A One Year Study of Prospective Teachers' Experiences Of Computers

Hülya Gür*
*Balıkesir University Necatibey Educational Faculty, 10100 Balıkesir, Turkey

Abstract:

The results of many studies asserted that information technology (IT) such as computer is an important tool that must be used in most parts of our lives especially in schools.

This study examines prospective teachers' computing experiences in computer courses in three different departments in education faculty. To have the widespread use of computers using namely login, password, e-mail, browse Internet, Microsoft Word, Microsoft Excel, and Word Path in Computer lessons in Balıkesir University. Therefore, the present study was conducted 197 participants who were took computer lessons in three different departments in Balıkesir University, during 2000-2001 academic year. In the present study, a group of participants' perceptions of using computers is investigated and their views were reflected to some extend. Questionnaire and natural observation are considered. The questionnaire was conducted at the end of the last semester in June 2001, the questionnaire about general computing skills, usage of software, word processing, database, spread sheet, programming, e-mailing, web browsing was conducted by the sample of 44 of BOTE1 (IT prospective teacher training) participants, 70 of IFBO3 (science prospective teacher training) participants, 83 of ISO3 (primary prospective teacher training) participants (total is 197). The statistical analyses of the questionnaire have been obtained. The detail of computer courses are reported and all participants' view are reflected of the paper.

Index terms: information technology, technology integration, computing experience, expectations.

Introduction:

Despite it has been almost last ten years time since the first microcomputers arrived on universities. Turkish universities continue to struggle with computer and information technology (IT) planning, like developing countries. To be effective, this planning must involve developing a better understanding of how well prepared prospective teachers are for entering into the technological worlds that are being created on university for them. Recently, it is commonly believed that participants are coming to university with different levels of computing experience such as using computers. In fact, this notion is supported by related literature such as Reed, et. al. (1995), Cohen, 1982; Meem, 1989; Ostler, 1984; Shields, (1984); DiBrito (1999); Purdom (1998) and Akpınar(2000). Robinson (1995) argues that university based teacher educators and school mentors must enter into a cooperative enterprise if attempts to educate new teachers in technology are to succeed. Bell and Coultas (1995) also highlight the mutual benefits of school-university partnerships in teacher training. Reed, et. al. (1995) indicated that participants were entering the program with increasing levels of computing experience. Studies also indicate that this level of computer experience is increasing over time (Cohen, 1982; Meem, 1989; Ostler, 1984; and Shields, 1984). Additionally, researchers have begun to explore computing experience in more detailed approaches since so many participants do in fact report having at least some computing experience. In relation to the present research, DiBrito (1999) asserted that 97% of 1,718 participants surveyed come to university with at least some computing experience. More specifically, he found that participants reported their highest level of proficiency with word processing (93%) and that they had similarly high levels of experience with using computers for research (89%) and spreadsheets (73%). He also found participants self-reported less experience with using databases (63%), email (55%), and the WWW (63%). In addition to this, Purdom (1998) also found that 97.9% of surveyed participants reported having some experience with computers. Similarly, the greatest percentage of participants identified word processing as the form of computing with which they had the most experience (97.9%),

whereas they also identified spreadsheets (80%), databases (63%), email (73.5%), the WWW (86.5%), and locating information using a database (84.5%) as areas of computing experience.

According to Resnick (1993) the only way that people will understand computerized learning environments is if they can participate in constructing it, modifying it, and extending it. It is important to understand the entering levels of computing experience for prospective teachers for a number of reasons. Perhaps most importantly, it offers insight into appropriate skills-based training and support that they might need. This study examines prospective teachers' entering levels of computing experience in an effort to make informed decisions for the development of one year computer course.

This study attempts to identify patterns during one-year time and between groups for computing experience by investigating IT teacher training (BOTE1) participants, science teacher training (IFBO3) participants, primary teacher training (ISO3) participants.

Problem and Method

This study attempts to answer the following questions: What is the effect of three different group on participant computing experiences? What is the effect of three different group on computer course in one academic year faculty computing experiences? Are there differences among departments and participants for computing experience for each of the three groups and if so what are these differences? What percentage of incoming participants in eight areas namely: have computers, identify general using of computers, use of software, use of word processing, data base, spread sheets, programming, e-mailing.

The study took place during a compulsory course open to high school teacher candidates. Both groups studied the same content, which included introduction to educational technologies, educational materials, instructional environments, principles of material and software development and principles of selection and evaluation of instructional materials. With regard to the use of computers in material development course, students in both groups studied the nature of educational technology, lesson plans, use of spread sheets, presentation software, Internet resources, computer tutorials, simulations, drills, games, intelligent systems and tests on a theoretical bases. They also inspected commercially available tutorials, simulations, games and tests.

Design of the Study

Participants

The participants in this study were prospective teachers who attended a Necatibey Educational Faculty in the Turkey. There were 197 total participants (see Figure 1) who completed the data collection instrument that addressed background-computing experience. This instrument was administered as a paper and pencil measure and as a web-based form in June 2001.

Figure 1. Participants by gender and by department

Participants	Male	Female	Total
BOTE1	25	19	44
ISO3	75	13	83
IFBO3	40	30	70
Total	135	62	197

Procedures

All participants who take part in this study completed a general computing session. These instructional sessions took place over the course of two hours a week during the both semesters. The agenda for each session involved: general computing skills, using software, spread sheets, programming, having all participants login to the network (logins and passwords were provided as part of the session), sending and receiving email, and using a web browser to access email, using a software such as Microsoft Word, Excel, Word Path.

The learning process began with individual laboratory tasks followed by whole class discussions, based on the principle that "we construct our understandings through our experiences"(Confrey, 1995).

Data Sources

The data was collected two ways: a questionnaire and natural observation. In this study, Reed, Ayersman, & Liu (1996)'s The Background Computing Experience Questionnaire was firstly modified and piloted. After all changes, it was conducted to determine the background levels of computing experience for all participants at the end of their last semester. Collected data were analysed descriptively to compute averages and percentages for all participants.

Analysis of the Data

To answer the first research question – What is the effect of computing experiences on participant of different department? – 8 ONE-WAY ANOVA's were conducted for each of the 8 areas of experience using the three groups of participant responses to the background computing survey (Table 1). Scheffe post-hoc analyses were done to compare mean differences of the all participants for each of the 8 experience types to determine directions and interactions of significant differences (Table2). To answer the second research question – What is the effect of department on computer course and lessons in faculty computing experiences? – 8 ONE-WAY ANOVA's were conducted for each of the 8 areas of experience with the three departments of faculty responses to the background computing survey (Table 3). Scheffe post-host analyses were done to compare mean differences of the three groups for each of the 8 experience types to determine directions and interactions of significant differences (Table 4 and 5). To answer the third research question – Are there differences among departments and among participants computing experiences for each of the three groups and if so what these differences? –Unpaired t-tests were conducted. The 8 experience types were compared for department and for participants for each of the three groups (Table 6). To answer the fourth research question – What percentage of incoming participants identify general using of computers, use of software, use of word processing, database, spreadsheets, programming, e-mailing? – Descriptive measures were used.

Findings and Interpretation

During the course, the participants learned about the main features of the computer. Well-designed computational tools and activities can provide students with new ways of thinking about computational ideas. Pre-service teachers' curriculum must be kept up-to-date [20] and such packages should be included in their study programs.

Background Computing Experience

Effect of different group on participant computing experiences. All 8 ONE-WAY ANOVA's revealed significant differences at the $p = <.0001$ levels Means tables and post hoc analyses further revealed that there were consistent differences between the ISO3 and BOTE1 groups for each of the 8 experience types (tables 2). The participants of BOTE1 had the highest mean score for all 8 types of experience. All of these differences were significant from ISO3 to BOTE1 and from IFBO3 to BOTE1. Comparisons of ISO3 and IFBO3 revealed significant differences for years of computing, use of software, spreadsheet, authoring, e-mail, and web browsing. While the BOTE1 had higher levels of experience for years of computing, spreadsheet, email, and web browsing it is surprising that the IFBO3 actually had significantly more experience than ISO3 for use of software. The BOTE1also had higher percentages of database, programming, use of software, spreadsheet, e-mail, and web browsing although these differences were also significant.

While it is expected that computing experience would change from department to department, it is reassuring to find that these differences are significant for most every comparison. It is expecting that BOTE1 is better results than the others. The reason for this, most of them had own computers, and they get use to it. Nearly 100 of them failed to complete the instrument or partially completed it making it unusable for this study. Except BOTE1 and a few IFBO, ISO3 filled the questionnaire paper-pencil. The second term, except ISO3, others filled the questionnaire via online. Therefore, they get to use computer widely. Although the BOTE1 participants achieved significantly higher percentages of all 8 types of experience as compared to ISO3 and IFBO3. It is interesting to note that some types of experience still seem to lag behind others. Clearly e-mail and web browsing are rapidly increasing (and soon might surpass even word processing, e-mailing, web browsing) but other

areas seem to be neglected namely programming, databases, and content-area software in each department.

Effect on Computing Experiences: The 8 ONE-Way's revealed significant differences for word processing, and databases. Post hoc analyses did not reveal any additional significant differences but the means tables indicated the directions of the changes for these experience areas. The significant difference for word processing was a due to the interaction of a decrease from ISO3 to IFBO3 and an increase from IFBO3 to BOTE1. No other differences were significant. These differences and even the significant differences are questionable due to the variation in age, computer experience and other factors.

Department and Participant Differences: One might expect that department would possess more years of computing experience than participant simply because they are IT prospective teachers. This expectation was supported by findings in this study.

The department' mean score for experience exceeded the participant mean score but that difference is greatly diminished for BOTE1. ISO3 had a significantly higher level of experie

ÜCnce for word processing. There were no significant differences for database experience. In IFBO3 the participant mean was higher but in ISO3 and BOTE1 mean was higher. There were no significant differences for programming in ISO3 and IFBO3. There were no significant differences for email. There were no significant differences for web browsing too.

It will be interesting to continue tracking this information over time as it appears that participants might soon following years. In spite of this, however, if participants are able to transfer these skills to the academic context they will progress much more rapidly within these courses that rely on these skills. If the participants do eventually surpass the faculty with any or all of the computer experience it can prove to be a very positive impact on the their learning and classroom environment.

The most of the participants had a computer: ISO3 : 5%, IFBO3: 10%; BOTE1: 88%. Having computer was a factor.

Limitations and Significance of the Study

The present study was took place during one-year time. Continuation of this study is crucial in truly determining if any trends exist. With only one-year of data it is certain that future studies will provide further insight into these issues. It is also imperative that changes not be made to the data collection instrument for 2002 and 2003 so that valid comparisons can be made.

In Turkey, most of the faculty integrating technology into their courses (e.g. teacher training courses) can rely on participants to adapt to their expectations much more readily as a result of this increasing experience. The technology standards should serve to uphold the diversity of computer applications that participant's experience.

As universities increasingly develop computer competency requirements and technology courses. For, IT-based courses might be increased in curriculum and programme for ISO3 prospective teachers. All participants might be more active users of technology. As computers continue to invade every facet of our lives and become increasingly prevalent in the educational setting at all grade levels it will be interesting to monitor changes in participant and faculty experience levels. While the most direct significance of this study is to faculty, participants, and administrators at our faculty, many institutions are undergoing similar transformations and our experiences are most likely generalizeable to them.

As this small study demonstrates, prospective teachers should learn computer based material development. However, more research is needed regarding ways of teaching other undergraduate students as well as in-service teachers about their long-term effects.

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Table 1. Summary of 8 one-way ANOVA's for three departments of .					
	Group	df	MS	F	p
Years of Computing					
	Between	2	541.84	47.64	<.0001*
	Within	2348	11.37		
General Computing					
	Between	2	31.38	34.82	<.0001*
	Within	2354	0.90		
Use of Software					
	Between	2	84.65	64.88	<.0001*
	Within	2352	1.31		
Word Processing					
	Between	2	120.52	105.51	<.0001*
	Within	2353	1.14		
Database					
	Between	2	74.36	48.25	<.0001*
	Within	2354	1.54		
Spreadsheet					
	Between	2	88.07	49.68	<.0001*
	Within	2354	1.77		
Programming					
	Between	2	15.64	12.22	<.0001*
	Within	2354	1.28		
Email					
	Between	2	330.55	168.21	<.0001*
	Within	2354	1.97		
Web Browsing					
	Between	2	249.40	155.05	<.0001*
	Within	2354	1.61		

Table 2. Scheffe post hoc analyses for three prospective teachers' comparisons for the 8 experience types.

	Group	Mean Difference	P-Value
General Computing			
	ISO3 and IFBO3	-0.03	.8620
	ISO3 and BOTE1	-0.35	<.0001*
	IFBO3 and BOTE1	-0.33	<.0001*
Use of Software			
	ISO3 and IFBO3	0.25	.0001*
	ISO3 and BOTE1	-0.38	<.0001*
	IFBO3 and BOTE1	-0.63	<.0001*
Word Processing			
	ISO3 and IFBO3	-0.08	.3224
	ISO3 and BOTE1	-0.70	<.0001*
	IFBO3 and BOTE1	-0.62	<.0001*
Database			
	ISO3 and IFBO3	-0.47	<.0001*
	ISO3 and BOTE1	-0.55	<.0001*
	IFBO3 and BOTE1	0.09	.4212
Spreadsheet			
	ISO3 and IFBO3	-0.45	<.0001*
	ISO3 and BOTE1	-0.66	<.0001*
	IFBO3 and BOTE1	-0.21	.0123*
Programming			
	ISO3 and IFBO3	-0.17	.0143*
	ISO3 and BOTE1	-0.27	<.0001*
	IFBO3 and BOTE1	0.10	.2547
Email			
	ISO3 and IFBO3	-0.78	<.0001*
	ISO3 and BOTE1	-1.31	<.0001*
	IFBO3 and BOTE1	-0.53	<.0001*
Web Browsing			
	ISO3 and IFBO3	-0.63	<.0001*
	ISO3 and BOTE1	-1.15	<.0001*
	IFBO3 and BOTE1	-0.52	<.0001*

Table 3. Summary of 8 one-way ANOVA's for three year groups of .

	Group	df	MS	F	p
General Computing					
	Between	2	0.77	1.36	.2702
	Within	33	0.56		
Use of Software					
	Between	2	6.25	4.35	.0211*
	Within	33	1.44		
Word Processing					
	Between	2	3.13	3.68	.0362*
	Within	33	0.85		
Database					
	Between	2	6.34	3.91	.0299*
	Within	33	1.62		
Spreadsheet					
	Between	2	6.00	3.20	.0538
	Within	33	1.88		
Programming					
	Between	2	0.42	0.31	.7373
	Within	33	1.37		
Email					
	Between	2	2.45	2.72	.0807
	Within	33	0.90		
Web Browsing					
	Between	2	1.17	0.99	.3824
	Within	33	1.18		

Table 4. Summary of 8 one-way ANOVA's for three groups of .					
	Group	df	MS	F	p
General Computing					
	Between	2	0.77	1.36	.2702
	Within	33	0.56		
Use of Software					

	Between	2	6.25	4.35	.0211*
	Within	33	1.44		
Word Processing					
	Between	2	3.13	3.68	.0362*
	Within	33	0.85		
Database					
	Between	2	6.34	3.91	.0299*
	Within	33	1.62		
Spreadsheet					
	Between	2	6.00	3.20	.0538
	Within	33	1.88		
Programming					
	Between	2	0.42	0.31	.7373
	Within	33	1.37		
Email					
	Between	2	2.45	2.72	.0807
	Within	33	0.90		
Web Browsing					
	Between	2	1.17	0.99	.3824
	Within	33	1.18		

Table 5. Means table for group comparisons for the 8 experience types.

	Group	Mean	Count	sd
General Computing				
	ISO3	2.50	15	0.00
	IFBO3	2.64	10	.92
	BOTE1	3.00	11	1.05
Use of Software*				
	ISO3	1.73	10	1.42
	IFBO3	1.83	15	1.14
	BOTE1	3.10	11	.99
Word Processing*				
	ISO3	3.91	10	.54
	IFBO3	3.17	15	1.14
	BOTE1	4.10	11	.87
Database*				
	ISO3	1.20	10	1.32
	IFBO3	0.50	15	1.04
	BOTE1	1.91	11	1.51
Spreadsheet				
	ISO3	1.17	15	1.29
	IFBO3	2.27	11	1.42
	BOTE1	2.40	10	1.43
Programming				
	ISO3	0.60	10	1.08
	IFBO3	0.83	15	1.22
	BOTE1	1.00	11	1.18
Email				
	ISO3	2.40	10	1.27
	IFBO3	2.83	15	.88
	BOTE1	3.36	11	.67
Web Browsing				
	ISO3	2.67	15	.65
	IFBO3	2.90	10	1.29
	BOTE1	3.27	11	1.35

Table 6. Two-Tailed Unpaired t-Test Results Comparing and Prospective teacher Experiences by Year Group.						
	Group	DF	t-value	P-value	Mean	SD
General Computing						
	BOTE1	871	1.75	.0812	3.00	1.05
	IFBO3	849	0.11	.9114	2.50	0.00
	ISO3	667	-0.58	.5626	2.64	0.92
Usage of Software						
	BOTE1	871	0.12	.9067	1.73	1.42
	IFBO3	849	5.45	<.0001*	3.10	0.99
	ISO3	665	-2.30	.0216*	1.83	1.14
Word Processing						
	BOTE1	871	3.18	.0016*	4.10	0.86
	IFBO3	849	0.10	.9202	3.17	1.14
	ISO3	666	0.57	.5684	3.91	0.54
Database						
	BOTE1	871	0.86	.3890	1.91	1.51
	IFBO3	849	-1.52	.1283	0.50	1.04
	ISO3	667	0.25	.7995	1.20	1.32
Spreadsheet						
	BOTE1	871	2.63	.0088*	2.40	1.43
	IFBO3	849	0.64	.5220	2.27	1.42
	ISO3	667	-1.09	.2774	1.17	1.30
Programming						
	BOTE1	871	0.63	.5266	0.83	1.22
	IFBO3	849	0.26	.7920	1.00	1.18
	ISO3	667	-0.41	.6846	0.60	1.08
Email						
	BOTE1	871	0.41	.6818	3.36	0.67
	IFBO3	849	1.06	.2895	2.83	0.88
	ISO3	667	1.03	.3044	2.40	1.27
Web Browsing						
	BOTE1	871	-0.50	.6197	3.27	1.35
	IFBO3	849	-0.43	.6658	2.67	0.65
	ISO3	667	1.37	.1726	2.90	1.29