World Applied Sciences Journal 4 (Supple 1): 51-57, 2008
ISSN 1818-4952

Instructional Technologies Literacy Level of Prospective Teachers

[1]Hasan Hüseyin Aksu and [2]Temel Topal

[1]Department of Primary Education, Education Faculty, Giresun University, Turkey
[2]Department of Educational Sciences, Education Faculty, Giresun University, Turkey

Abstract: The aim of this study is to establish the level of prospective teachers' awareness and literacy of instructional technology. Undergraduate students of senior class within the second semester of 2007-2008 academic year from the departments of primary schoolteaching, science and technology schoolteaching, Turkish schoolteaching, and social studies schoolteaching in Giresun University, Faculty of Education make up the sampling of this study. The sample of the study consists of 400 students, only 340 of whom were actively involved in the questionnaire and answered the questions. Survey method was used as a means of data collection. In order to determine the level of prospective teachers' ability to use teaching technology, a questionnaire of a five scaled likert type from *never (1)* to *always (5)* was developed by the researchers. The results obtained indicated that prospective teachers considered themselves to be satisfied and partly satisfied with the level of their ability to make use of instructional technology. The results also showed that male prospective teachers had relatively more ability to use teaching technology than their female counterparts. Moreover, the level of prospective teachers' ability to make use of instructional technology show a significant difference in terms of the type of the scores on the higher education examination. The difference is highly significant with the succeeded fields in the higher education exam. Among the prospective teachers in the Faculty of Education difference in terms of their field of study and the difference was found to be significant between the fields they are studying in the university.

Key words: Schoolteaching · Prospective teachers · Instructional technology · Technology literacy level · Utilizing technology · Material design · Information research

INTRODUCTION

The consistent and organized studies are required to improve the quality of the profession of teaching. Therefore, in Turkey especially since 1990's, in line with the requirements of the modern age, different arrangements and new programs are developed. In this sense, within the restructuring process many arrangements have been made related to "undergraduate" level in faculties of education.

In educational environment instructional technologies are being attributed special place and importance each passing day. In recent years, rapid developments in this field has had its reflections on education, as on other fields, and has caused many changes in educational field as well. Today, the acquired knowledge and skills intended to the use of instructional technologies has become one of the important tools from the aspects of each student's keeping up with society and professional life. Students' deficiency in skills and their lack of knowledge on the utilization of the instructional tools has become the primary obstacle, such as illiteracy, against making them keep up with social life and let them penetrate into professional life [1].

Instructional technology is defined as the use of all technologies together for effectively promoted education, the education process's being designed in this sense and the application and evaluation of them towards determined objectives [2]. In parallel with the development of instructional technologies, some devices that are pleasing to the eye and ear; such as, overhead projectors, computers and reflectors has gotten into classroom environment in addition to different materials used in classical classroom environment. With the use of visual and audio devices, the learning becomes faster and more lasting [3]. One of the main goals of instructional technology is to broaden the living area. Under the circumstances where the students have introduction attitudes the expected learning's are realized easier [4].

Corresponding Author: Dr. Hasan Hüseyin Aksu, Department of Primary Education, Education Faculty, Giresun University, Turkey

The rapid changes and developments in the field of science and technology have their effects on the field of education. These developments improve the quality of education and still load the teacher with a charge and give him certain responsibilities. As teachers get more competent in their fields, the evaluation of instructional technologies' effectiveness becomes of great importance. Instructional technologies give some advantages to the teachers from the aspects of time, energy, productivity, activating education, scientific approach and being strong and timely in offering the teaching. However, these advantages mostly depend on teacher's effective and productive use of those technologies. Nonoperative and unproductive use of technology can create even more problems instead of facilitating the educational service.

As such in most countries, also in Turkey the studies on using technology in school environment increasingly continuing. Along with technology's having its place schools, a process of change has begun. Speaking of the people who change within the school system, the teachers, who are more in contact with students and who are responsible for executing and planning educational activities, should be the first to come to mind [5].

A teacher should also plan to use suitable instructional tools and materials while taking the contributions he can make into consideration. For this he should recognize the visual, audio, audiovisual and interactive instructional tools and materials as well as other sources; he also should choose and use the appropriate one(s) in accordance with the purpose he wants to achieve. After a lesson supported with instructional tools and materials;

- Education becomes more attractive,
- The anticipated (necessary) time for the education would be abridged,
- Instruction's quality would be improved,
- Students would develop positive attributes fort he learning process and for the teachers as they learn more.

Instructional tools and materials contains (1) transferring information between the source and receiver, (2) all kinds of written or drawn, mechanical or electronic instruments and materials that facilitates achieving the lesson objectives [6].

New technologies will effect physical environment, the scope, methods in education and instructor's education and will definitely necessitate some changes. In order to realize the active use of instructional technologies in schools; first, teachers should be educated largely, then, new academic programs and, more importantly, new educational models should be reassessed accordingly. It adds new dimensions to the field of education to use extremely flexible and widespread instructional technologies within the direction of enriching and developing education process with the programs prepared accordingly [7].

The Purpose of The Study: In this study, the instructional technologies illiteracy level prospective teachers intended to be determined.

METHODS

Population and Sampling: The sampling of the study is the students in senior classes of the departments of primary education, science studies, Turkish linguistics, pre-school and social studies teaching undergraduate programmes in the Faculty of Education of the Giresun University that were studying the second semester of 2007-2008 academic year.

Collection of Data: Survey method is used as a means of data collection. In order to develop instructional technology availability scale; first, the literature is reviewed, and then an ill-structured questionnaire on instructional technology availability level was applied to above mentioned prospective teachers. A practice form of 32 items on instructional technology availability issue was applied to a total of 300 prospective teachers. The five-point likert scale consisting the " 1-never, 2-seldom, 3-sometimes, 4-often, 5-always" items was developed and applied. In order to determine the structure validity and sub-factors of the scale factor analysis was done first and following the factor analysis the "instructional technology availability scale" was formed. In the first section of the two, the personal information about students' genders and departments they are studying in higher education (classroom schoolteaching, science and technology schoolteaching, Turkish schoolteaching and social studies schoolteaching) and the scores they got from the fields (verbal, numerical and equal weight) in higher education examination are stated. In the second section, the dimensions of instructional technologies availability level (utilizing technology, material design and information research) are stated. The scale is reduced to 22 items after item analysis and applied to the senior students of Giresun University Faculty of Education. The study is carried out with 400 students and 340 of them

answered the questions. And the answers are evaluated as never 1, seldom 2, sometimes 3, often 4, always 5 points.

Data Analysis: Data are analyzed and tabulated with SPSS 13.0 packaged software. Tables are formed on the basis of sub-factors namely; utilization of the technology, material design and computer use. Analyzing the data, the means, standard deviations and the number of the students (N) according to the personal attributes of the them form the aspects of above mentioned three sub-dimensions are presented. The differences' being statistically significant are tried to be determined with t-test and F test under the above mentioned dimensions. The validity of the study is ensured with the view of field experts and the internal validity factor (α) is calculated for the study as 0.89.

FINDINGS AND INTERPRETATIONS

Participant prospective teachers' answers to the questions in the instructional technology availability questionnaire are analyzed one by one and tabulated accordingly. Regarding personal information of prospective teachers; their number (n), mean ($\bar{x}$), standard deviation (sd), degree of freedom (df), t-value, one way analysis of variance (F) and significance value (P) are displayed in the tables. The mean ($\bar{x}$), standard deviation (sd) and the t-test results are shown in Table 1 in regarding students' gender as derived from the answers they give to each item.

In Instructional technologies availability scale, it is aimed to evaluate the difference between genders in the dimensions of utilizing technology, material design and information research. As is seen in Table 1, considering the gender average values obtained from the study under the utilizing technology dimension, male's mean value (43.01) is clearly higher than the female's mean value of (41.32). The t-test is applied to determine whether the difference between mean values of genders is significant and a t-value of 1.94 is found. Since the "P" value of (0.054) significance level is higher than the 0.05, it can be inferred that there is no significant difference between the mean values obtained for male and female prospective teachers. Considering the gender average values obtained from the study under the material design dimension, male's mean value (27.25) is clearly higher than the female's mean value of (23.77). The t-test is applied to determine whether the difference between mean values of genders is significant and a t-value of 4.87 is found. Since the "P" value of (0.000) significance level is lower than the 0.05, it can be inferred that there is significant difference between the mean values obtained for male and female prospective teachers. Similarly, there is statistical difference at significant level ($P<0.05$) considering gender under the information research dimension. Considering total values, instructional technologies availability level P value between genders is found significant. The results obtained demonstrates that instructional technologies availability level differentiates between male and female prospective teachers and the difference is evidently in favour of male prospective teachers. In other words, it can be said that male prospective teachers show more awareness for instructional technologies than the female prospective teachers.

Whether there is significant difference between their succeeded fields in the higher education exam and utilizing technology, material design and information research dimensions is tested. The one way variance analysis results of prospective teachers' succeeded fields in higher education exam is given below at Table 2.

As is seen in Table 2, the F value ($F= 7.892$, $p<0.05$) is found significant between prospective teachers' succeeded fields in OSS exam under the dimension of information research. Considering Scheffe test on the

Table 1: Comparison of prospective teacher's instructional technologies utilization level in accordance with their gender

Dimension	Gender	n	($\bar{x}$)	Sd	Df	t-value	P
Utilizing Technology	Male	168	43.01	8.345	343	1.94	0.054
	Female	177	41.32	7.861			
Material Design	Male	169	27.25	6.762	343	4.87	0.000*
	Female	176	23.77	6.525			
Information Research	Male	169	12.53	2.550	344	4.31	0.000*
	Female	177	11.32	2.691			
Total	Male	168	82.80	15.49	342	4.04	0.000*
	Female	176	76.42	13.81			

* Significant at level $P<0.05$

Table 2: ANOVA Result Scores of Prospective Teacher's Instructional Technologies Utilization Level In Accordance With Succeeded Higher Education Exam (OSS) Fields

Dimension	Source of the variance	Sum of squares	Df	Avarage of squares	F	P	Significant difference
Utilizing technology	Inter groups	1003.797	2.00	501.899	7.892	0.000*	13-14
	In groups	21748.957	342.00	63.593			13-15
	Total		22752.754	344.00			
Material design	Inter groups	663.261	2.00	331.631	7.310	0.001*	13-14
	In groups	15514.727	342.00	45.365			13-15
	Total		16177.988	344.00			
Information research	Inter groups	63.656	2.00	31.828	4.492	0.012*	14-15
	In groups	2430.567	343.00	7.086			
	Total		2494.223	345.00			
Total	Inter groups	3696.229	2.00	1848.115	8.596	0.000*	13-14
	In groups	73315.280	341.00	215.001			13-15
	Total		77011.509	343.00			

13: Verbal , 14: Numerical, 15: Equal weight * Significant at level P<0.05

Table 3: ANOVA Result Scores of Prospective Teacher's Instructional Technologies Utilization Level In Accordance With The Fields They Are Studying

Dimension	Source of the variance	Sum of squares	Df	Avarage of squares	F	P	Significant difference
Utilizing technology	Intergroups	1779.548	4	444.887	7.212	0.000*	8-10
	Ingroups	20973.206	340	61.686			8-12
	Total	22752.754	344				9-10
							9-12
Material Design	Intergroups	826.079	4	206.520	4.574	0.001*	8-10
	Ingroups	15351.909	340	45.153			9-10
	Total	16177.988	344				
Information Research	Intergroups	65.186	4	16.297	2.288	0.060	
	Ingroups	2429.036	341	7.123			
	Total	2494.223	345				
Total	Intergroups	5115.536	4	1278.884	6.030	0.000*	8-10
	Ingroups	71895.973	339	212.083			9-10
	Total	77011.509	343				9-12

8: Classroom schoolteaching, 9: Science and technology schoolteaching, 10: Turkish schoolteaching, 12: Social studies schoolteaching
* Significant at level P<0.05

source of the difference, there found difference against equal weight field comparing the equal weight field with the verbal field for the prospective teachers. According to this finding, it can be inferred that the prospective teachers succeeded in verbal field are more inclined to use technology compared to the ones who succeeded in numerical and equal weight fields. Accordingly, in material design dimension, again, significant difference is identified between the prospective teachers succeeded in mentioned three fields ($F= 7.31$, $p<0.005$). Considering Scheffe test on the source of the difference, there is a difference in favour of equal weight field succeeded prospective teachers comparing the verbal and equal weight field succeeded prospective teachers; and in favour of numerical field succeeded prospective teachers comparing the verbal and numerical field succeeded prospective teachers. Depending above obtained data, it can be said that verbal field succeeded prospective teachers show less awareness for the material design dimension compared to the equal weight and numerical field succeeded prospective teachers. Considering information research dimension, there is significant difference between the values of all above mentioned succeeded fields for the prospective teachers ($F= 4.492$, $p<0.05$). Scheffe test demonstrates that the difference is originated from numerical field succeeded prospective teachers. It can be inferred that numerical field succeeded prospective teachers are more eager to reach information. Last but not the least, considering the total scores, there is significant difference between the values of all above mentioned succeeded fields for the prospective teachers in mathematical interest ($F= 8.596$, $p<0.05$). It can be concluded from Table 2 that the instructional technologies availability level verbal field succeeded prospective teachers is relatively lower whereas the levels of equal weigh and numerical field succeeded prospective teachers' are almost at the same level and no significant difference is observed.

Whether there is significant difference between the fields (classroom schoolteaching, science and technology

schoolteaching, turkish schoolteaching, and social studies schoolteaching) they are studying in the university and utilizing technology, material design and information research dimensions is tested. The one way variance analysis results of prospective teachers' fields they study in university is Table 3.

As seen in Table 3, it is determined that there is significant difference between the instructional technology availability level of prospective teachers according to the fields they are studying ($F= 7.21$, $p<0.05$). Moreover, according to the Scheffe test results derived from to determine which field the difference is caused of; there is significant difference in favour of classroom schoolteaching studying prospective teachers between classroom schoolteaching studying and Turkish schoolteaching studying prospective teachers, in favour of science and technology schoolteaching studying prospective teachers between science and technology schoolteaching studying and Turkish schoolteaching studying prospective teachers, in favour classroom schoolteaching studying prospective teachers between classroom schoolteaching studying and social studies schoolteaching studying prospective teachers, in favour of science and technology schoolteaching studying prospective teachers between science and technology schoolteaching studying and social studies schoolteaching studying prospective teachers. According to these results, it can be interpreted that numerical and equal weight fields succeeded prospective teachers are more inclined to use instructional technologies. Again in material design dimension significant difference is observed ($F= 4.57$, $p<0.05$) in favour of classroom schoolteaching studying prospective teachers between classroom schoolteaching studying and Turkish schoolteaching studying prospective teachers, in favour of science and technology schoolteaching studying prospective teachers between science and technology schoolteaching studying and Turkish schoolteaching studying prospective teachers. In information research dimension, however, no significant difference is observed considering the fields they are studying. According to those findings, it can be inferred that each prospective teacher, regardless of the field he is studying, has almost the same skill level in information research dimension. Considering toal score, it can be concluded that there is significant difference between instructional technologies availability level and the field the prospective teacher studying ($F= 8.596$, $p>0.05$). As the result of Scheffe test applied, the differences are; in favour of classroom schoolteaching studying prospective teachers between classroom schoolteaching studying and Turkish schoolteaching studying prospective teachers, in favour of science and technology schoolteaching studying prospective teachers between science and technology schoolteaching studying and Turkish schoolteaching studying prospective teachers, in favour of science and technology schoolteaching studying prospective teachers between science and technology schoolteaching studying and social studies schoolteaching studying prospective teachers. The insignificant difference between classroom schoolteaching and science and technology schoolteaching fields may result from numerical scores' having more weight in calculating the equal weight score. The prospective teachers who are studying numerical fields are more talented to use instructional technologies compared to prospective teachers who are studying verbal fields. Based on these findings, it can be interpreted that prospective teachers who are studying numerical fields are more inclined to make use of instructional technologies.

DISCUSSION AND CONCLUSION

In parallel with the general developments in education, the improvement of instructional materials and their coming into schools as important materials for education; this study was carried out with the purpose of determining and assessing the instructional technologies literacy level of prospective teachers and revealing how instructional technologies effect them. Based on findings obtained with in the scope of the study, it is indicated that male prospective teachers are relatively more inclined and talented to use instructional technology than their female counterparts. This may result from male prospective teachers' being more interested in technological tools and equipments and their sparing more time for their applications. A study done by Deniz (2000) has revealed that male prospective teachers' attitudes towards technology, towards their being interested in technology, towards technology's being used in education environment and towards technological concerns came out more relatively positive [5]. The results obtained from this study correspond with the results obtained from the study applied to prospective teachers. Moreover, it is also indicated that there is significant difference between prospective teachers' literacy level of instructional technology and prospective teachers' succeeded fields (verbal, numerical and equal weight) in higher education

exam (OSS) exam. These results are in parallel with a similar study carried out with another prospective teachers group [8,9]. In addition to this, there found significant difference between the instructional technology availability level of prospective teachers according to the fields (classroom schoolteaching, science and technology schoolteaching, turkish schoolteaching, and social studies schoolteaching) they are studying as paired classroom schoolteaching-Turkish schoolteaching, science and technology schoolteaching-Turkish schoolteaching, science and technology schoolteaching-social studies schoolteaching. Liu and others (1992) also reached to a conclusion that mathematics and science and technology schoolteaching prospective teachers' concern level of technology found significantly low [8]. This result also shows consistency with the results of the study carried out with prospective teachers considering the fields they are studying.

As a result; since a remarkable number of prospective teachers' level of utilizing technology is good enough, it can be said that they will easily use this technology when they become teachers. According to the results given above following recommendations can be put forward :

- Preparing technology supported instructional material the screen design, animation and simulations should attract their attention and interest and not distract them.
- Prospective teachers' developing materials and their effectiveness can be identified with the help of the experiments.
- Educational Faculty research and application schools need to be established just as it is in medical faculties so that prospective teachers would have the opportunity to practice and live what they've learned theoretically [10].
- It could be more beneficial if the prospective teachers are given a chance to make the applications of what they learned in *instructional technologies and material development* lesson in real school environment.
- For the prospective teachers, the more they get experienced in instructional technology the more positive attitude they should get for it.
- The instructional technologies and material development lesson which is included in the undergraduate programme of educational faculties, should be taught by the experts.

REFERENCES

1. MEB., 2007. Bilişim Teknoloji Siniflarinin Halka Açilmasi. 08.01.2007 tarih ve 211 sayili genelge.
2. Şahin, T.Y. and S. Yildirim, 1999. Öğretim Teknolojileri ve Materyal Geliştirme. Instructional Technologies and Material Development. Ankara: Ani Yayincilik.
3. Yiğit, N., N. Alev, H. Özmen, T. Altun and S. Akyildiz, 2007. Öğretim Teknolojileri ve Materyal Tasarimi. Instructional Technologies and Material Design. Trabzon: Akademi Kitabevi.
4. Demirel, Ö., S. Seferoğlu and E. Yağci, 2001. Öğretim Teknolojileri ve Materyal Geliştirme. Instructional Technologies and Material Development. Ankara: Ani Yayincilik.
5. Deniz, L., 2000. Öğretmen Adaylarinin Bilgisayar Yaşantilari ve Bilgisayar Tutumlari. Prospective Teachers'computer Experiences And Attitudes. M.Ü. Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi sayi, 12: 135-166.
6. Gözütok, F.D., 2006. Öğretim İlke ve Yöntemleri. Teaching Principles and Methods. Ankara: Ekinoks Eğitim Danişmanlik Hiz. ve Bas. Yay. Da. San. ve Tic. Ltd. Şti.
7. Akkoyunlu, B., 1996. Bilgisayar Okur Yazarliği Yeterlilikleri ile Mevcut Ders Programlari'nin Kaynaştirmasinin Öğrenci Başari ve Tutumlarina Etkisi. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 12: 127-134.
8. Liu, M., W.M. Reed and P.D. Phillips, 1992. Teacher education students and computer: Gender, major, pior computer experience, occurrence and anxiety. J. Res. Computer Edu., 24 (4): 457-467.
9. Deniz, L., 1994. Bilgisayar Tutum Ölçeği (BTÖ-M)'nin geçerlik, güvenirlik, norm çalişmasi ve örnek bir uygulama. Yayinlanmamiş Doktora Tezi. Marmara Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.
10. Aşıkoğlu, B. (2006). İngilizce Öğretmen Adaylarinin Öğretim Yöntem ve Teknikleri Konusundaki Yeterliklerine İlişkin Algilari. Eurasian Journal of Educational Research, 22, 1-11.

Appendix: This scale is prepared to determine the instructional technologies availability level of prospective teachers.

Fields of competence	Never	Seldom	Sometimes	Often	Always
01. I can prepare transparents for over-head projectors					
02. I can use over-head projector in the line with the purpose of the lesson					
03. I can make use of computer and related technologies in the line with the purpose of the lesson					
04. I can use TV. in the line with the purpose of the lesson					
05. I can use slide projector in the line with the purpose of the lesson					
06. I can make use of instructional materials in the line with the purpose of the lesson					
07. I can make use of graphic materials that are prepared by computer and related technologies in the line with the purpose of the lesson					
08. I can prepare original and economical instructional materials within the bounds of possibility					
09. I can prepare two-dimension visual materials such as, poster, exercise sheets and crossword puzzles					
10. I can prepare instructional materials complying with design principles such as, colour, ratio, wholeness, writing and form					
11. I can obtain information about my students by making use of computer and related technology					
12. I can design knowledge complying to instructional material by making use of computer and related technology					
13. I can use any computer technology and pocket programme for educational purpose					
14. I can make necessary computer and technological arrangements in the line with the purpose of the teaching in the instructional environment					
15. I can organize an online distant education programme					
16. I can give online lessons					
17. I can prepare audio cassettes					
18. I can prepare video cassettes					
19. I can organize and design a web site					
20. I can use internet effectively					
21. I use the education-related search engines in the internet effectively					
22. I make use of any opportunity effectively to search internet					