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Impact of Information and Communication Technologies Based Initiatives: An Attitudinal Change in Students and Teachers

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Abstract

There is curiosity and awareness throughout the world regarding the role of Information and Communication technologies. This is felt in each and every section of society. Several studies have confirmed and considered information and communication technology's significance in the field of education. It has not only affected learners but also to the teachers. This paper explores how ICT-based projects affect teachers' and students' attitudes. The data was collected through self-prepared attitude scale. It was distributed among the teachers and students of various schools. Two hundred students and one hundred twenty teachers responded to the questionnaire. Analysis was done through the data collected from the teachers as well as from students. The study's conclusions demonstrated that while there was no significant variation in the attitudes of teachers utilizing different ICT-based programs, there was a substantial difference in the students' attitude toward learning with different ICT-based programs.

Keywords

ICT Based Initiatives, ICT, Teacher's Attitude, Student's Attitude

1. Introduction

All educational institutions are rapidly adopting information and communication technology (ICT) in one or the other way. Education systems around the world are forced to embrace ICT and integrate it into their learning environments due to globalization and the knowledge-based economy; the Indian educational system is no exception. These days, technology plays a significant and essential role in schooling. We can say that it has matured quite a lot. It is essential that all

educators accept and apply it effectively in the classroom in order to achieve success and proper implementation of curricular goals. The numerous components that go into integrating ICT into educational systems, such as those related to the technological and human aspects of the integration (such as instructors, ongoing assistance, trainers, and headmasters), account for a significant portion of its complexity [1]. The growing need and use of ICT also demand the preparation from teacher's side. It is now very essential for the teachers to have sound and working knowledge of these resources. The knowledge and preparation of teachers for ICT also influence students' performance and engagement.

2. Review of Related Literature

It was reported that the student-teachers lacked the necessary competence in the full implementation of ICT in the curriculum [2] [3]. This underscores the need to improve the ICT contents of teacher education programs in universities in developing nations. Some researchers investigated how teachers' ICT use was correlated with their attitudes about ICT and technological proficiency [4]. They discovered that the teachers' attitude toward ICT and the amount of ICT they utilize are positively correlated. While others investigated how instructors, both those who used and those who were passive and didn't feel about ICT in connection to the subjects they taught in school [5]. It was found in the study that teachers who used ICT had a much more positive opinion of it than those who didn't. In relation to the subjects they taught in school, they also had a more positive opinion of ICT. According to research by Ana Belen Sanchez *et al.* (2012), in-service instructors showed a very positive attitude toward ICT. It investigated that the attitudes of teacher educators on ICT. The study found that men's attitudes regarding ICT were more positive than women's [3] [6].

3. Need and Significance of the Study

It is often assumed that ICTs can empower teachers and students, encourage change, and facilitate the development of "21st-century skills", although researches to back up these claims are currently scarce. ICT has enormous promise in education. It helps a teacher to reach a large number of students in an efficient and effective manner by making them more current and lively. Indeed, statistics on the nature and scope of these challenges are limited in most places due to shortcomings of monitoring and evaluation tools and procedures for ICT use in schools and their influence on teaching and learning. Without review, future new programs and activities will be in vain. Furthermore, the success of any ICT endeavor rests on the mindset of students and teachers. With these ideas, researchers conducted the current study.

4. Objectives

1) To investigate the influence of ICT-based initiatives on students' attitudes towards ICT.

2) To compare student's attitude towards various ICT-based initiatives.

3) To identify the impact of ICT-based initiatives on teachers' attitudes towards ICT.

4) To compare teachers' perspectives towards different ICT-based initiatives.

5. Hypotheses

1) There is no significant difference in mean scores of attitudes of students of various ICT initiatives.

2) There is no significant difference in mean scores of the attitudes of teachers engaged with various ICT based initiatives.

6. Methodology

The current study is descriptive in nature and survey method has been used. All the students using ICT based initiatives in their schools in Lucknow District of Uttar Pradesh (India) constituted the population. 20 secondary schools related to each four projects namely TeachNext, Educomm, TataEdge and ICT initiatives at KV (Kendriya Vidyalaya) have been selected by systematic random sampling technique. Six teachers from each school were picked through random sampling. Ten students of class 9th were picked from each school. In this way, overall 20 schools, 120 teachers and 200 students were the sample of the study.

Tools

Two attitude scales one for students and another for teachers were prepared by the investigators. They were Likert scale having 50 items for teachers and students. There were five options—Strongly Agree, Agree, Uncertain, Disagree and Strongly Disagree for each statement.

7. Result and Discussion

7.1. Objective 1—To Investigate the Influence of ICT-Based Initiatives on Students' Attitudes towards ICT

The attitude of students was assessed using a scale for students comprise of 40 statements. The results were analyzed in percentage under five categories, as indicated in Table 1.

Table 1. Student's attitude (in %).

Attitude		Positive		Average		Negative	
	Overall	Num	%	Num	%	Num	%
Overall	200	82	41%	94	47%	24	12%
TeachNext	50	23	46%	24	48%	3	6%
Tata Edge	50	26	52%	22	44%	2	4%
Educomm	50	22	44%	21	42%	7	14%
ICT @ KV	50	11	22%	27	54%	12	24%

Attitude of students towards ICT which is presented in Figure 1 reveals that Students' general attitudes out of 200 students, 82 possess a positive attitude toward ICT (41%), 94 have an average attitude (47%), and 24 possess a negative view (12%). A further look at the chart shows that a significant portion of teachers, 47%, possess average opinion toward ICT.

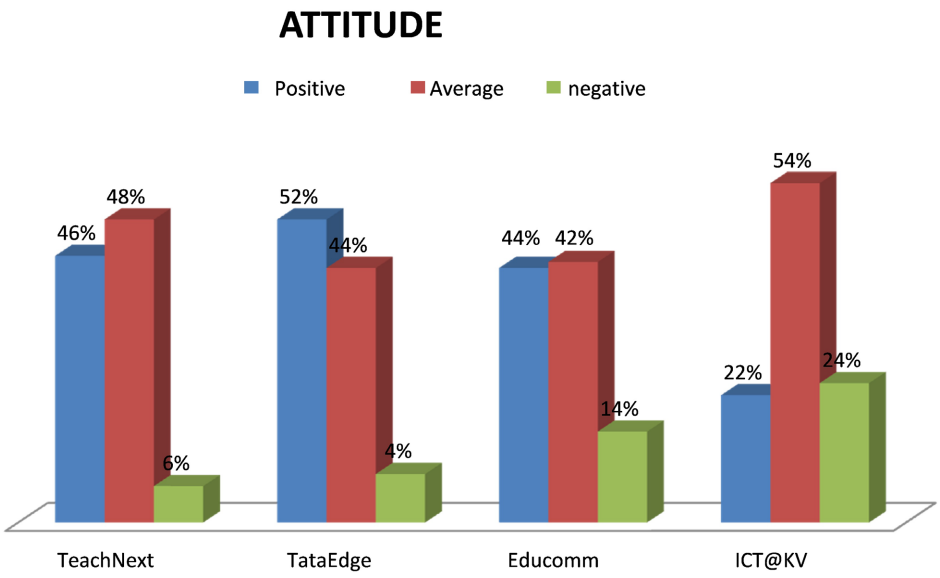

Figure 1. Students' general attitudes toward ICT.

In TeachNext initiatives, 46% teachers possess positive attitude, 48% possess an average and 6% possess negative attitude. In Tata ClassEdge initiatives, 52% teachers possess positive attitude, 44% possess an average, 4% possess negative attitude. In Educomp class initiatives, 44% of the teachers possess positive attitude, 42% possess an average, 14% possess negative attitude. In KV, 22% of the teachers possess positive attitude,54% possess an average, 24% possess negative attitude.

As per analysis, 47% of students possess an average attitude toward ICT, whereas 41% of students possess a positive attitude. Practically speaking, ICT initiatives are effective in altering instructors' perspectives. Students' attitudes regarding ICT are determined by how it is used in the classroom.

Additionally, the table shows that teachers' attitudes about various ICT-based initiatives vary. Students enrolled in the Tata ClassEdge program exhibit a more positive attitude than those enrolled in other programs. Compared to 46% of TeachNext, 44% of Educomp, and 22% of ICT initiatives at KV, 52% of students had positive attitude. There are 44% of its students have an average attitude compared to 48% of TeachNext, 42% of Educomp, and 54% of KV students. ICT is employed in practically every topic and by every teacher in these schools where the Tata ClassEdge project is in operation. Schools which have Tata ClassEdge program have a smaller number of negative attitude students *i.e.* 4% students average in comparison to 6% of TeachNext, 14% of Educomp solution and 24% of KVstudents.

7.2. Objective 2—To Compare Student's Attitude towards Various ICT-Based Initiatives

The hypothesis defined under objective number 2 that there is no significant difference between the attitudes of students studying under diverse ICT-based projects is tested using ANOVA.

Table 2. "F" value for various ICT based projects.

Source of Variation	Sum of squares (SS)	Df	Mean Square (MS)	F-value
BetweenGroups	12827.055	3	4275.685	
With-in Groups	32601.14	196	166.3323	25.70567
Total	45428.195	199		

The computed F value of 25.70 is obviously higher than Table 2 value of F at the 0.05 level of significance. The f-ratio value is 25.70567. The p-value is <0.00001. The result is significant at $p < 0.05$. Consequently, at the 0.05 level, the computed F value is significant.

Since the computed value of "F" is significant at the 0.05 level, it is evident that there is a substantial variation in the attitudes of students enrolled in various ICT-based programs. As a result, it may be concluded that the groups differ in how they see various ICT-based initiatives. Given that the "F" value is significant at the 0.05 level, the null hypothesis is disapproved. It indicates that at least two groups, or more than two groups, differ significantly from one another.

Post Hoc Tukey HSD has been calculated between the groups to ensure which groups are significantly different or not. The result has been shown in Table 3.

Table 3. Mean and Post Hoc Tukey HSD related to attitudes of teachers associated with various ICT based initiatives.

S.N.	Initiatives	N	Mean	H.S.D. (0.05 = 6.687)	Significance at 0.05 level
1	**Tata Classedge**	50	173.52	10.40	**Significant**
	Educomp	50	163.12		
2	**Tata ClassEdge**	50	173.52	18.72	**Significant**
	ICT@KV	50	154.80		
3	**Tata ClassEdge**	50	174.18	0.66	**Not significant**
	TeachNext	50	186.35		
4	**Educomp**	50	182.13	8.32	**Significant**
	ICT@KV	50	170.09		
5	**Educomp**	50	182.13	11.06	**Significant**
	TeachNext	50	186.35		
6	**ICT@KV**	50	170.09	19.38	**Significant**
	TeachNext	50	186.35		

In the Post Hoc Tukey HSD the value of HSD at 0.05 is 6.687. The mean of the attitude of students studying from Tata ClassEdge and Educomp class are 173.52 and 163.12 respectively. HSD for this group is 10.40 which is significant at 0.05 level. The mean score of students' attitude of Tata ClassEdge and ICT initiatives at KV are 173.52 and 154.80 respectively and HSD for this group is 18.72 which is significant at 0.05 level. The mean score of the students' attitude studying from Tata classEdge and TeachNext are 187.53 and 186.35 respectively. HSD for this group is 0.66 that is not significant. The mean score of the students' attitude studying from Educomp classes and ICT initiatives at KV are 182.13 and 170.09 respectively. HSD for this group is 8.32 that is significant. The mean of the students' attitude studying from Educomp classes and TeachNext are 182.13 and 186.35 respectively. HSD for this group is 11.06 that is significant. Students from ICT initiatives at KV and TeachNext have mean attitudes of 170.09 and 186.35, respectively. HSD for this group is 19.38 that is significant.

According to the findings, students' attitudes toward ICT initiatives at KV and Tata ClassEdge, TeachNext, and Educomp classes varied significantly.

Numerous factors influence how pupils feel about ICT. The current disparity in the attitudes of students in private and public schools toward ICT may be caused by a number of factors, including the availability of appropriate ICT tools, the frequent use of ICT-based projects in the classroom, the proficiency of the teachers, and the successful integration of ICT-based projects with the curriculum. In contrast, students generally exhibit a more favorable attitude towards ICT, particularly regarding its perceived usefulness and ease of use in enhancing their academic and social experiences. The technology acceptance model highlights that students' readiness to adopt ICT can vary significantly based on their experiences and the relevance of technology in their lives. For example, while students in conflict situations such as Palestine showed enthusiasm for e-learning, practical barriers still limited their adoption [7].

Facilities related to infrastructure and teachers' readiness to use ICT in the classroom are critical elements that influence students' attitudes toward ICT.

7.3. Objective 3—To Identify the Impact of ICT-Based Initiatives on Teachers' Attitudes towards ICT

Teachers' attitude has been analysed on the basis of the percentage under five categories, which is presented in **Table 4** and **Figure 2** and **Figure 3**.

Table 4. Attitude of teachers.

Attitude/Initiatives	Overall	Positive		Average		Negative	
		N	%	N	%	N	%
Overall	120	52	43%	55	46%	13	11%
TeachNext	30	13	43%	15	50%	2	7%
Tata Edge	30	15	50%	12	40%	3	10%
Educomp classes	30	14	47%	14	47%	2	6%
ICT @ KV	30	10	33%	14	47%	6	20%

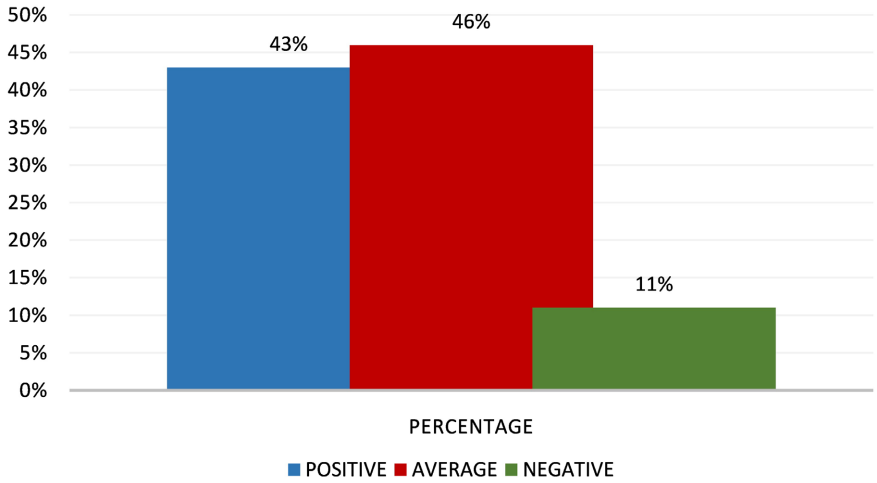

Figure 2. Bar diagram of percentage wise distribution of attitude of teachers.

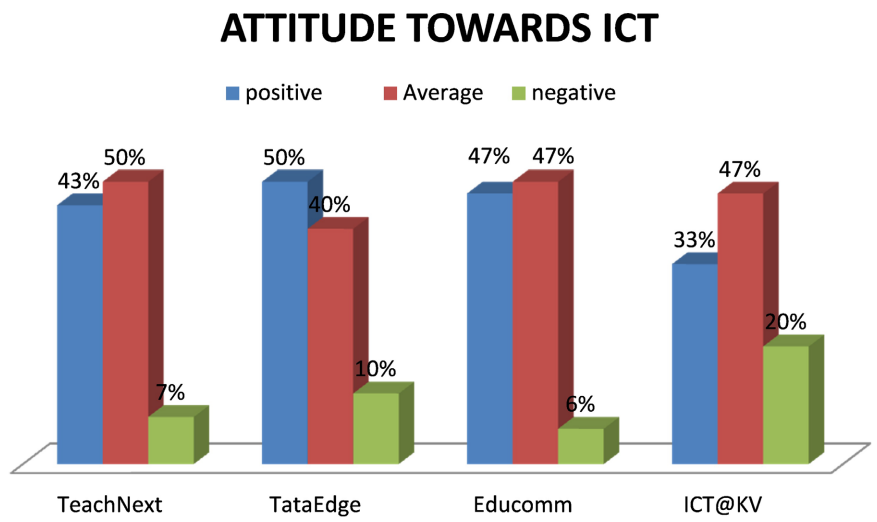

Figure 3. Bar diagram of attitude of teachers.

It demonstrates how teachers feel about ICT in general and ICT-based programs in particular. Out of 120 teachers, 52 (43%) have a positive attitude toward ICT, 55 (46%) have an average attitude, and 13 (11%) have negative opinion. A further look at the data shows that a significant portion of teachers, 46%, have neither a good nor a negative opinion toward ICT. The project wise study of attitude of teachers towards ICT based projects reveals that:

1) In the TeachNext projects, 43% of the teachers have positive attitude, 50% have average and 8% have negative attitude.

2) Under the Tata ClassEdge project, 50% of the teachers have positive attitude, 40% have an average, 10% have negative attitude.

3) Under the Educomp class project, 47% of the teachers have positive attitude, 47% have an average, 6% have negative attitude.

4) Under the ICT @ KV project, 33% of the teachers have positive attitude, 47% have an average, 20% have negative attitude.

The above analysis indicates that 43% of teachers have a positive attitude towards ICT, 46% have an average attitude, half have a neutral or average attitude, and 11% have negative attitude.

Teachers with a positive attitude are more likely to succeed in teaching and implementing ICT-based projects in their institutions. The majority of teachers agreed that ICT is an innovative instrument with the potential to significantly improve the teaching and learning process. ICT-based projects have substantially affected teachers' attitudes about ICT. Research indicates that teachers' attitudes towards ICT are generally positive, yet they are significantly influenced by internal factors such as technological literacy, perceptions, and beliefs. For instance, the shift from traditional teaching roles to facilitators of technology-enhanced learning necessitates not only a positive attitude but also the capability to effectively integrate ICT into their pedagogical practices.

However, barriers such as insufficient training and lack of confidence often hinder teachers from fully embracing technology. This is echoed in findings from Cyprus, where despite advanced infrastructure, teachers encountered challenges that negatively impacted their attitudes towards ICT integration [8]. Similarly, research in Indonesia revealed that while teachers expressed a positive attitude towards ICT, inadequate knowledge and skills impeded effective integration. [9] Various other factors like age, lengthy syllabus, and lack of technological awareness and fear of accepting new technology may be the reasons for the average attitude of teachers towards ICT.

7.4. Objective 4—To Compare the Attitude of Teachers Dealing with Different ICT Based Projects

From Table 5, the calculated F value is 2.07 which is smaller than table value of F at 0.05 level which is 2.65. Therefore, the calculated F value is not significant at 0.05 level. The "F" value indicates that all the teachers have a similar attitude towards the ICT.

Table 5. "F" value related to attitudes of teachers.

Source of variation	SS	Df	MS	F-value
BetweenGroups	1214.7	3	404.9	
WithinGroups	22617.26	116	194.97	2.07
Total	23831.96	119		

The findings indicate that there is no significant variation in teachers' attitudes about ICT while dealing with diverse ICT-based initiatives. They all recognize the value of ICT in the teaching-learning process. They all use ICT in the classroom, which has helped them improve their teaching as well as their professional development.

The findings indicate that there is no substantial variation in attitudes among teachers engaging with diverse ICT-based projects. The lack of significant differences

in attitudes could be attributed to teachers' similar readiness to embrace technology, the nearly identical nature and form of ICT-based projects, intensive training of ICT tools and project management and the presence of a technology culture in schools.

8. Conclusion

In conclusion, while both students and teachers exhibit generally positive attitudes towards ICT, various barriers significantly influence the effective integration of technology in education. Teachers' views about adopting ICT have been found to be positive, yet a significant proportion of teachers' attitude remain average or low. Teachers are hesitant to embrace ICT in their teaching processes, most likely due to lack of information about technology and insufficient training to use such ICT programs effectively. Schools that lack adequate training facilities, ICT infrastructure and well-defined regulations for the use of ICT projects in the classroom foster negative attitudes about ICT programs among both teachers and pupils. Addressing these barriers through targeted training, ongoing professional development, and supportive institutional frameworks is essential for fostering a more positive attitude towards ICT among educators and learners. The interplay between teacher and student attitudes highlights the importance of a collaborative approach to enhance the overall educational experience through technology. Future research that delves deeper into these dynamics will be crucial in advancing the effective use of ICT in educational settings.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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