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ICT Integration in Schools: The Invincible Role of School Leadership

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Abstract

With the advent of a new philosophy towards ICT and its role in education, a wide body of research has developed investigating the role of ICT and its effect in developing an interactive education environment. However it is yet to be ascertained how teachers from different schools across the state of Kerala have reacted to this paradigm shift from traditional pedagogical methods to adoption of ICT in Teaching and Learning process. It is also vital to understand the difference in trends across Private v/s Government schools. This study reveals stark differences in the implementation pattern with private schools leading with better infrastructural support and teacher readiness. School leadership is one of the major factors which have emerged as reasons for better ICT implementation in schools. This study tries to provide an understanding of the issues surrounding Technology acceptance by Teachers of government, aided and private higher secondary schools. This paper investigates the ground realities of ICT usage by school teachers for teaching and learning purposes and their perception on technology adoption. The paper also investigates the availability of basic ICT infrastructure facilities in different schools.

Keyword: ICT, Teaching and Learning Process, Technology Acceptance, School Leadership

Introduction

Information and communication technology initiatives in educational settings have been the topic of research for long now. The digital technology revolution has not only transformed the daily lives of people it has leveraged technology thought even in the field of education leaving the educationists searching for ways to utilize technology to enhance student learning. Students can be better engaged in honing their critical thinking skills, while learning process through high-quality digital standards based content, personalized learning plans and professional development strategies. Teachers who form an inseparable part of the educational process may play an instrumental role in adopting such technology enabled teaching learning practices provided they possess the required expertise and have access to the necessary resources. Pelgrum and Law (2003) have stated that the terminology 'computers ' was replaced by 'IT' i.e., information technology in the late 1980s indicative of the shift of focus from computing to effective knowledge management. Followed by this development was the introduction of the term 'ICT' (information and communication technology) around 1992, when e-mail was popularized among the general public. According to a United Nations report (1999) ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services and other related information and communication activities. According to UNESCO (2002) information and communication technology (ICT) may be regarded as the combination of 'Informatics technology' with other related technology, specifically communication technology. The various kinds of ICT products are available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radiobroadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD ROMs etc. The author (Hew & Brush, 2007) gives a detailed report on the various integration barriers that

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have been documented in the literature over the previous years. These studies reveal that although teachers have a strong desire to integrate ICT in their teaching practice but there are several barriers to this integration. One such classification of barriers classifies these impediments as extrinsic and intrinsic. The extrinsic barriers have been named as time, access, training, resources and support. The intrinsic barriers have been categorized as attitude, belief, practice and resistance. Traditionally the school curriculum is designed around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favoring curricula that promote competency and performance. There is a shift from the emphasis on what the information is, to how the same could be presented illustriously before the learning audience. Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordable technologies (Oliver, 2000). The integration of information and communication technologies can help revitalize teachers and students. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. According to Zhao and Cziko (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005). Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2002) concludes that the benefits of ICT will be gained 'when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheeler, 2001). 'Teachers' competence in the technology use is critical in the success of ICT implementation. Lack of such expertise could lead to reluctance to use ICT tools in classrooms. The anxiety to use such technology may force Teachers to deny the usefulness and effectiveness of such implementations in the educational context. In contrast, teachers' confidence in using technologies supports their beliefs in technologies' contribution to teaching and individual development and the need to expand the application of ICT in the future (Bingimlas, 2009). A techno-savvy pool of teachers will have changed responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than dyadic teaching roles (Littlejohn et al., 2002).

Review of Literature

Various models have been found while reviewing the literatures relating to technology acceptance. To name a few there are the ICTIMS (Akbulut, Ferhan, & Kesim, 2007), TPACK framework (Mishra & Koehler, 2006). (Ottestad, 2013). The author posited that school leadership possessed various shades of different leadership styles which could be categorized as distributed, transformational and pedagogical. The author suggested the use of four indicators of possible inclination towards ICT in pedagogical practice namely digital practice, ICT maturity, Assessment & roles with ICT and Leadership for collaboration. The UTAUT is a unified model that was developed by Venkatesh et al (2003) based on social cognitive theory with a combination of eight prominent information technology (IT) acceptance research models. The EIGHT (8) variables examined in each study were coded as Performance expectation (PE), Effort expectancy (EE), Social influence (SI), and Facilitating condition (FC) Behavioral intention (BI), Attitude towards using ICT (AT), Anxiety (AX) and Self efficacy (SE). In another article, (Oye & Iahad, 2011) authors talk about understanding why people accept or reject new information or communication technology has been one of the most challenging issues in the study of ICT acceptance model. There are numerous conditions to be met before ICT innovations can be introduced, adopted and diffused through higher education institutions (Ghalandari, 2012). The author emphasizes in this article that Performance expectancy is the degree to which individual believes that using the system will help him or her to attain gains in their job performance. The motivation of the behavior selection is determined by the desirability of the outcome. However, at the core of the theory is

the cognitive process of how an individual processes the different motivational elements. Computer Anxiety means evoking anxious or emotional reactions when it comes to performing a behavior using the technology. (Venkatesh & Davis, 2000) The authors stated perceived usefulness and identification were conveyed into a system of beliefs, which were developed by an individual's demographic background.Social influence means the degree to which an individual perceived that important others believe he or she should use the new system. (Hart & Henriques, 2006) The authors talk about five facilitating conditions constructs that are examined: internal support, external support, top management support, organizational characteristics and DSS package characteristics. The findings show a relationship between the top management support and organizational characteristics constructs and perceived usefulness. Facilitating condition means the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. (alharbi, 2013) This study examined teachers' attitude towards integrating technology in Saudi Arabia and the United States. There are several factors and challenges for teachers and schools to adapt or integrate technology. And there were also similarities and differences between the preparation and practices of teachers in respected countries. Teachers, who become the main focus during the process of integrating these technologies into the curriculum, face several obstacles when trying to integrate technology into their curricula. Attitude towards using technology can be defined in simple meaning as an individual's overall affective reaction to using a system. (jamil, 2010) The author in his study seeks to investigate the attitudes of teachers towards the use of ICT for educational purposes by teachers in Jordanian rural secondary schools and its contributions to the body of knowledge regarding the level of ICT use also. Here the results were consistent with those previously reported in studies related to the use of ICT in the educational settings. (sabzian & gilakjani, 2013) The author in his paper examines how teachers understand the use of computer technology resources in English language teaching. And also aims to define the teachers' attitudes, computer technology training and discuss computer technology and professional development.

Objectives

- To compare the existing infrastructural support available in schools for the implementation of ICT in the teaching learning processes.
- To investigate any attitudinal differences towards use of ICT and the perception of worthwhile outcomes among teachers of various secondary and higher secondary schools.

The following hypothesis were tested in the study,

H1: Performance Expectancy varies with type of school

H2: Attitude towards using ICT is different across categories of type of school

H3: Facilitating Conditions are different across categories of type of school

Research Methodology

The data was collected using a structured research instrument to obtain results relating to the demographics of the respondents and the respondents perception of different dimensions leading to acceptance of technology.

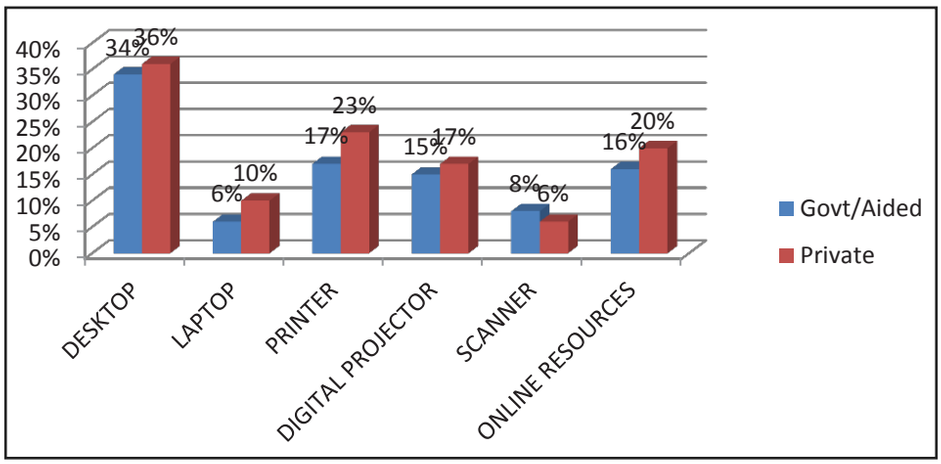
The questionnaire was developed after thorough review of literature. The structured questionnaire contained the questions to elicit information based on the various issues related to technology integration in schools. The survey was conducted using print copies of structured questionnaire which were circulated among school teachers from secondary and higher secondary government, aided and private schools in Cochin, an urban city of Kerala. Most of the questions used were 5-point Likerttype to record the ICT usage pattern of school teachers. The sampling method used for the study was of convenient sampling with an equal proportion of respondents from Government/Aided and private schools so as to facilitate a comparative analysis of usage of technology by these teachers in different schools. Chi-Square tests followed by non-parametric test, Mann-Whitney U Test were performed for testing the significance of the postulated hypothesis to establish the differences in the pattern of technology acceptance by teachers from different schools.

Analysis and Discussion

A detailed analysis of the collected data revealed a remarkable difference in the ICT resource availability in the two categories of schools. The following table given below shows the private schools has reported a stronger resource base.

Table 1 ICT resources in Govt. & Aided schools VS Private Schools (source: Primary data)

A. The table below shows the availability of ICT resources in private and Govt./Aided schools



B. Performance Expectancy: is the degree to which individual believes that using the system will help him or her to attain gains in his/her job performance. A cross tabulation of respondents performance expectancy scores across different types of schools was attempted, which is reflected in table 2.

Table 2 Crosstabulation Performance Expectancy across Different Types of Schools (source: Primary data)

		High Performance Expectancy	*Very High Performance Expectancy*	
	Count	38	11	50
	% within Type of school	76.0%	22.0%	100.0%
Govt. & Aided	% within pe_new	63.3%	28.2%	50.0%
	Count	22	28	50
	% within Type of school	44.0%	56.0%	100.0%
Private	% within pe_new	36.7%	71.8%	50.0%
	Count	60	39	100
	% within Type of school	60.0%	39.0%	100.0%
Total	% within pe_new	100.0%	100.0%	100.0%

The table 2 indicates the grouped performance expectancy score of teachers across various types of schools. Performance expectancy score which varied from minimum of 7 to a maximum of 15 was grouped into two categories of high indicated by'2' and very high indicated by'3'. It can be observed from the table that 76% of the teachers from government schools reported high performance expectancy while 72% of private school teachers reported very high performance expectancy scores.

Table 2a

Chi-Square Test:	*Value*	*Df*	*Asymp.Sig(2-sided)*
Pearson Chi-Square	12.677	2	.002

The Chi-Square test was found to be significant, proving statistically that there were variations in the performance expectancy scores of teachers from different types of schools. To further confirm this difference hypothesis testing was conducted using the Mann - Whitney U test.

The following hypothesis were tested

H1: Performance Expectancy varies with type of school.

H0: Performance Expectancy is same across different of type of school.

Table 3. Mann-Whitney U test for Performance Expectancy across different type of schools (source: Primary data)

Ranks				
	Type of school	*N*	*Mean Rank*	*Sum of Ranks*
Performance-Expectancy	Govt.& Aided	50	41.56	2078.00
	Private	50	59.44	2972.00
	Total	100		

Table 3a

Test Statistics[a]	
	Performance Expectancy
Mann-Whitney U	803.000
Wilcoxon W	2078.000
Z	-3.246
Asymp. Sig. (2-tailed)	.001
a. Grouping Variable: Type of school	

The test proved significant with alternate hypothesis (H1) being accepted i.e. performance expectancy of teachers towards use of ICT varied with type of school. It was observed in the table 3a that the mean rank of performance expectancy of private school teachers was more than the government school teachers.

Cross Tabulation of Attitude towards use of ICT with type of school

Table 4 A Cross Tabulation Attitude towards use of ICT Across Different Types of Schools (source: Primary data)

High Very High			*Attitude in using ICT*		*Total*
Type of school	Govt.& Aided	Count	13	37	50
		% within Type of school	26.0%	74.0%	100.0%
		% within attitude new	76.5%	44.6%	50.0%
		% of Total	13.0%	37.0%	50.0%
	Private	Count	4	46	50
		% within Type of school	8.0%	92.0%	100.0%
		% within attitude new	23.5%	55.4%	50.0%
		% of Total	4.0%	46.0%	50.0%
Total		Count	17	83	100
% within Type of school			17.0%	83.0%	100.0%
% within attitude new			100.0%	100.0%	100.0%
% of Total			17.0%	83.0%	100.0%

From the above table it can be seen that the majority of private school teachers had a very high Positive attitude towards use of ICT with 92% of the private school teachers falling in the very high score. A hypothesis testing to confirm the difference in teacher's attitude towards using ICT was done using the Mann-Whitney U test. The table below shows a summary of findings.

Table 4a Chi-Square Statistic Supporting the cross Tabulation

Chi-Square Tests	*Value*	*Df*	*Asymp.Sig(2-sided)*
Pearson Chi-Square	5.741	1	.017

Table 5 Mann-Whitney U test for Attitude towards using ICT across different type of schools (source: Primary data)

Ranks				
	Type of school	*N*	*Mean Rank*	*Sum of Ranks*
AttitudeTowardsUsingICT	Govt. & Aided	50	43.89	2194.50
	Private	50	57.11	2855.50
	Total	100		

Table 5a Mann-Whitney U test for Attitude towards using ICT across different type of schools (source: Primary data)

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of AttitudeTowardsUsingICT is the same across categories of Type of school.	Independent-Samples Mann-Whitney U Test	.009	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The following hypothesis was tested:

H2: Attitude towards using ICT is different in different type of schools

H0:Attitude towards using ICT is same across different types of schools

The test proved to be significant with the acceptance of the alternate hypothesis H2i.e. the attitude towards using ICT among teachers varied with type of school.

Cross tabulation of Facilitating Conditions with type of school

Facilitating conditions indicated the technology readiness of the schools as reported by the various teachers from government and private schools that were part of this study.

Table 6 Cross Tabulation Facilitating conditions for the use of ICT across Different Types of schools(source: Primary data)

			FacilitatingNew		
			High	*Veryhigh*	*Total*
Type of school	Govt. & Aided	Count	6	44	50
		% within Type of school	12.0%	88.0%	100.0%
		% within Facilitating_ New	25.0%	57.9%	50.0%
		% of Total	6.0%	44.0%	50.0%
	Private	Count	18	32	50
		% within Type of school	36.0%	64.0%	100.0%
		% within Facilitating New	75.0%	42.1%	50.0%
		% of Total	18.0%	32.0%	50.0%
Total		Count	24	76	100
	% within Type of school		24.0%	76.0%	100.0%
	% within Facilitating New		100.0%	100.0%	100.0%
	% of Total		24.0%	76.0%	100.0%

Table 6a Chi-square test(source: Primary data)

Chi-Square Tests	*Value*	*Df*	*Asymp. Sig (2-sided)*
Pearson Chi-Square	*7.895*	1	*.005*

The cross tabulation tables 6 and 6a show there is a significant difference in the perception about facilitating conditions in schools that are needed for ICT implementation vary with the type of school. To further confirm the results a hypothesis testing was done using Mann-Whitney U Test.

The following hypothesis were tested.

H3: Facilitating Condition is different across categories of type of school.

H0: Facilitating Condition is same across categories of type of school.

Table 7 Mann-Whitney U test for Facilitating Conditions for using ICT across different type of schools (source: Primary data)

Ranks				
	Type of school	*N*	*Mean Rank*	*Sum of Ranks*
Facilitating-Condition	Govt. & Aided	50	58.89	2944.50
	Private	50	42.11	2105.50
	Total	100		

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of AttitudeTowardsUsingICT is the same across categories of Type of school.	Independent-Samples Mann-Whitney U Test	.009	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 7a Mann-Whitney U test for Facilitating Conditions across different type of schools (source: Primary data)

The test was found to be significant and alternative hypothesis i.e. Facilitating Condition varied with the type of schoolwas proved statistically.

Results and Discussions

Out of total 100 respondents, majority of the respondents, i.e. 47% were in the age category 36 to 45 years and reported high usage of ICT. Almost 50% of the respondents had 10.5 to 20 years of teaching experience. The study also found that 67% respondents hailing from the urban areas of the city had higher performance expectancy scores, 20% of teachers stayed in semi urban areas, and 13% of teachers hailed from rural areas. Comparing the rate of ICT resources based on the availability for use in Private and Govt. / Aided schools, Private schools were more ICT ready. Performance Expectancy, attitude towards using ICT and facilitating conditions varied significantly with type of school and private school teachers had higher score for each of these. The analysis further also showed that teachers from urban and semi-urban regions showed a keener attitude towards use of ICT, when compared to teachers hailing from rural areas. Social influence emerged as a significant predictor of ICT use by the teachers.

Conclusion

This study provides an insight into ground realities of actual ICT usage by school teachers for curriculum delivery. The analysis of the various dimensions of the ICT integration in these higher secondary schools revealed that the performance expectancy score was much higher for private school teachers as compared to the government and aided school teachers. Likewise the score for facilitating conditions and attitude towards using ICT all were found to be significantly higher in teachers from the private schools. These findings point at the importance timely interventions by the school leaders to promote, facilitate and monitor the pedagogical implementation of ICT in schools. The study found that teachers found it difficult to incorporate lessons using ICT due to various practical reasons as well, namely the lack of adequacy of resources, lack of time, the large class population particularly in the government schools etc. Some schools also reported the lack of curriculum support for various subjects which restricted the use of technology in these areas. Further research is necessary to bring to light various ways in which the integration of ICT into the school curriculum could be better streamlined.

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