individuals directing the future, do not use education and communication technologies or are not sufficiently knowledgeable about this subject, our education system and people in our country can not carry out the necessary social developments and will get out of data and form an underdeveloped society taking the information from other counties. One of the basic goals of education is to train individuals who can not only benefit from but also science and technologies. If we do not achieve this goal, we can not train the individuals of an information society (İşman, 2008).

As biology includes complex relationships of unfamiliar and abstract concepts, it is quite difficult to learn and teach. In biology teaching, the fact that educational situations and biology concepts are abstract and complex causes students to experience difficulty in understanding certain subjects and to learn them via memorization without understanding (Kılıç and Sağlam, 2004). In order to solve this problem, the use of information and communication technologies is increasingly important. It is especially important in biology if computers can present the information visually. Well-prepared pictures, three-dimensional models, animations, interactive environments and so on help comprehend the target information more easily (Çömlekçioğlu and Bayraktaroğlu, 2001).

When ICT-aided applications reported in related literature are examined, it is seen that certain conceptual and technology-based factors (motivation, attitude, lack of technological sub-structure and so on) influence the application process and thus the quality of learning and academic achievement. One of these factors is attitude.

In general sense, attitude is a biased response of an individual to a specific object. Alport defines attitude as continuous readiness in mental and neural respects. According to Ralflinton, attitude is an implicit response. It could be negative-positive or neutral and can not be directly observed. In order to be able to decide on what attitudes an individual develops towards a specific object or event, the individual's response to that object should be observed in various environments. Attitude is resistant to change (Morgan, 1999). Computer or ICT attitude has been defined as a person's general evaluation or feeling of favor or antipathy toward computer Technologies and specific computer related activities (Kubiatko ve Haláková, 2009). The aim of this study is to determine the pre-service biology teachers' attitudes towards ICT using in biology teaching in terms of various variables.

2. Method

In the study, the survey model was used.

2.1. Research Group

The research group consist of 70 students who studying at Department of Biology Education of Ziya Gokalp Education Faculty in Dicle University in the academic year of 2011-2012.

2.2. Data Collection

"Information and Communication Technology Attitudes Questionnaire-IAQ" (Kubiatko ve Haláková, 2009) which includes 28 items was used as data collection tool. Every item in the questionnaire is 5-scale by Likert. Likert scale question comprised five points ranking following: ''strongly agree" (5 points), ''agree" (4 points), ''neutral" (3 points), ''disagree" (2 points), ''strongly disagree" (1 point). Several questions were constructed negatively. The evaluation of them was in reverse order. The scale consist of five dimensions namely: (D1) the positive influence of ICT; (D2) the negative influence of ICT; (D3) advantages of ICT; (D4) ICT used in biology lesson; (D5) disadvantages of ICT. Cronbach's Alpha internal consistency coefficient of the scale was calculated to be 0.82. It was used SPSS 15.0 package program in the analysis of the data. The analysis of the data were made by t test and ANOVA techniques. Significance level was taken to be .05.

3. Findings

3.1. Findings Regarding Attitudes towards ICT Using in Biology Teaching

The mean scores of the study group, the standard deviation and the minimum and maximum scores in the scale were calculated. The findings regarding the distribution of the scores of the participating students are presented in Table 1.

Table 1. The distribution of the scores of the study group

	n	$\overline{X}$	**SD**	**Min.**	**Max.**
D1	70	4,15	,573	2,86	5,00
D2		3,22	,835	1,50	4,50
D3		4,26	,676	2,75	5,00
D4		4,26	,648	2,75	5,00
D5		3,23	,723	1,40	4,40
Overall		**3,76**	**,507**	**2,77**	**4,69**

A total of 70 pre-service biology teachers participated in the study. The distribution of the scores of the participating students in the scale revealed that the lowest score obtained was 2.77, while the highest was 4.69. The mean score of the participants regarding the scale of Attitudes Towards ICT Using in Biology Teaching was found to be 3.76, and the standard deviation was calculated as 0.507. Depending on the mean score, it could be stated that the participating students has positive attitudes towards ICT using in Biology Teaching.

3.2. Findings Regarding Attitudes towards ICT Using in Biology Teaching by Gender

In order to determine whether the participants' scores regarding their attitudes towards ICT using in biology teaching differed by their gender, independent samples t-test was applied. The t-test results are presented in Table 2.

Table 2. The t-test results of Attitudes towards ICT Using in Biology Teaching by Gender

Group	n	$\overline{X}$	SD	dF	t	p
Male	46	3,71	,387	68	1,158	.251
Female	24	3,86	, 547			

As can be seen in Table 2, the mean score of the 46 male students participating in the study regarding their Attitudes Towards ICT Using in Biology Teaching was 3.71, while that of the 24 female students regarding their Attitudes Towards ICT Using in Biology Teaching was found to be 3.86. As a result of the independent samples t-test conducted to see whether this difference was significant or not, the t value was not found statistically significant ($p > .05$). This result demonstrated that scores of both male and female students regarding their Attitudes Towards ICT Using in Biology Teaching did not differ from each other.

3.3. Findings Regarding Attitudes towards ICT Using in Biology Teaching by Class Grades

In addition, the study also examined whether the participants' scores regarding their Attitudes Towards ICT Using in Biology Teaching differed depending on their class grades. The overall distribution of the scores with respect to the participants' class grades is presented in Table 3.

Table 3. The overall distribution of the scores by the participants' class grades

Class Grades	n	$\overline{X}$	SD
1	9	3,92	,480
2	14	3,83	,528
3	18	3,69	,331
4	14	3,73	,528
5	15	3,65	,507

According to Table 3, the students with the highest mean score regarding the Attitudes Towards ICT Using in Biology Teaching were the first-grade students with a mean score of 3.92, while those with the lowest mean score regarding the Attitudes Towards ICT Using in Biology Teaching were the fifth-grade students with a mean score of 3.65. In order to test whether the mean scores were statistically significant or not between the class grades, one-way analysis of variance (One-way ANOVA) was conducted. The results of this analysis are presented in Table 4.

Table 4. The ANOVA results of Attitudes towards ICT Using in Biology Teaching by Class Grades

	Sum of Squares	**dF**	**Mean Square**	**F**	**p**
Between Groups	,452	4	,113	,436	,782
Within Groups	16,849	65	,259		
Total	17,301	69			

As can be seen in Table 4, the F value (F=,436; p>.05) calculated via the analysis of the significance of the differences between the participants' scores regarding their Attitudes Towards ICT Using in Biology Teaching with respect to their class grades was not found statistically significant. This result revealed that the participants' scores regarding their Attitudes Towards ICT Using in Biology Teaching did not differ depending on their class grades.

4. Conclusion and Discussion

The results indicate that; pre-service biology teachers have positive attitudes towards ICT using in biology teaching and although their attitudes do not differ regarding gender and class.

Especially in biology courses, it is quite important to use visual elements (such as pictures, animations, videos and so on) for concretizing abstract concepts. The biggest source for obtaining these elements is considered to be information and communication technologies. For effective use of ICT, it could be stated that a biology teacher's positive attitudes will positively influence the teaching process of the biology course.

In one study conducted on teacher-training institutions' use of education and information technologies, Akpınar (2003) reported several problems. Some of these problems were as follows: pre-service teachers do not have sufficient knowledge about computer literacy; they lack efficient applications regarding the use of technological materials; faculties' negative attitudes influence pre-service teachers' attitudes towards technology; pre-service teachers are not informed sufficiently about the preparation and use of Internet-based materials that will contribute to their learning and to their professional development; pre-service teachers are not sufficiently aware of the necessity for interactive courses regarding technology use; and pre-service teachers as well as teachers do not use appropriate instructional tools (cited in Ertürk, 2007). As one of the most important steps in the integration of information and communication technologies into teacher training, pre-service teachers could be provided with specific contexts and technological sub-structures which will allow them learn technology by doing and experiencing. Research that will reveal the knowledge, skills and attitudes of pre-service teachers

regarding the use of these technologies for instructional purposes will also provide the basis of the execution and planning of such instructional contexts (Çuhadar and Yücel, 2010).

In line with these findings, the following suggestions could be put forward:

- Increasing the number of applications to be carried out during pre-service teachers' undergraduate education to develop their ICT use skills and their attitudes towards ICT could increase their attitudes as well. In this respect, web-aided applications could be increased.
- Prior to web-aided applications to be carried out at universities, determining students' ICT attitude levels could increase the effectiveness of such applications.

References

Çömlekçioğlu, U. ve Bayraktaroğlu, E. (2001). Biyoloji ve Bilişim Teknolojileri. *Kahramanmaraş Sütçü İmam Üniversitesi Fen ve Mühendislik Dergisi*, 4 (1).

Çuhadar, C. ve Yücel, M. (2010). Yabancı Dil Öğretmeni Adaylarının Bilgi ve İletişim Teknolojilerinin Öğretim Amaçlı Kullanımına Yönelik Öz-yeterlik Algıları. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 27: 199-210.

Ertürk, R. (2007). *Öğretmenlerin İnternet Kullanma Becerileri ve İnternet'e Yönelik Tutumları,* Unpublished master thesis, Sakarya University, Sakarya, Turkey.

İşman, A. (2008). *Öğretim Teknolojileri ve Materyal Geliştirme.* Pegem A Yayıncılık, Ankara.

Kılıç, D. ve Sağlam, N. (2004). Biyoloji Eğitiminde Kavram Haritalarının Öğrenme Başarısına ve Kalıcılığına Etkisi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 27: 155-164.

Kubiatko, M. and Haláková, Z. (2009). Slovak High School Students' Attitudes to ICT Using in Biology Lesson. *Computers in Human Behavior* , 25, 743–748.

Morgan, C. T. (1999). *Psikolojiye Giriş* (Çev.,H.Arıcı ve ark.). Meteksan, Ankara.

Özmusul, M. (2008). *İlköğretim İkinci Kademe Öğrencilerinin Bilgi ve İletişim Teknolojilerinden Yararlanma Düzeyleri*. Unpublished master thesis, Gaziantep University, Gaziantep, Turkey.

UNESCO. (2006). *Using ICT to Develop Literacy*. UNESCO Bangkok:18-21