PERCEIVED ICT COMPETENCIES OF TEACHERS: EVIDENCES FROM KENDRIYA VIDYALAYS

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Abstract

Perceived ICT competencies indicate the teachers' ability as well as the level of confidence in ICT knowledge and skills. Teachers' competence with computer technology is a key factor for effective use of ICT in teaching. Perceived ICT competencies of teachers working in Kendriya Vidyalays of Odisha were examined through the ICT competency scale. The competencies include fundamental concepts, knowledge and skills on basic ICT competencies and advanced ICT competencies. The findings of the study revealed that The result indicates that a majority of male and female teachers perceive themselves as competent in ICT competencies. The results indicate that 'majority of the more experienced teachers' do not perceive themselves as competent in ICT competencies, and they are neutral on most of these competencies, whereas, less experienced teachers exhibited higher confidence in most of the ICT competencies. However, it is found that teachers who have already completed any certificate programme in computer perceive their ICT competency level better than their counterparts who have not gone through any formal certificate programme in computer. Furthermore, results indicated that a majority of teachers with computer course perceive their highest competency levels as "sufficient" or "completely sufficient" in the 'use of word processors for personal and institutional purposes.

Keywords: ICT, Perceived ICT Competencies & Kendriyavidyalayas

Genesis of the Study

Information and Communication Technology has been evolving with a remarkable effect on the teaching and learning experiences throughout the world. Worldwide research has shown that ICT leads to improve students' learning and better teaching methods in increasing Knowledge, Comprehension, Practical skill and Presentation skills in different subject areas like mathematics, science and social sciences. ICT has maintained a critical role in enhancing the quality of education. Therefore, many countries in general and India in particular wish to enhance the quality and effectiveness of the learning process in schools and consider ICT as an inevitable means by which quality may be enhanced. This includes helping students to learn and teachers to perform their works more effectively. As a consequence of rapid developments, ICT has become the focus point for educational purposes. Teachers should be

equipped with adequate ICT competencies in education so as to reap the good quality education. ICT competencies of teachers and how they perceive the role of ICT in teaching/learning process play key roles in the integration of ICT in schools. Analysis, design, development, implementation, use, evaluation and management of educational technologies require diversified competencies and knowledge (Adelsberger, Collis & Pawlowski, 2002). Tinmaz (2004) investigated prospective teachers' competency level on a three-point scale. He reported results that prospective teachers were graduated with a less than moderate level competency. Consequently, it is not easy that these prospective teachers could infuse technology into their courses successfully. The results of his study indicated the highest level of computer competency appeared to be with e-mail and the lowest level of computer competency seemed to be with databases. Toker (2004) conducted a survey of 1086 prospective teachers from Primary School Teacher Education Department at Suleyman Demirel University in Turkey. He found that prospective teachers felt themselves intermediate technology users. Specifically, prospective teachers are at an intermediate level for using technology in educational environments and basic computer skills. In contrast, for advanced computer skills their level is novice. According to Smith and Kubasko (2006) prospective teachers (interns) on average rated their skills with using ICT higher than that of their partnership K-12 teachers. Nanasy (2001) also investigated computer competencies of prospective teachers. The results of his study indicated, participants felt competent to teach with ICT to their students. The highest level of computer competency appeared to be in word-processing, e-mail and using the Internet. The lowest level of computer competency seemed to be with presentation programs, educational software, desktop publishing, database management, website design and teleconferencing. Similar to the Nanasy, according to Watson and Prestridge (2001), prospective teachers had the greatest competence in 'word processing' and the least competence in 'multimedia' and 'web page development'. The study of Akkoyunlu and Orhan (2003) found that prospective teachers were proficient about ICT competencies. They surveyed 159 fourth year prospective teachers from 5 university departments of CEIT in Turkey. The undergraduate program in CEIT department was designed to offer B.Sc. degree in computer education and instructional technology and the graduates of this department were qualified to teach ICT at basic and secondary education schools. Hence, the investigators are keenly interested to unveil the perceived ICT competencies of teachers for better facilitation of ICT integration in Kendriya Vidyalayas.

Objective of the Study

The study was carried out to unveil the perceived ICT competencies of the teachers working in Kendriya Vidyalayas (KVs).

Research Question of the Study

What are the teachers' perceived ICT competencies in KVs?

Design of the study

The study comes under the descriptive survey research.

Population and Sample of the study

The target population of the present study were all teachers KVs ranging from Class-I to Class-XII. Owing to time and resources, the researcher had purposively selected all KVs in Odisha as the accessible population of the present study. In Odisha, there are 38 KVs which comes under the jurisdiction four Zones namely Cuttack (12 KVs), Bhubaneswar (08 KVs), Berhampur (09 KVs) and Sambalpur (09 KVs). By adopting disproportionate stratified random sampling, the researchers selected four KVs from each Zone as sampling unit of the present study. Thus, 16 KVs were included in the present study as the sampling units. Further, 10 teachers excluding computer teachers of each KVs purposively selected keeping view the gender, teaching experience and prior computer course completed. However, 160 teachers constituted the sample of the study.

Tool used

ICT competency scale for teachers

This scale was developed to know the perceived ICT competency of teachers. It consisted 16 items based on five dimensions namely 1) word processing, 2) file navigation, 3) use of www, 4) use of spreadsheets and 5) presentation software in teaching learning process. The teachers were required to respond each item on five-point Likert type scale such as 5= Completely Sufficient, 4= Sufficient, 3= Neutral, 2= Insufficient and 1= Completely Insufficient. Approximate time limit for completion of the scale was 15 minutes.

Techniques of data analysis

Collected data were analyzed utilizing descriptive statistics and the qualitative responses were analyzed by using the content analysis. The descriptive analysis was used to investigate the current status of competency of teachers of KVs. The descriptive statistics like: frequencies, mean, percentage, standard deviation, were calculated for the data obtained through ICT competency test.

Results and Discussion

i.   Perceived ICT competencies of teachers of KVs

Perceived ICT competencies indicate the teachers' ability as well as his/her level of confidence in ICT knowledge and skills. Teachers' competence with computer technology is a key factor for effective use of ICT in teaching (Knezek and Christensen, 2002). Perceived ICT competencies were examined through the ICT competency scale. The competencies include fundamental concepts, knowledge and skills on basic ICT competencies and advanced ICT competencies. Teachers rated their levels of competence with the statements by using a five-point Likert-type scale (5 indicating "Completely Sufficient", 4 indicating "Sufficient", 3 indicating "Neutral", 2 indicating "Insufficient", and 1 indicating "Completely Insufficient").

Table-1: Perceived ICT competencies of Male (N=110) and Female (N=50) teachers of KVs

S. No	Competencies	Variable	M	S.D	% of "Completely sufficient (5)" + "sufficient (4)"
1.	Use of operating systems	Male	3.69	.93	53
		Female	3.92	.69	72
2.	Use of the Internet - World Wide Web (WWW).	Male	4.40	.87	53
		Female	3.49	.69	52
3.	Use of word processors for personal and institutional purposes.	Male	4.09	.86	80
		Female	3.80	.85	72
4.	Use of spreadsheets for personal and institutional purposes.	Male	3.84	.98	67
		Female	3.88	.59	76
5.	Use of ICT for communication.	Male	3.89	.98	69
		Female	3.84	.61	72
6.	Use of ICT for collecting data.	Male	4.13	.83	75
		Female	3.84	.67	76

No.	Item	Gender	Mean	SD	%
7.	Use of communication tools to support instruction.	Male	4.02	.80	73
		Female	3.64	.48	64
8.	Use of ICT to enhance personal and professional development.	Male	3.93	.81	67
		Female	3.84	.61	72
9.	Use of ICT to support learning and teaching beyond classroom.	Male	3.74	.90	60
		Female	3.70	.80	76
10.	Use of ICT to support classroom learning and teaching.	Male	4.04	.87	66
		Female	3.88	.59	76
11.	Use of computer aided instructional materials.	Male	3.89	.78	67
		Female	3.56	.64	56
12.	Use of image editing programs (e.g., Paint) and graphics programs (e.g., Photoshop).	Male	3.91	.92	63
		Female	3.76	.71	76
13.	Use of presentation software (e.g. power point).	Male	4.02	.82	64
		Female	3.72	.87	60
14.	Use of ICT in student assessment.	Male	2.95	1.33	44
		Female	2.80	1.29	41
15.	Use of ICT in course design.	Male	2.94	1.34	45
		Female	2.92	1.25	40
16.	Use of hypermedia and multimedia tools to support instruction.	Male	2.78	1.27	34
		Female	2.61	1.31	38
Overall		**Male**	**3.76**		
		Female	**3.57**		

Mean and standard deviation, total percentage of male and female teachers who marked their ICT competencies as "sufficient" and "completely sufficient" are provided in Table-1. The result indicates that a majority of male and female teachers perceive themselves as competent

"sufficient" (M=3.76 and M=3.57) in ICT competencies. As shown in the Table, overall mean ICT competencies of male teachers is slight higher than the female teachers. Furthermore, 'use of the Internet-World Wide Web (WWW)(M=4.40)', 'use of word processors for personal and institutional purposes (M=4.09)', 'use of ICT for collecting data (M=4.13)', 'use of communication tools to support instruction (4.02)', 'use of ICT to support classroom learning and teaching (M=4.04)', 'use of presentation software (e.g. power point) (M=4.02)' were perceived as the highest competencies by male teachers while 'use of operating systems (M=3.92)', 'use of spreadsheets for personal and institutional purposes and use of ICT to support classroom learning and teaching (M=3.88)', 'use of ICT for communication, use of ICT for collecting data and use of ICT to enhance personal and professional development (M=3.84)' were perceived as the highest competencies by female teachers. On the contrary, 'use of ICT in student assessment (M=2.95 & 2.80)', 'use of ICT in course design (M=2.94 & 2.92)' and 'use of hypermedia and multimedia tools to support instruction (M=2.78 & 2.61)' were perceived as the lowest competencies by both male and female teachers of KVs respectively.

Table-1 depicts that both male and female teachers are equally competent in simple ICT competencies. However, mean score of most of the ICT competencies of male teachers are higher than that of females. It could be stated that males perceived themselves more competent in ICT skills than females. This result can be due to the social roles of males and females in the society. Females do not get enough time for practice at home due to house hold work. Usually males perform more technical tasks where as females perform more domestic tasks. The findings of the present study are consistent with findings of research studies conducted by (Lynch, 2001; Toker, 2004; Torkzadeh, Pflughoeft& Hall, 1999). In addition, studies have established that girls are less confident than boys in their computer skills, and that some international studies have found that boys scored better than girls in computer related knowledge and skills in vast majority of countries.

The study thus confirmed the view of gender and competence as actively constructed in a social process. On the contrary findings are inconsistent with the research studies conducted by (Haderlie, 2001; Nanasy, 2001; Hornung, 2002; Snider, 2003). In a research conducted by Kay (2006), he found that male teachers had relatively higher levels of computer attitude and ability before computer implementation, but there was no difference between males and females regarding computer attitude and ability after the implementation of the technology.

ii.   Perceived ICT competencies of More and Less Experience teachers

Means and standard deviations, and total percentages of teachers who marked their ICT competencies as "sufficient" or "completely sufficient" are provided in Table-2. The results indicate that 'majority of the more experienced' do not perceive themselves as competent in ICT competencies (M=3.20) overall, and they are neutral on most of these competencies. As depicted in the Table-2 'use of operating systems (64 % M=3.55)', 'use of the Internet - World Wide Web (WWW) (50 %, M=50)', 'use of ICT for communication (71 %, M=3.83)', 'use of ICT for collecting data (55 %, M=3.22) were perceived by more experienced teachers as highest competencies in ICT.

On the other hand, a high majority of less experienced teachers perceived themselves competent (M=3.76) overall in ICT competency level as sufficient or completely sufficient. A majority of 'less experienced teachers' perceive their competency level as "sufficient" or "completely sufficient" in the use of 'use of word processors for personal and institutional purposes (82 %, M=4.07)', 'use of ICT for collecting data (79 %, M=4.18)', 'use of ICT to support classroom learning and teaching (75 %, M=4.11)', 'use of presentation software (e.g. power point), use of ICT to enhance personal and professional development (75%, M=4.07)', 'Use of communication tools to support instruction (75 %) and use of ICT for communication (71 %) with M=4.04 each.

On the other hand, a large majority of more as well as less experienced teachers (ranging from 54 % to 67 %) perceive their competency level as "insufficient" or "completely insufficient" in the 'use of hypermedia and multimedia tools to support instruction (M=2.61 & 2.72)', 'use of ICT in course design (M=2.87 & 2.92)', 'use of ICT in student assessment (M=2.90 & 2.98)' which may be considered as a core teaching need for all teachers across experiences.

Table-2: ICT Competencies of more (N=104) and less (N=56) experience teachers

S. No	Competencies	Variable	M	S.D	% of "Completely sufficient (5)" + "sufficient (4)"
1.	Use of operating systems.	M. Exp.	3.55	1.35	64

No.	Item	Group	Mean	SD	N
		L. Exp.	4.00	.76	71
2.	Use of the Internet - World Wide Web (WWW).	M. Exp.	3.26	1.34	50
		L. Exp.	3.64	1.19	71
3.	Use of word processors for personal and institutional purposes.	M. Exp.	3.16	1.26	53
		L. Exp.	4.07	.75	82
4.	Use of spreadsheets for personal and institutional purposes.	M. Exp.	3.26	1.34	55
		L. Exp.	3.78	.94	68
5.	Use of ICT for communication.	M. Exp.	3.83	.78	71
		L. Exp.	4.04	.94	71
6.	Use of ICT for collecting data.	M. Exp.	3.22	1.33	55
		L. Exp.	4.18	.85	79
7.	Use of communication tools to support instruction.	M. Exp.	3.16	1.26	53
		L. Exp.	4.04	.82	75
8.	Use of ICT to enhance personal and professional development.	M. Exp.	3.22	1.22	51
		L. Exp.	4.07	.75	75
9.	Use of ICT to support learning and teaching beyond classroom.	M. Exp.	3.15	1.27	53
		L. Exp.	3.93	.84	68
10.	Use of ICT to support classroom learning and teaching.	M. Exp.	3.08	1.32	50
		L. Exp.	4.11	.77	75
11.	Use of computer aided instructional materials.	M. Exp.	3.07	1.32	51
		L. Exp.	3.86	.74	64
12.	Use of image editing programs (e.g., Paint) and graphics programs (e.g., Photoshop).	M. Exp.	3.07	1.32	49
		L. Exp.	3.82	.89	64
13.	Use of presentation software (e.g. power point).	M. Exp.	3.92	.78	73
		L. Exp.	4.07	.84	75

14.	Use of ICT in student assessment.	M. Exp.	2.90	1.29	40
		L. Exp.	2.98	1.33	46
15.	Use of ICT in course design.	M. Exp.	2.87	1.31	40
		L. Exp.	2.92	1.25	40
16.	Use of hypermedia and multimedia tools to support instruction.	M. Exp.	2.61	1.34	33
		L. Exp.	2.72	1.31	40
Overall		**M. Exp.**	**3.20**		
		L. Exp.	**3.76**		

From the Table-2, it is clear that less experienced teachers showed higher confidence in most of the ICT competencies. The reason to this disparity may be that fresh teachers are more experienced in using the technology. This finding is consistent with research studies undertaken by Baek, Jong & Kim (2008) who claimed that experienced teachers are less ready to integrate ICT into their teaching. Similarly, in United States, the (U.S National Centre for Education Statistics, 2000) reported that teachers with less experience in teaching were more likely to integrate computers in their teaching than teachers with more experience in teaching. On the other hand research study conducted by Lau & Sim (2008) revealed that older teachers frequently use computer technology in the classrooms more than the younger teachers. The result is in agreement with Russell, Bebell, O'Dwyer, & O'Connor, (2003) who found that new teachers who were highly skilled with technology are more equipped older teachers who did not incorporate ICT in their teaching.

iii.   **Perceived ICT competencies of teachers of KVs with and without computer Course**

Means and standard deviations, and total percentages of teachers who marked their ICT competencies as "sufficient" or "completely sufficient" are provided in Table-3. It is found from the table-3 that teachers who have already completed any certificate programme in computer perceive their ICT competency level (M=3.81) overall is better than their counterparts who have not gone through any formal certificate programme in computer (M=3.22) overall. Furthermore, results indicate that a majority of teachers with computer course perceive their highest competency levels as "sufficient" or "completely sufficient" in the 'use of word processors for personal and institutional purposes (86 %, M=4.29)', 'use of

ICT for collecting data (84 %, M=4.29)', 'use of ICT for communication (80 %, M=4.16)', 'use of communication tools to support instruction (82 %, M=4.13)', 'use of operating systems (73 %, M=4.11). 'use of presentation software (e.g. power point) (80%, M=4.09). 'use of ICT to support classroom learning and teaching (78%, M=4.07)'. On the contrary, "use of hypermedia and multimedia tools to support instruction" (32%, M=2.74) was perceived as the lowest competency. On the other hand, 'use of word processors for personal and institutional purposes (71 %, M=3.80)' was perceived as the highest ICT competencies and 'use of hypermedia and multimedia tools to support instruction' (12%, M=2.04) was perceived as the lowest competency by teachers without computer course.

Table-3: ICT competencies of teachers with computer course (N=90) and without computer course (N=70)

S. No	Competencies	Variable	M	S.D	% of "Completely sufficient (5)" + "sufficient (4)"
1.	Use of operating systems.	With C. Course	4.11	.80	73
		Without C. Course	3.34	.63	37
2.	Use of the Internet - World Wide Web (WWW).	With C. Course	3.66	.84	62
		Without C. Course	3.17	.77	37
3.	Use of word processors for personal and institutional purposes.	With C. Course	4.29	.75	86
		Without C. Course	3.80	.92	71
4.	Use of spreadsheets for personal and institutional purposes.	With C. Course	3.93	.98	73
		Without C. Course	3.71	.81	65
5.	Use of ICT for communication.	With C. Course	4.16	.89	80
		Without C. Course	3.57	.69	57
6.	Use of ICT for collecting data.	With C. Course	4.29	.78	84
		Without C. Course	3.60	.73	58
7.	Use of communication tools to support instruction.	With C. Course	4.13	.75	82
		Without C. Course	3.49	.55	46
8.	Use of ICT to enhance personal development.	With C. Course	4.00	.76	71
		Without C. Course	3.69	.71	68
9.	Use of ICT to support learning and teaching beyond classroom.	With C. Course	3.93	.74	73
		Without C. Course	3.46	.91	54
10.	Use of ICT to support classroom learning and teaching.	With C. Course	4.07	.71	78
		Without C. Course	3.51	.84	54
11.	Use of computer aided instructional materials.	With C. Course	4.00	.67	78
		Without C. Course	3.68	.85	60
12.	Use of image editing	With C. Course	4.02	.83	75

	programs (e.g., Paint) and graphics programs (e.g., Photoshop).	Without C. Course	3.71	.78	63
13.	Use of presentation software (e.g. power point).	With C. Course	4.09	.81	80
		Without C. Course	3.71	.81	60
14.	Use of ICT in student assessment.	With C. Course	2.85	1.31	40
		Without C. Course	2.22	1.22	18
15.	Use of ICT in course design.	With C. Course	2.76	1.27	35
		Without C. Course	2.55	1.35	31
16.	Use of hypermedia and multimedia tools to support instruction.	With C. Course	2.74	1.34	32
		Without C. Course	2.04	1.15	12
Overall		With C. Course	**3.81**		
		Without C. Course	**3.22**		

From the Table-3, it could be interpreted that teachers who had completed any "certificate programme in computer" before joining in KVs perceive their ICT competency level better than the teachers who had not taken "certificate programme in computer". It can be concluded that 'teachers with computer course' are practicing more advance ICT competencies during their subsequent in-service training because of their earlier exposure to basic ICT competencies while "teachers without computer course" trail behind to gain command over basic ICT competencies in their subsequent in-service training programme. In his study, Altun (2003) found a parallel result, which revealed a significant difference between those who have taken a "Computer" course and those who have not. Thus teachers may be given scope to undergo short course in ICT to excel in their job. KVs administration may consider making it a part of their entry qualification for better facilitation of ICT integration.

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