Student Teachers' Awareness Regarding Computer Hardware and Computer Competencies: An Action Research

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ABSTRACT   In this action research the main focus was given to the student teachers' awareness about two very important skills for modern era. First is Computer Hardware and the second is awareness of computer competences. The main objective is to know the current status of ICT education in teacher training colleges through investigating student teachers' familiarity regarding computer hardware and investigating student teachers' awareness regarding competitiveness of computer related working competencies. Results of this research shows the need of up gradation of ICT course in the faculty of education.

**Key words:** Awareness, Computer competences.

Introduction

This research aimed to provide a general picture of Information and Communication Technology (ICT) Education in teacher training colleges. Through this aim, student teachers' awareness regarding computer hardware and ICT competencies were identified. The research is based on two basic questions. (1) Which computers are known to student teachers? (2) Which ICT competencies the student teachers perform well? And which performances they unable to perform well related to particular competency?

The Problem

Statement of the Problem. Student teachers' awareness regarding computer hardware and computer competencies

Purposes. (1) To know the current status of ICT education in teacher training colleges through investigating student teachers' familiarity regarding computer hardware and (2) investigating student teachers' awareness regarding competitiveness of computer related working competencies.

Definition of the Terms. The operational definition of Information and Communication Technology Education related terms **(a) computer hard**ware and **(b) computer competency** are defined in this research is as under:

(a) **Computer Hardware**. The course structure of the computer education subject of B.Ed. /M.Ed. course in which student teachers study/know/work with the computer hardware (25) such as hard disc, Ram...webcam, etc. are covered in the list to know the familiarity of student teachers.

(b) **Computer Competency.** The course structure of the computer education subject of B.Ed./M.Ed. course in which (1) basic computer operation skills, (2) setup and maintenance, (3) word processing, (4) spreadsheets, (5) database, (6) networking and (7) telecommunication; are covered as ICT competency. The list covers

performances related to these competencies for which student teachers' opinions of their competitiveness were sought.

Background of the Study

Theoretical Aspect. The term 'Information and Communication Technology' (ICT) has gained popularity in recent years. It encompasses the effective use of equipment and programs to access information, and store, organize, manipulate and present it (Gay & Blades, 2005). Education system around the world is increasing pressure to use ICT as part of educational process. Tinio (2002) give the reason behind this pressure that there is an increasing expectation that students must attain a level of technological fluency to function effectively in society. According to Hannafin & Saveney (1993) it is in the responsibility of educational institutes to provide students with required facilities. According to the report of **Organization for Economic Co-operation and Development** [OECD, 2007], there are three main rationales for the inclusion of ICT into education: economic, social and pedagogical. For the economic rationale, the center of attention is familiarization with ICT have becomes important factor of employability. The second rationale highlights the importance of ICT as a requirement for participation in societal – vocational activities. Third rationale underlines the role of ICT in teaching and learning.

As a consequence of the importance of ICT competency, education systems are now under raising pressure to integrate ICT in the educational process. After the introduction of ICT into classrooms there are still unanswered questions about impact of technology in the long and short term on students' learning, and how it has affected simple and complex tasks. These are

important for (a) forming government policies, (b) directing teacher education programmes, (c) advancing national curricula, (d) designing or reforming classroom implementation and (e) analyzing cost and benefits (Cox & Marshal, 2007).

From the above discussion it seems to be important to explore ICT competencies among students of any level who are now ready to go further education and/or will become the future employees and adults soon. This study will inform educators and policymakers regarding the ICT competencies of student teachers.

Past Researches. There are a large number of studies in the subject, which have focused on status of computer education surveying perceived competences, attitude, needs, awareness, etc. towards ICT of the students. The sample variation is found from primary level to higher education. The selection of competencies is also differing according to the course structure of the faculty (Yalcin, 2008). Karsten & Rath (1998) studied computer self-efficacy as a practical indicator of student computer competency. Patrica & Clariana (2005) studied perception v/s reality determining computer proficiency of International Students in the field of management. The researcher selected only management skills, such as working with system software, the Internet and creating mathematical report for perceiving two, four and five performances accordingly. Ravat & Modi (2009) selected MLsc students. The researcher selected seven competencies, such as basic computer skill, word processing skills, database skills, presentation skills, networking skills and information skills. The result revealed that students are less efficient in networking skills then selected other skills.

In past researches, researchers selected computer competency as dependent

variable and different independent variables for their study. The independent variables gender, parents' education and computer ownership is found related to the competency (Yalcin, 2008; Eraut, 1989). There is large number of tools measuring Computer self-efficacy, competency, attitude etc. is available on the web. Computer Proficiency Assessment Test, Attitude Inventory, Awareness Test, Competency Inventory (Murphy & Coover, 1989; Nickel, 1986; Asan, 2003; Flowers & Algozzine, 2000 etc.) allows students to demonstrate proficiency.

Methodology

Participants. The target population about which the researcher was interested in obtaining data and drawing conclusions included the entire post graduate students of M.Ed. of the Saurashtra University distributed in ten institutes and approximately 280 student teachers. In all one hundred seventy postgraduate students (M.Ed.) from randomly selected six institutes responded in the tool.

Data Collection Instrument. The investigator prepared a self-evaluation data collection tool. The tool was prepared in two sections to meet the objectives of the study.

The section 1 of the tool is an opinionnaire covering a list of twenty-five hardware related to computer education practice. The respondents have to respond in terms of familiarity or unfamiliarity about the hardware in the tool.

The section 2 of the tool was identified as checklist, which contains seven competences related to computer, covering overall twenty-eight performances. The checklist was based on past researches. The researcher aimed to investigate to what extent the students perceived them selves competent on specific ICT performance. This section included twenty eight items in total,

with four alternative responses presented for each item with a value ranging from 1 to 4: 4=completely competent, 3= competent, 2=some what competent, 1=not competent.

The tool is based on past researches. After studying the tools, in order to ensure its format, language, content and face validity, two teachers examined it; the experts were from the department of Education and IT. There were seven suggestions out of them three for the performances of the competencies and four for the proper IT word-frame. In response to the feedback, the tool was revised. After pilot testing, reliability coefficient was calculated. The reliability coefficient was found to be 0.94 for section 1 and 0.89 for section 2. All the items had significant correlation coefficient of item-total correlation.

Data Collection Procedure. After selection of the M.Ed. colleges the researcher selected ICT teachers and informed him personally regarding data collection procedure. The terms related to the subject, competencies and performances were discussed with the teacher. They administered the tool and if participant ask them to define operationally certain terms, then they have done it. The tool was administered in six institutes. Institutes were selected randomly and during the administration the researcher was present in the institute but not in the class, only because it was self-evaluation tool and if very familiar person do this job then social desirability may not appear in the responses. The tool usually took about 40 minutes for the students to complete it.

Data Analysis. The data obtained were analyzed through descriptive and inferential statistics. The responses were checked for irregularities and missing data. Out of 173 students that participated in the

research, the data obtained from three students were not included in the analysis because of anomalies in the data and incomplete data. The researcher recorded the responses of the participants received for 'familiar and unfamiliar' and 'perceived competencies in four categories' in section 1 & 2 of the tool. It means the responses according to two and four categories were tabulated first and than percentage participants in each category were calculated. Chi-square test was used to test the significance of the responses. The responses were firstly converted in to quantitative data according to favorableness/perceive ness of the participants for the hardware and competencies and then inferential statistics

was used to get the answers of the research questions.

Results

The analysis of the data collected through Opinionnaire and Check list are presented here, with three headings: (1) Student teachers, familiarity with the computer hard-wares, (2) Student teachers' perceived computer competencies and (3) Students' none perceive ness of the performances related to specific competency.

Student Teachers' Familiarity for Computer Hardware. Section 1 in the tool was designed in order to know student teachers familiarity of the computer hard wears. Table 1 shows the result in general.

Table 1

Student Teachers' Familiarity with the Computer Hardwares

No.	Familiar Frequencies with Significant Chi-square (More than 50% Sample)	Familiar Frequencies with Significant Chi-square (Less than 50% Sample)
1.	Hard Disc, CD-ROM, CD, DVD, Floppy Disc, Keyboard, Mouse, Monitor, Printer, Scanner, Microphone/Speaker, Digital Camera, Video Camera, Overhead Projector	RAM, Disc drive, Fax, Modem, Web Cam
	Non-Familiar Hard-wares to the Sample with Significant Chi-square	
2.	Sound Card, TV/Radio Card, Joystick, Optical Scanner, Ethernet Card	

Table 1 shows that out of twenty-five hardware selected by the researcher for the opinion fifteen and five hardware were fully familiar and somewhat familiar to the sample while six were not familiar.

Student Teachers' Competitiveness on Specific ICT Competency. Section 2 in the tool was designed in order to examine student teachers' perceived competencies on specific ICT performances. Computer Technology contains seven competencies: (1) basic computer operation skills, (2) setup and

maintenance, (3) word processing, (4) spreadsheets, (5) database, (6) networking and (7) telecommunication. Each competency covers four performances.

Table 2 shows the mean score and standard deviation of students' responses on different performances of selected computer competency in section 2 of the tool. While in Table 3 the performances not perceived by the student teachers to selected computer competencies are reported.

Table 2

Students Teachers' Perceived Performances to Computer Competencies

Item	Performances	Mean and SD
1.1 to 1.4	Insert and eject CD/DVD/Pen drive, Access information from CD/DVD/Pen drive/Hard drive, Create, copy and delete data/file from accessed information, Copy the data from hard drive/CD/pen drive.	Mean 3.54, 3.3, 3.29 and 3.36 with SD 0.69, 0.68, 0.92, and 0.93 respectively
2.5 to 2.8	Connecting peripheral devices, Protecting pen drive/hard drive from virus, Managing the icons, data folders, De-fragmenting disk and drive cleaning.	Mean 3.35, 3.39, 3.23 and 3.26 with SD 0.94, 0.86, 0.79, and 0.83 respectively
3.9 to 3.12	Set margins, bullets, numbering, paragraph, Page set, spell check and header- footer, Change font size and type, Cut, copy, paste, find & replace in and between documents.	Mean 3.39, 3.26, 3.32 and 3.39 with SD 0.86, 0.79, 0.87, and 0.86 respectively
4.13 4.14 4.16	Enter data in cell and short data, Move data within the spread sheet, Make a new sheet, rename and delete.	Mean 3.23, 3.32, and 3.22 with SD 0.86, 0.89, and 0.82 respectively
5.17	Enter data in a database setting.	Mean 2.89 with SD 0.76
6.21 6.23 6.24	Logging of a network, Electronic file search & sharing, Using net devices.	Mean 3.35, 3.39, and 3.32 with SD 0.77, 0.76 and 0.87
7.257.26 7.28	Send and receive e-mail, Navigate the world wide web, Use social networking.	Mean 3.34, 3.33, and 2.89 with SD 0.87, 0.78 and 0.87

Table 3
Students Teachers not Perceived Performances to Computer Competencies

Item	Performances	Responses (in %), Mean and SD					
4.15.	**Use formula for simple statistics**	**20**	**23**	**31**	**26**	**2.37**	**1.01**
5.18.	**Setting primary and secondary key**	**24**	**28**	**36**	**12**	**2.37**	**0.98**
5.19.	**Setting relation between table**	**27**	**23**	**28**	**23**	**2.36**	**1.07**
5.20.	**Sort & search & produce report in a database**	**28**	**24**	**18**	**29**	**2.39**	**1.03**
6.22.	**Working in a network environment**	**20**	**23**	**31**	**26**	**2.37**	**0.98**
7.27.	**Subscribe to a list-server**	**20**	**23**	**31**	**26**	**2.37**	**0.98**

Table 2 & 3 shows mean score and standard deviations for students' perceived and not perceived performances related to selected computer competencies. As seen in the table 1, students perceived the three highest competence for the performances 1.1, 1.2, 1.3, 1.4 & 2.1, 2.2, 2.3, 2.4 & 3.1, 3.2, 3.3, 3.4. These competencies are (1) basic computer operation skills, (2) setup and maintenance, and (3) word processing. Students are also perceived another three competencies, they are (1) spreadsheets (2) networking and (3) telecommunication accept performances related to these competencies, such as use formula for simple statistics, working in a network environment and subscribe to a list-server respectively (table 2). Finally students perceived the one lowest competence database which includes performances; setting primary and secondary key, setting relation between table and sort and search & produce report in a data base.

Discussion of the Results

The student teachers are not aware with computer hard wares such as, Sound Card, TV/Radio Card, Joystick, Optical Scanner and Ethernet Card. They are not competent in 'database' computer performances, such as (i) setting primary and secondary key, (ii) setting relation between table and (iii) sort, and search & produce report in a database. The student teachers are also not competent in performances such as (iv) use formula for simple statistics, (v) working in a network environment and (vi) subscribe a list-server of spreadsheets, networking and telecommunication competencies.

The result shows that there is need of competitiveness related to the research base course (computer competencies/performances) of ICT in higher education system. In other words there is need of up gradation of ICT course in the faculty of education. Apart from common skill advance skill base course should be introduced and students have to select choice base course accordingly not a frame of course for every one of computer education.

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