Computer Support to Teachers

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Abstract

The potential of computer usage towards enhancing teaching learning process has received considerable attention in recent times. The computer support to teachers is a major issue around which discussions and researches about computer use seem to coalesce. The present study systematically and comprehensively assesses teachers' perceptions regarding assistance available to teachers in schools in the use of computers in teaching-learning process i.e., administrators, experts, technicians, computer literate co-workers, colleagues, who endorse computer use. The findings suggest that overall, computer support to teachers is not provided always or on daily basis. As a consequence of implementation of favorable policies, schools occasionally provide support in use of computers. However, there is scope for further enhancement in provision of support to teachers related to allocation of more time to plan and integrate computers in curriculum, sufficient slots in the school time table for students to use computers for completing computer-based assignments, curriculum-related technology-coordinator, opportunities to discuss computer-related topics with colleagues and exchange ideas about ways of using computers in teaching-learning, and e-parental involvement. The findings emphasise that due consideration is required and significant efforts have to be made towards improving the computer support to desired levels in order to implement widespread adoption of computer use in teaching-learning process.

Keywords: Computer, Computer Support, Computer Use, CAL, CMI, CAI Computer Support to Teachers

BACKGROUND AND RATIONALE

For the past decade there is a major push towards integrating computer technology in teaching-learning process because of the vast promise it offers such as cheap, accessible and instantaneous information, enormous potential for interactivity and media-rich communication and powerful educational tools for teachers and students (Mouza, 2002). Various researchers have employed several research methods in an attempt to understand the distinct ways in which computers can help teachers in improving the teaching and learning process (Ely, 1995; Stratford, 1997; Drury, 1995; Blankenship, 1998; Sinko and Lehtinen, 1999; Smeets, Mooij, Bamps, Bartolomé, Lowyck, Redmond, and Steffens, 1999; Wallace, 2001; Omur, 2008; Dawson, 2008). Researchers Harris (2000); Kellenberger and Hendricks (2000); and Martin and Ofori-Attah (2005) identified that teachers could use computers for different purposes like, for teaching purposes, administration purposes, and personal purposes. Computers greatly facilitates teaching-learning process for various subjects especially language, mathematics and science. Computer technology is also being increasingly applied by school teachers in non-instructional (record keeping, grade averaging, communication, etc.) and pre-instructional (developing materials, researching instructional content, etc.) uses. Various educationists have interrelated computer use with constructivist, collaborative, and inquiry-based learning and also, with pedagogical changes. The literature on computers and constructivist reforms also described a variety of teaching-learning activities that were permitted with the use of computers that were not feasible otherwise (Sheingold and Hadley, 1993; Glennan and Melmed, 1996).

Various developing countries are currently following in the footsteps of the developed countries in promoting use of technology in education. In India, the National Centre for Computer-based Education, NCERT released the National Curriculum Framework for School Education in 2000 which outlines the following necessary Information Technology Tools to be procured for schools. In association with the Global e-Schools and Communities Initiative (GeSCI), the Ministry of Human Resource Development (MHRD) has formulated India's National Policy on Information and Communication Technology (ICT) in School Education in order to devise, catalyze, support, and sustain ICT activities and processes to improve access, quality and efficiency of ICT tools and resources to all students and teachers. It promotes networking, research, evaluation and experimentation in ICT tools and practices to utilize the potentials of ICT in school education. National level organisations like Central Institute of Educational Technology (CIET), National Council of Educational Research and Training (NCERT), Indira Gandhi National Open University (IGNOU) and State level organisations like State Institutes of Educational Technology (SIETs) play a proactive role in developing and sharing of digital content. Moreover, under Public Private Partnership model in education, various technology firms such as, Intel India, Microsoft Partners in Learning, Oracle Education Foundation are partnering with governments, educators, and local content and curriculum providers to create sustainable educational programs to train teachers and prepare students to succeed in the global economy.

Despite several initiatives and significant efforts in various developing countries, it has often been observed that there is a general unwillingness among teachers and schools to promote use of computers across the curriculum (Harris, 2000; and Neiderhauser and Stoddart, 2001) and integration of computers by faculty into the classroom has not kept pace (McKenzie and Clay, 1995). One important factor affecting use of computers in teaching-learning process is the support that school provides to the teachers in use of computers.

Blankenship (1998) determined support as one of the key predictor of computer use. Lack of administrative support to teachers in use of computers has been listed as one of the major barriers to the use of computers by teachers (Hadley and Sheingold, 1993; Ely, 1993; Fairbrother and Kurina, 2000; Williams, 2000; Jones, 2004; Sahin and Thompson, 2006; Prabhu Shankar and Subasri, 2006). Thus, teachers are prevented from making full use of computers in teaching. The findings of another study by Mohd Yunus (2007) regarding the main challenges to ICT integration perceived by the teachers revealed that ICT integration in teaching learning was dependent upon adequate access, adequate computer resources, teacher development opportunities, and onsite support – all of which require funding, thought, planning and support. Pulist (2007) described that in-house technical expertise, trouble-shooting facilities and availability of sufficient time were found to be most crucial factors in enhancement of competency level of teachers in the use of Web-Based Technology.

Apparently, one of the key hurdles in integration of computers in teaching and learning is the limited support provided by the school in teachers' use of computers. Thus, in the absence of a comprehensive framework for assessing extent of support in teachers' use of computers in various related dimensions, it is neither possible to assess current levels of computer support nor is it possible to design suitable remediation plans. Understandably, the lack of appropriate measures to address fundamental need to assess the support in use of computers by teachers will continue to jeopardize effective integration of computer technology in education. In light of this, there is a need for designing a comprehensive framework for defining and understanding computer support to teachers. Once such a framework is formulated, it could prove to be an indispensable instrument in designing measures for improving computer support to teachers, thereby contributing towards enhanced use of computers in education. The study was based on this vital need.

STUDY

The meaning of the word support is to keep (one's spirits, for example) from failing during stress; lend strength to (American Heritage Dictionary, 1969, p. 1293). This definition is a good description of what a teacher is looking for with regard to support of computers. Again, however, this support comes in many forms. It might be a technical person available on demand, a fellow teacher with some encouraging words, or a principal who believes in technology and commits to implementation (money, time, conferences, specific training).

Within the school system a teacher can receive support for computer use in the following contexts.

- Maintenance for computer related equipments, software, etc.
- Encouragement from principal to use computers.
- Technical assistance for operating and maintaining computers.
- Expertise (technology-coordinator) to help developing and adjusting software to the curricular needs.
- Opportunities to discuss computer-related topics with colleagues and exchange ideas about ways of using computers in teaching-learning.
- Enough time to plan and integrate computer use in your curriculum.
- Sufficient slots in the school time table for students to use computers for completing computer-based assignments assigned by the teachers.
- Support for e-parental involvement.

Therefore, for the present study, computer support is operationalised from teachers' perspective the assistance available to teachers in schools in the use of computers in teaching-learning process i.e., administrators, experts, technicians, computer literate co-workers, colleagues, who endorse computer use.

In the present study, the term computer means a device which is used for instructional as well as pre-instructional and non-instructional purposes by the teachers and students in teaching-learning process. The term "use of computers" (or "computer use") is intended to refer to various ways in which teachers use computers for instruction and management of teaching learning process; like computer aided learning (CAL) which describes an educational environment where a computer is treated as an aid to an overall teaching-learning strategy with other methods and aids and it becomes a tool - just like a chalkboard, a calculator, a pen, a chart, a model, a flash card, or a book - that helps teachers teach and helps their students learn; computer managed instruction (CMI) where computer is used for pre- and non-instructional purposes; and computer assisted instruction (CAI), the mode of instruction in which a student directly interacts with a computer and learns through lessons programmed into the computer, like tutorial, drill-and-practice, simulation, instructional gaming, problem solving.

METHOD

Given the importance of school support to teachers in use of computers for successful infusion of computers into teaching and learning, the purpose of the study was thereof to design a comprehensive framework to study teachers' current levels of computer support in all the related dimensions.

Population

While the state of educational infrastructure and several other pertinent factors vary drastically across various schools in private, public and state government school systems in different regions of the country, Central Schools (Kendriya Vidyalayas), owing to inherent

design, mission, and objectives, maintain considerable uniformity in various establishments across the country. Hence, from the perspective of the present study, Central Schools provided as ideal population. The implications of the study could be generalized to design recommendations for formulating policies and strategies at a national and international level.

Sample

To begin with, the researcher obtained the latest directory of Central Schools (Kendriya Vidyalayas) from the office of Kendriya Vidyalaya Sangathan, Delhi Region, India. From the list of Central Schools, a random sample of 20 schools was selected to participate in the study. From each of the selected school, 15 teachers were selected randomly from the teachers' attendance register such that preferably a set of 5 teachers (excluding computer teachers) was selected from each of the three grades (PRT, TGT and PGT grade). Thus, a total number of 300 teachers of Central Schools of NCT of Delhi constituted sample of the present study.

Construction of Questionnaire

An initial questionnaire was submitted to the experts for face and content validity. There was a 'yes - no' type validity assessment in which an item in the questionnaire was accepted if more than half of the experts provided affirmative responses. As such, for this questionnaire, since all the items related to computer support were found valid by the experts, hence no item was deleted. At the same time, their suggestions were incorporated and thus some abstract or superficial terms like 'enough', 'adequate', 'sufficient' were removed and a quasi-final draft was obtained to be administered on the try-out sample. In order to identify weak, ambiguous, non-functional, or defective items, the quasi-final questionnaire was administered for try-out to a sample of 30 teachers, 10 each from the three selected schools of Delhi. The resulting responses were statistically analyzed to determine the reliability of scale in the quasi-final questionnaire.

The Cronbach's Alpha for 'school support in use of computer' was calculated to be 0.73 and found significant at p<0.01 level (Table 1).

Table 1 MEAN, Standard Deviation, Reliability Coefficient for School Support (N = 30)

Construct	N Items	Mean	SD	α*
School Support to Teachers in Use of Computers	8	2.09	0.35	0.73

Significant at p<0.01 level

As the questionnaire was found to be quite reliable (Cronbach's Alpha=0.73), quasi-final questionnaire was used as the final questionnaire. Thus, after careful considerations, a survey questionnaire (Appendix) was developed by the investigator for collecting the data.

Initial Questionnaire ⟶ Quasi-final Questionnaire ⟶ Final Questionnaire
(Expert: Validity)   (Try-out: Reliability)   (Data: Analyses)

A three-point scale consisting of 8 items was constructed by the investigator to measure school support to teachers in use of computers. The teachers were asked to rate their level of school support for computer use on a three point scale: 1 = never (under no circumstances), 2 = sometimes (occasionally/on special occasions) and 3 = always (nearly daily/whenever require). The final score of respondents on the scale was sum of their ratings for all of the items.

Administration of Questionnaire

After seeking permission from the Assistant Commissioner, Kendriya Vidyalaya Sangathan and the Principals of respective schools, the questionnaire (Appendix) was given to each selected

teacher in the free periods. The teachers were given three days to fill-in the questionnaire as per the instructions provided therein and the filled-in questionnaires were collected from role teachers on the agreed dates.

RESULT

The teachers were asked to rate the level of school support for computer use on a three point scale: never (under no circumstances), sometimes (occasionally/on occasions) and always (nearly daily/whenever require) for eight items. The percentage of respondents in each of these categories was calculated and school support was represented by a mean score on a three-point, scale ranging from 1 (never) to 3 (always). The same has been presented in Table 2.

Table 2 Percentage Distribution of Respondents in getting School Support in Use of Computers and Distribution of Mean Score of Responses on School Support to Teachers

Scale	Never 1	Sometimes 2	Always 3	Means Score	SD
	Percent (%)				
Support for computer use	6%	42%	52%	2.43	0.50

Table 2 illustrates the percent and distribution of mean scores of teachers' responses on the 8-item school support scale. Approximately half of the teachers reported that they always get school support for computer use whenever required and the remaining half reported to get school support sometimes. Hence, teachers in general had got school's support in use of computers (mean = 2.43; SD = 0.5).

The eight item-wise percentages of three categories of responses (never to always) on School Support Scale are presented in the Table 3.

Table 3 Item-wise Percentage Distribution of Respondents on Support Scale

#	Statements	%		
	Your school provides…	Never	Sometimes	Always
1	maintenance for computer related equipments	35.0	26.3	38.7
2	encouragement from Principal to use computers	1.0	15.7	83.3
3	technical assistance for maintaining computers	7.3	51.3	41.3
4	technology-coordinator to help you developing and adjusting software to your curricular needs	22.3	55.3	22.3
5	opportunities to discuss computer-related topics with colleagues and exchange ideas about ways of using computers in teaching-learning	10.0	61.7	28.3
6	time to integrate computers in the curriculum	34.7	51.0	14.3
7	sufficient slots in the school time table for students to use computers for completing computer-based assignments assigned by you	27.7	56.0	16.3
8	support for e-parental involvement	31.3	58.3	10.3

Some of the striking findings as evident from the 8 item-wise percentages of three categories of responses (never, sometimes, and always) in the above table reveal that about one-third of teachers expected increased support for maintenance of equipment, e-parental involvement, more time to plan and integrate computers in their curriculum, and technology-coordinator to help them developing and adjusting software to their curricular needs.

DISCUSSION

There are distinct ways in which computers can help educators in improving teaching and learning process. However, there are several organizational and individual factors that play important roles in the process of integrating computers in education. The integration of ICT in teaching and learning entails transformation of teaching process as well as redefining the role

of teachers to some extent. As a result, fostering technology usage among individual teachers remains a critical challenge for school administrators, technology advocates and policy makers. Thus, it is beneficial to identify conditions and determinants of technology usage among teachers in order to realize the shift of paradigm in the usage of computer with the advent of information technology. Teachers' inclination to use technology in classroom was considered to be dependent on various support systems that include communities, parents, business leaders, and administrators (Dupagne and Krendl, 1992; Mahmood and Hirt, 1992; Becker, 1994). (Newhouse, 1997; Middleton, Flores and Knaupp, 1997; Blankenship, 1998; Ginsberg and McCormack, 1998).

Although researches to examine measures for promoting use of computers in education have emphasized the importance of computer support but its know-how has not been dealt appropriately. Therefore, impediments like how and what all need to be covered in computer support, are required to be addressed before the power of computers is exploited to its full potential to transform teaching-learning process in the most effective manner. Hence, a need was felt to design a comprehensive framework for understanding computer support to teachers. The study has provided such a framework that prescribes essential dimensions of computer support to teachers by the school with regard to their use of computers in teaching-learning process. The computer support is studied in terms of teachers' perceptions regarding assistance available to teachers in schools in the use of computers in teaching-learning process i.e., administrators, experts, technicians, computer literate co-workers, colleagues, who endorse computer use. The study has also used this framework in the form of a questionnaire to investigate the current level of computer support to teachers.

The study shows that teachers have got school's support in use of computers occasionally. Support is provided in terms of maintenance for computer related equipments, technical assistance, and expert guidance either on occasions or whenever required. However, there is scope for further improvement in provision of support related to allocation of more time to plan and integrate computers in curriculum, curriculum-related technology-coordinator, incentives and encouragement to teachers to use computer, and e-parental involvement.

This deficiency of computer support in schools has been reported in the literature also. Blackenship (1998), Hadley and Sheingold (1993), Ely (1993), Fairbrother and Kurina(2000), Williams (2000), Pelgrum (2001), Jones (2004), Sahin and Thompson (2006), Prabhu Shankar and Subasri (2006) Yunus (2007) Pulist (2007) reported insufficient computer support by school to teachers as one of the major obstacles in integration of ICT in professional practice. Similarly, the findings from the present study substantiate this as teachers indicated deficiencies regarding technology-coordinator to help teachers developing and adjusting software to their curricular needs, sufficient slots in the school time table for students to use computers for completing computer-based assignments assigned by them, opportunities to discuss computer-related topics with colleagues and exchange ideas about ways of using computers in teaching-learning; that need to be addressed on urgent basis. Therefore, the present study supports and extends such knowledge in existing literature wherein computer communication technology integration related an important factor computer support has again come up as a deficient area and requires significant efforts towards improving it to desired levels.

CONCLUSION

Although proved as being an indispensible tool to teaching and learning, computers as shown by various researchers are being used only for support in the educational practice and only a few teachers actually integrate computers as a teaching tool or learning device. Similar trends are emerging in many developing countries and the situation in India is no exception. In the

absence of a comprehensive and an all-inclusive framework for assessing computer support to teachers it is neither possible to assess current levels of computer support nor is it possible to design suitable remediation plans which in turn continue to imperil effective integration of computer technology in education. As present study was based on this vital need, the researcher attempted to construct a comprehensive framework in questionnaire to assess computer support to teachers in the form of their perceptions regarding assistance available to teachers in schools in the use of computers in teaching-learning process. A detailed appraisal of the current levels of computer support, as perceived by school teachers, would prove to be an indispensible instrument in designing measures for enhancing computer support of teachers.

Although the study was conducted in the Central Schools of NCT of Delhi, the implications are applicable to various other government, public and private school systems existent in India and abroad.

As a consequence of implementation of favorable policies, schools occasionally provide support in use of computers. However, there is scope for further enhancement in provision of support to teachers related to allocation of more time to plan and integrate computers in curriculum, sufficient slots in the school time table for students to use computers for completing computer-based assignments, curriculum-related technology-coordinator, opportunities to discuss computer-related topics with colleagues and exchange ideas about ways of using computers in teaching-learning, and e-parental involvement. Therefore, it is highly recommended to ensure sufficient support to teachers in use of computers on daily basis at the earliest.

Acknowledgements

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