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A STUDY OF TECHNOLOGY INTEGRATION PROFICIENCY OF TEACHERS IN RELATION TO THEIR COMPUTER COMPETENCE

Ms. Anupkiran Kaur
Research Scholar, Punjab University, Chandigarh
e-mail address: anupkiran693@gmail.com
Dr. Vandana Mehra
Prof., Deptt. of Education, Panjab University,Chandigarh
e-mail address: mehravandana95@gmail.com

Abstract

The present study was conducted to investigate Technology Integration Proficiency of the teachers in relation to their Computer Competence. The study employed descriptive survey method of research and a 2X3 Factorial Design was employed and the dependent variable was Technology Integration Proficiency scores of Secondary school teachers. 392 secondary school teachers were selected by using Stratified Sampling Technique from Government Schools of Chandigarh consisting of secondary school teachers from two academic streams; namely, science/mathematics (162) and social science/ languages (230). Each of the teachers were administered Technology Integration Proficiency Scale (made by the investigator) as well as Computer Competence of Teachers Questionnaire (Bhalla,2004). The total scores of the data were analysed using Mean, S.D., t-test and F-ratio. The study suggested that there was a significant difference between Technology Integration Proficiency scores of secondary school teachers with different levels of Computer Competence.

Key Words: Technology Integration Proficiency, Computer Competence.

The rapid spread of electronic communication has the capacity to affect the quality and efficiency of basic education throughout the world in dramatic ways – both positively and negatively. The ease with which teachers and students can gather information over the Internet on virtually any topic has the potential to transform instructional content and pedagogical practice. While the use of electronic communication technology as a medium of instruction is just beginning in basic education, it is already clear that it will be a dominant trend over the

next decade (Chapman, Garrett and Mahlck, 2004).

In contemporary society, there are compelling reasons for making significantly greater use of digital teaching resources, and indeed digital student administration and communication systems. The digital can enrich the teaching, make the learning more relevant, engage all manner of students, individualize much of the teaching, enhance the efficiency of the teaching, open new unexplored worlds, reduce teacher's workload, and when successfully used across the schools of the nation, can assist to enhance national productivity in knowledge- based economics (Lee and Winzenried, 2009).

In a broad sense, technology integration can be described as a process of using existing tools, equipment and materials, including the use of electronic media, for the purpose of enhancing learning. It involves managing and coordinating available instructional aids and resources in order to facilitate learning. It also involves the selection of suitable technology based on the learning needs of students as well as the ability of teachers to adapt such technology to fit specific learning activities. It calls for teachers' ability to select suitable technology while planning instruction. It also requires teachers to use appropriate technology to present and evaluate instruction as well as use relevant technology for follow-up learning activities. Such a broad definition of technology in education will help teachers develop a rational approach toward technology integration.

Teachers are the main agents of implementing computer technology. If their roles are not considered in implementing computer technology, it will bring about only limited impacts. Without the participation of teachers, computer technology itself does not make a significant effect on students' achievement. The quality of education can be determined by teachers (Wenglinsky, 2001).

Studies related to Technology Integration Proficiency and Computer Competence

Veerathanongdech (2018) lamented about the barriers to technology integration for teachers in Thai-curriculum schools. Even with the Educational reforms with technology use since 1997, achievement of Thai students did not improve. The researcher investigated the influence of Technology Integration barriers that were external and internal to the teacher, on their intention to integrate technology in the classroom. 105 teachers of Thai- curriculum schools were sampled, and their data were collected by Technology Integration Barrier Survey (TIBS). Multiple Linear Regression was used to find relationships between external and internal barriers to teachers' behavioral intention to integrate technology in the classroom, respectively. The result was that teachers did not face strong external or internal barriers, with only a

temperate level of intention to integrate technology in the classroom. Internal barriers were found to influence teachers' intention to integrate technology.

Hidayat et al. (2018) studied teachers' perception of instructional technology integration into English language learning. They focused on five aspects namely; teachers' perception, competency technology, attitude, experience and barrier of instructional technology integrating into English language learning. The study used descriptive method of research. The population of study was 43 respondents out of which a sample consisting of 21 teachers were randomly selected from English teachers of SMK, Kendari. In conclusion most of English teachers were proficient using technology; most of English teachers had a positive perception towards instructional technology into English language learning; most of English teachers had a positive attitude toward instructional technology into English language learning; the English teachers were sometime and seldom in integrating instructional technology into English language learning and lastly, there was some barrier in integrating instructional technology into English language learning. It meant that even though teachers had a positive perception, a positive attitude of instructional technology integrating into English language learning, unfortunately they sometime and seldom used technology into English language learning because of same problems namely, lack of technical support and insufficient internet speed, most parents were not in favour to use technology in term of financial, and lack of content technology for teaching.

In the article, Next Wave for Integration of Educational Technology into the Classroom: Collaborative Technology Integration Planning Practices, Scalise (2018) was of the view that Technology Integration Planning (TIP) practices were yielding many emerging examples of effective ICT practice in schools. He explored and evaluated some best practices on emerging trends in schools: the use of digital collaboration that brought together groups of students into learning networks. The study exemplified the approach with a case study analysis of a sample of collaborative science notebooks from the Assessment and Teaching of Twenty-First Century Skills (ATC21S) project. Therefore, the purpose of this study was to investigate the factors that influence secondary school teachers' ICT usage in schools.

Objectives

The main objectives of this study were:-

1. To study Technology Integration Proficiency scores of secondary school teachers of different academic streams.
2. To study Technology Integration Proficiency scores of secondary school teachers with different levels of Computer Competence.
3. To study the interaction effect of teacher's type of academic streams and different levels of Computer Competence on Technology Integration Proficiency scores.

Hypotheses

Hypotheses related to Technology Integration Proficiency scores of secondary school teachers with respect to different levels of Computer Competence.

2 x 3 ANOVA was employed to analyse Technology Integration Proficiency scores of secondary school teachers with respect to different levels of Computer Competence. The following Null Hypotheses was tested through this analysis:-

Ho 1: There is no significant difference between Technology Integration Proficiency scores of secondary school teachers of different academic streams.

Ho 2: There is no significant difference between Technology Integration Proficiency scores of secondary school teachers with different levels of Computer Competence.

Ho 3: There is no significant interaction between type of academic streams and different levels of Computer Competence with regard to Technology Integration Proficiency scores.

Design

The study employed descriptive survey method of research. A 2X3 Factorial Design was employed and the dependent variable was Technology Integration Proficiency scores of Secondary school teachers. The independent variables in the 2X3 ANOVA design were:

Type of Academic Streams

- Science/ Mathematics
- Social Science/ Languages

Different levels of Computer Competence

- Low
- Moderate
- High

The 2X3 ANOVA design was employed to study Technology Integration Proficiency of Secondary schoolteachers in relation to their Computer Competence.

Sample

Stratified Sampling Technique was employed in the present study. Thirty-seven Government High Schools and Government Senior Secondary Schools were randomly selected from Chandigarh, provided they had computer and Internet facility. From these thirty-seven schools, 392 secondary school teachers were selected belonging to two different academic streams i.e. science/mathematics (162) and social science/ languages (230).

Tools Used

The following tools were used to collect the data:-

- Technology Integration Proficiency Scale (developed by the investigator)
- Computer Competence of School Teachers Questionnaire by Bhalla (2014)

Results and Discussions

Table 1: Number of teachers (with labels) in the academic streams and different levels of Computer Competence

		Value Label	NUMBER
STREAM	1	MATH-SC	162
	2	SST-LANG	230
COMPUTER COMPETENCE	1.00	LOW	107
	2.00	MOD	178
	3.00	HIGH	107

Table 2: Means and S.D.'s of sub samples of Technology Integration Proficiency scores in relation to academic streams and different levels of Computer Competence

Computer Competence	Academic Streams	
	Social Science/Languages	Maths /Science
Low	Mean: 162.17 S.D. : 20.720 N : 64	Mean: 158.23 S.D. : 24.509 N : 43
Moderate	Mean: 166.86 S.D. : 17.461 N : 111	Mean: 166.75 S.D. : 19.291 N : 67
High	Mean: 175.91 S.D. : 17.557 N : 55	Mean: 179.58 S.D. : 19.122 N : 52
Total	Mean: 167.72 S.D. : 19.034 N : 230	Mean: 168.60 S.D. : 22.230 N : 162

Table 3: Summary of 2X3 ANOVA for Technology Integration Proficiency scores of secondary school teachers in relation to different levels of Computer Competence

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	16933.820a	5	3386.764	8.974	.000
Intercept	10167592.423	1	10167592.423	26942.636	.000
STREAMS	1.449	1	1.449	.004	.951
COMPUTER COMPETENCE	16640.867	2	8320.434	22.048	0.01*
STREAM * COMPUTER COMPETENCE	758.554	2	379.277	1.005	.367
Error	145668.402	386	377.379		
Total	11237501.000	392			
Corrected Total	162602.222	391			

a. R Squared = .104 (Adjusted R Squared = .093)
b. * Significant at 0.01

Main Effects

Streams

F ratio (0.004) for the difference in the Technology Integration Proficiency for secondary school teachers of different streams was not found to be significant. This suggests that secondary school teachers of different streams exhibited comparable Technology Integration Proficiency scores. Therefore, Ho 1 stands accepted i.e. there is no significant difference between Technology Integration Proficiency scores of secondary school teachers of different academic streams.

Computer Competence

F ratio (22.048) for the difference among secondary school teachers' Computer Competence with respect to the Technology Integration Proficiency was found to be significant at 0.01 level of confidence. Therefore, Ho 2 stands rejected and we infer that there is a significant difference between Technology Integration Proficiency scores of secondary school teachers with different levels of Computer Competence.

Further t-test was employed to identify different levels at which Computer Competence becomes significant.

Table No. 4 : t- test among Maths/Science secondary school teachers with low, moderate and high Computer Competence with respect to Technology Integration Proficiency scores

MSLCC (Maths-Science Low Computer Competence)

MSMCC (Maths-Science Moderate Computer Competence)

MSHCC (Maths-Science High Computer Competence)

	MSLCC (M=158.23)	MSMCC (M=166.75)	MSHCC (M=179.58)
MSLCC (M=158.23)		2.029*	4.767**
MSMCC (M=166.75)			3.613**
MSHCC (M=179.58)			

* Significant at 0.05 level

**Significant at 0.01 level

From the above-mentioned table 3, it was clear that significant difference was found among low, moderate and high Computer Competence of secondary school teachers of Maths/Science with respect to Technology Integration Proficiency scores. Table 3 indicates:

- Maths-Science teachers with moderate computer competence exhibited better technology integration proficiency scores as compared to Maths-Science teachers with low computer competence (t= 2.029)
- Maths-Science teachers with high computer competence exhibited better technology integration proficiency scores as compared to Maths-Science teachers with low computer competence (t= 4.767)
- Maths-Science teachers with high computer competence exhibited better technology integration proficiency scores as compared to Maths-Science teachers with moderate computer competence (t= 3.613)

So, this study provides sufficient evidence to reject Null Hypothesis Ho 2 as significant difference was found among Computer Competence scores of Maths/Science secondary school teachers with respect to their Technology Integration Proficiency scores.

Table No. 5 : t- test among Social Science – Languages secondary school teachers with low, moderate and high Computer Competence with respect to Technology Integration Proficiency scores

SLLCC (Social Science – Languages Low Computer Competence)

SLMCC (Social Science – Languages Moderate Computer Competence)

SLHCC (Social Science – Languages High Computer Competence)

	SLLCC (M=162.17)	SLMCC (M=166.86)	SLHCC (M=175.91)
SLLCC (M=162.17)		1.595	3.866**
SLMCC (M=166.86)			3.139**
SLHCC (M=175.91)			

**Significant at 0.01 level

From the above-mentioned table 4, it was clear that significant difference was found among low, moderate and high Computer Competence of secondary school teachers of Social Science – Languages with respect to Technology Integration Proficiency scores. Table 4 indicated that:

- Social Science – Languages teachers with moderate computer competence exhibited comparable technology integration proficiency scores as compared to Social Science – Languages teachers with low computer competence (t= 1.595)
- Social Science – Languages teachers with high computer competence exhibited better technology integration proficiency scores as compared to Social Science – Languages teachers with low computer competence (t= 3.866)
- Social Science – Languages teachers with high computer competence exhibited better technology integration proficiency scores as compared to Social Science – Languages teachers with moderate computer competence (t= 3.139)

So, this study provides sufficient evidence to reject Null Hypothesis Ho 2 as significant difference was found among Computer Competence scores of Social Science – Languages secondary school teachers with respect to their Technology Integration Proficiency scores.

Therefore, from Table No. 3 and Table No. 4, it is inferred that Ho 2 stands rejected as there is a significant difference between Technology Integration Proficiency scores of Maths /Science and Social Science /Languages secondary school teachers with different levels of Computer Competence.

So, the study suggests that there is a significant difference between Technology Integration Proficiency scores of secondary school teachers with different levels of Computer Competence.

Interaction Effects

Streams X Computer Competence

F- ratio for the interaction between Streams and Computer Competence was not found to be significant even at 0.05 level of confidence. This suggests that Streams and Computer Competence did not interact to yield significant difference in teacher's Technology Integration Proficiency scores. So this study could not provide sufficient evidence to reject the null hypothesis Ho 3. Hence, Ho 3 was retained as no significant interaction was found between Streams and Computer Competence of secondary school teachers with respect to Technology Integration Proficiency.

Educational Implications

- Teachers with high Computer Competence, be it in any of the academic streams, Maths /Science or Social Science /Languages have been found to have more TIP scores. Therefore, computer competence, the ability to use technological devices, makes the teacher confident to integrate technology in classrooms.
- Teacher Training is required, both at pre-service and in-service stage to make the use of technology in teaching , a continued process.
- If we want the education system to sustain in the 21st century, the teachers will have to be proficient in using technology as well as using technology in all the processes of teaching and learning.
- The barriers/hindrances need to be brought to light to overcome under utilization of technology in the classrooms.
- Irrespective of the academic streams the teachers belong to, they are at an equal footing when it comes to both computer competence as well as technology integration in the classrooms.

References

- Bhalla, J. (2014). Computer Competence of School Teachers. IOSR Journal of Humanities and Social Science, 19(1), 69-80
  Retrieved from http://iosrjournals.org/iosr-jhss/ on May 1, 2016
- Chapman, D.W., Garrett, A. & Mahlck, L.O.(2004) The role of technology in school improvement. In Chapman, D.W. & Mahlck, L.O. (Eds) (2004). Adapting technology for school improvement: a global perspective. International Institute for Educational Planning, Paris.
- Hidayat, F., Tanduklangi, A., & Badara, A. (2018). Teachers Perception Of Instructional Technology Integration Into English Language Learning. Journal of Language Education …, 3(2). Retrieved from http://ojs.uho.ac.id/index.php/JLEET/article/view/6680
- Lee, M., & Winzenried, A. (2009). The use of Instructional Technology in Schools. Australia : Acer press
- Scalise K. (2018) Next Wave for Integration of Educational Technology into the Classroom: Collaborative Technology Integration Planning Practices. In: Care E., Griffin P., Wilson M. (eds) Assessment and Teaching of 21st Century Skills. Educational Assessment in an Information Age. Springer, Cham.

https://doi.org/10.1007/978-3-319-65368-6_14

- Veerathanongdech, W. B. (2018). Barriers To Technology Integration For Teachers In Thai-Curriculum Schools. AU EJournal of Interdisciplinary Research (ISSN: 2408-1906), 3(1). Retrieved from http://www.assumptionjournal.au.edu/index.php/eJIR/article/view/4138
- Wenglinsky, H. (2001). Flunking ETS: How teaching matters. Education Matters, 1(2), 75-78. Princeton, NJ: Policy Information Centre. Educational Testing Service