

# PROSPECTIVE TEACHERS' OPINIONS ON FACTORS THAT CONTRIBUTE TO SUCCESSFUL TECHNOLOGY INTEGRATION

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**Abstract:** This paper presents views of prospective computer teachers about successful technology integration in Turkey. This study investigated prospective teachers' attitudes toward technology integration and their perceptions of potential technology integration barriers. Two questionnaires were administered to 378 computer education student teachers enrolled in the 3 universities in Turkey in order to determine their opinions on factors that contribute to successful technology integration.

## Introduction

Since we are now in the Information Age, information technologies such as computers, telecommunications, and digital cameras are becoming more common both in our formal and informal educational system. As technological developments rapidly increase in every field, integration of technology into education is also unavoidable. Indeed, many studies have proved that technology is an important component of modern-day education. For example, Pierson (2001) stated that integrating technology tools into the teaching and learning programs is an inseparable part of good teaching. Yildirim (2000) also claimed that teachers should have appropriate technology competence during their preservice education to meet their students' needs. Teachers are expected to integrate technology into education which will result in student learning. (Ross, Hogaboam-Gray & Hannay, 2001)

It clearly shows that many educators agreed that integrating technology into curriculum plays a major role in providing rich teaching and learning environment. However, putting technology into classroom is only a part of the task. The ultimate goal of integrating technology is that students must use it with the same ease with which they use books, maps, pencil and pens. According to Brush et al. (2003) in spite of technologies available in schools, a large number of teachers report little or no use of computers for instruction. While many school and university students are using technology in their personal lives in a wide variety of ways, they are not using computers very extensively in classrooms to learn effectively in a variety of subject areas.

There is a significant body of literature addressing that successful use of technology by students in the classroom is dependent on teachers' views (Jacobsen, Clifford, & Friesen, 2002, Becker, 1994, Pierson, 2001, Christensen, 2002, Yildirim, 2000, Ross, Hogaboam & Hannay, 2001). However, there have been some factors that contribute to the integration of technology when teachers use technology in their teaching activities. For example, Christensen (2002) stated that teachers' attitudes toward computers are important factors while using computers in the classroom.

Teachers take some courses about integrating technology throughout their preservice education. Teacher preparation has emerged as the critical factor for the contributions of new technologies to improved learning. Therefore, preservice teachers programs have important role for teachers acquiring some skills about integration technology. According to Yildirim (2000), teacher education programs need to provide prospective teachers with technology

training, which can satisfy their needs in the schools at which they will work. Therefore, institutions of teacher education and school districts should cooperate in designing technology-training curricula to meet teacher's specific technology needs.

The purpose of this study was to investigate prospective teachers' attitudes toward technology integration and their perceptions of potential technology integration barriers in order to determine prospective teachers' opinions on factors that contribute to successful technology integration. Becker (1994) stated that researches indicate various factors contribute to the frequency and the effectiveness of technology utilization by teachers.

### **Method of the Study**

In this study, two questionnaires which are adapted from Brush et al (2003) were used to collect data from prospective teachers in the departments of Computer Education and Instructional Technology at 3 different universities in Turkey. The first one included demographic information about the participants and their attitudes toward the technology integration activities. Brown (2004) stated that preservice teachers' attitudes may have considerable impact on their ability to practice teaching with technology. The second questionnaire was about environmental resource barriers to determine prospective teachers' views. This second questionnaire consists of 16 likert-type items which include opinions of prospective teachers related to barriers of technology integration

The questionnaires were administered to 378 prospective computer teachers in Turkey and findings are presented comparatively based on student teachers' opinions. The findings of this study will provide the evidence on the factors that contribute to successful technology integration and its impact on prospective teachers' instructional and professional uses of technology.

### **Findings**

Technology attitudes and perception survey, which was developed and used by Glazewski et al (2001) and Brush et al (2003), was translated into Turkish by the researcher. This survey includes 2 sections, which are attitudes toward technology integration and environmental resource barriers. After translation, items were checked by an expert of Turkish language in order to provide integrity of grammar and meaning. Items were regulated according to the experts' views. After that, the data were collected consecutively from the prospective computer teachers, who are enrolled in Hacettepe University (n=111), Ankara, Selcuk University (n=97), Konya and 19 Mayıs University (n=170), Samsun in Turkey in spring semester of the 2004-2005 academic year. The participants were informed that all responses would be kept completely confidential and they agreed to participate to the study voluntarily. The first part of the questionnaire included demographic information, such as gender, age and secondary schooling, etc. Of the participants, % 29.4 were in Hacettepe University, %25.7 were in Selcuk University and %45 were in 19 Mayıs University. Of the students, %61 were male and %39 were female. Moreover, of the students, % 36 were graduated from vocational or Anatolian vocational high school in secondary schooling. In Turkey, secondary education covers general and vocational or technical high schools with additional three or four years of training. Demographic information of the subjects was given in table 1.

According to second part of the study, prospective computer teachers' attitudes toward the technology integration were investigated. It consists of 16 likert-type items, which include opinions of prospective teachers related to attitudes toward technology integration. Participants' responses are presented in Table 2. From the table it is shown that generally, student teachers' attitudes toward the technology integration were positively high in almost all items. Mean scores of attitudes items change from 4.35 to 2.2. The highest mean score (M=4.35) is the first item which is "I support the use of technology in the classroom". Other highest mean score is item 5 (M=4.27), which is "A variety of technologies is important to enhance student learning." The lowest mean score is item 12 (M=2.20),

which is "Teaching students how to use technology isn't my job" The other lowest mean score ( $M=2.5$ ) tenth item, which is "Technical problems can be avoided with proper teaching planning". Moreover, prospective teachers' attitudes are approximately the same among the three universities. Means and standard deviations of the observed variable for the participants are presented in Table 3. It is clearly shown that student teachers have positive attitudes toward technology integration activities ( $M=3.5$  and  $SD=0.45$ ).

Characteristics	<i>n</i>	(%)	Characteristics	<i>n</i>	(%)
<i>University</i>			<i>Father's education</i>		
Hacettepe	111	(% 29.4)	Primary school	137	(% 36.2)
Selcuk	97	(% 25.7)	Middle school	76	(% 20.1)
19 Mayıs	170	(% 45)	High school	122	(% 32.3)
<i>Gender</i>			Post graduate	34	(% 9)
Male	227	(% 61)	None (eg. Illiterate)	9	(% 2.4)
Female	145	(% 39)	<i>Mothers' occupation</i>		
<i>Age</i>			Housewife	286	(% 75.7)
18-20	126	(% 33.8)	Teacher	23	(% 6.1)
21-23	226	(% 60.6)	Employee	13	(% 3.5)
24 and above	22	(% 5.6)	Retired	22	(% 5.8)
<i>Secondary schooling</i>			Other	34	(% 9.9)
General	106	(% 28)	<i>Father's occupation</i>		
Anatolian	136	(% 36)	Self employed	64	(% 16.9)
Vocational /Technical	76	(% 20.1)	Worker	44	(% 11.6)
Anatolian vocational /Technical	60	(% 15.9)	Teacher	45	(% 11.9)
<i>Mother's education</i>			Employee	75	(% 19.8)
Primary school	227	(% 60.1)	Farmer	24	(% 6.3)
Middle school	44	(% 11.6)	Retired	98	(% 25.9)
High school	51	(% 13.5)	Other	28	(% 7.6)
Post graduate	13	(% 3.4)			
None (eg. Illiterate)	43	(% 11.4)			

**Table 1 demographic information about the participants (N=378)**

**Table 2 Participants' responses to attitudes towards integration technology (N=378)**

Items	Mean	SD
I support the use of technology in the classroom	4.35	1.18
I can deliver a technology-integrated lesson with technical support preparing	4.11	0.93
Incorporating technology into instruction helps students learning	3.39	1.00
I am confident about integrating technology in to a language art, social studies, math, art or other content area lesson	3.36	1.05
A variety of technologies is important to enhance student learning	4.27	0.95
Given a learning goal, I am able to develop ideas for integrating technology	3.78	1.01
I feel that my technology course has prepared me to integrate technology in to my content area specialization	4.06	0.93
I do not need assistance to deliver a technology integrated lesson	3.45	1.04
Knowledge about technology will improve my teaching	3.81	0.99
Technical problems can be avoided with proper teaching planning	2.50	1.03
Student motivation increases when technology is integrated into the curriculum	4.07	0.95
Teaching students to use technology isn't my job	2.20	1.18

I do not need more training on how to integrate technology	3.10	1.10
Content instruction should take priority over technology skills	3.39	1.11
I could integrate technology in to a lesson with more technology skills training	3.38	1.23
Technology facilitates the use of a wide variety of instructional strategies designed to maximize learning	3.29	1.13

**Table 3. Summary Statistics of Observed Variable: Mean Scores and Standard Deviations**

Variable	University	<i>M</i>	<i>SD</i>	<i>N</i>
Attitude	Hacettepe	3.60	.33	111
	Selcuk	3.54	.33	97
	19 Mayıs	3.44	.54	170
	Total	3.51	.45	378

Participants' responses for items which are environmental resource barriers to integrating technology are presented in Table 4. According to students the most effective barrier is item 2 ( $M=4.30$ ), which is "In order for technology integration to be successful, teachers should have more access to computer labs". Other most effective barrier for successful technology integration is item 1 ( $M=4.15$ ), which is "It is easier to use technology with smaller class size". Student teachers identified that the least effective barrier for technology integration is item 11 ( $M=1.95$ ), which is "A teacher must have advanced technology skills to effectively integrate technology". Moreover, student teachers disagree with "There is not enough time in class to implement technology-based lesson" (item 3,  $M=1.97$ ).

**Table 4. Participants' responses to environmental barriers for integrating technology (N=378)**

Items	Mean	SD
It is easier to use technology with smaller class size	4.15	1.11
In order for technology integration to be successful, teachers should have more access to computer labs	4.30	0.97
There is not enough time in class to implement technology-based lesson	1.97	1.10
Technology-integrated curriculum projects require too much preparation time	2.68	1.23
An unsuccessful technology-integrated lesson is usually the result of a lack of teachers' technology skills	2.30	1.02
Schools do not provide enough support to teachers for technology integration	2.11	1.04
A teacher with novice technology skills can deliver an effective lesson integrating technology	3.46	1.21
A teacher must have advanced technology skills to effectively use technology in a lesson	2.65	1.26
Lower elementary students (K-2) can not effectively use technology as a learning goal	3.70	1.22
For effective technology integration in a lesson, a teacher needs to adapt his or her teaching strategies to become more student-centered	2.88	1.21
A teacher must have advanced technology skills to effectively integrate technology	1.95	1.06
Lack of knowledge about ways to integrate technology into the curriculum is a barrier for technology integration	3.51	1.01
More teachers would integrate technology if they had more training on how to use technology	3.45	1.14
There is not enough technology support in schools today	2.61	1.25
It is more difficult to deliver a technology-integrated lesson in a classroom with 1-4 computers than in a computer lab	3.95	0.99
My university assignment doesn't require effectively technology use	2.10	1.03

## Conclusion

This study investigated the general views of prospective computer teachers about successful technology integration in Turkey. This study considered prospective teachers' attitudes toward technology integration and their perceptions of potential technology integration barriers. It is important to understand their thoughts about technology integration because they will be teachers in the future. According to the findings of this research, some major results have come out. Preservice teachers' attitudes towards integrating technology in classroom settings were very positive in this study. Positive attitude is quite important to integrate technology by teachers in classroom setting. Most of the literature supports this result. (Jacobsen, Clifford, & Friesen, 2002, Becker, 1994, Pierson, 2001, Christensen, 2002, Yildirim, 2000, Ross, Hogaboam & Hannay, 2001). For example, Christensen, (2002) stated that teachers are often resistant to use technology in the classroom. Therefore, teacher attitudes are major factors in fostering technology integration. Teachers' positive attitudes toward technology also influence students' use of technology in learning activities (Christensen 2002).

According to the results of this study, prospective teachers believed that there are many factors that contribute to successful technology integration. These factors can be summarized as follows;

- a) Limited access to computers in schools
- b) Crowded classrooms
- c) Number of computers in labs
- d) Teachers' knowledge and competency about technology integration
- e) Lack of software and hardware availability
- f) Lack of training in how to use technology and so on.

However, it is an interesting result that prospective teachers do not think there is not enough time to implement technology-based lessons in the classroom. Moreover, according to pre-service teachers, there are adequate technological supports in our schools. For the effective use of technology in classrooms, these barriers should be eliminated by the educational authorities, such as directorates of schools and Ministry of Education. Teacher education programs need to provide technology training for prospective teachers (Yildirim, 2000) and also prospective teachers should be equipped about new technological developments so that they can satisfy their needs in the schools at which they will work

These results are generally supported by other studies which are conducted about technology integration. For example, Glazewski et al (2002) found that preservice teachers perception towards technology were positive. In their studies, preservice teachers also mentioned the barriers to integrate technology. However, in Turkey, there are a few studies about preservice teachers' ideas about the technology integration. Cagiltay et al (2001) conducted studies about inservice teachers' situations for technology integration. Actually, their findings are generally similar to this present study. They investigated that teachers' perception about using computers in schools. According to their results, teachers believed that the use of computer technology in schools is beneficial for teaching and learning activities. However, they found that in-service teachers' competencies are not enough to integrate technology. In the present study, preservice teachers think that their education is adequate to integrate technology. This situation may result from the characteristics of participants because they are computer education students. Therefore, similar studies should be conducted by other departments of education faculties.

Finally, the results of this study indicate the emphasis of technology integration from the perspective of prospective computer teachers; they will be teachers after they graduate from university. Therefore, much of that research conducted that teachers' use of technology in classroom is quite important to integrate technology into learning and teaching activities. Moreover, future studies that examine the other preservice teachers at different departments, such as art, science, math and language are needed in order to compare results. Hereby, current situations about preservice teachers' views about the integration of technologies into the teaching and learning process will appeared in Turkey.

## References:

- Becker, H. J. (1994). How exemplary computer-using teachers differ from other teachers: Implications for realizing the potential of computers in schools. *Journal of Research on Computing in Education*, 26(3), 291–321.
- Brown, D. (2004). From the University to Elementary Classroom: Students' Experiences in Learning to Integrate Technology in Instruction. Doctoral dissertation, University of California, Irvine and Los Angeles. UMI Dissertation Services, 3145885
- Çagiltay, K., Çakiroglu, J., Çagiltay, N. & Çakiroglu, E. (2001). Teachers' Perspectives About the Use of Computers. *Hacettepe University Journal of Education*. 21. 19-28
- Glazewski, K., Brush, T., Ku, H. Y., & Igoe, A. (2001). The Current State of Technology Integration in Preservice Teacher Education: The PT3@ASU Project. Paper presented at the annual meeting of the American Educational Research Association, Seattle, WA. [http://pt3.ed.asu.edu/docs/AERA\\_PT4.doc](http://pt3.ed.asu.edu/docs/AERA_PT4.doc).
- Brush, T., Glazewski, K., Rutowski, K., Berg K., Stromfors, C., Hernandez, M., V., Stock, L & Sutton, J., (2003) Integrating Technology in a Field-Based Teacher Training Program: The PT3@ASU Project. *Educational Technology Research and Development*. 51 (1), 57-72
- Christensen, R., (2002). Effects of technology integration education on the attitudes of teachers and students. *Journal of Research on technology in Education*, 34(4), 411-433.
- Jacobsen, M. Clifford, P. & Friesen, S. (2002). Preparing teachers for technology integration: Creating a culture of inquiry in the context of use. *Contemporary Issues in Technology and Teacher Education* [Online serial], 2(3). Available: <http://www.citejournal.org/vol2/iss3/currentpractice/article2.cfm>
- Pierson, M. (2001). Technology integration practice as a function of pedagogical expertise. *Journal of Research on Computing in Education*, 33(4), 413-430.
- Ross, J.A., Hogaboam-Gray, A., & Hannay, L. (2001). Effects of teacher efficacy on computer skills and computer cognitions of Canadian students in grades k-3. *The Elementary School Journal*, 102, 141-156.
- Yildirim, S. (2000). Effects of an educational computing course on preservice and inservice teachers: A discussion and analysis of attitudes and use. *Journal of Research on Computing in Education*, 32(4), 479 – 495.