

## Determinants of ICT Integration in Quality Enhancement of Teaching Learning Process: A Study of Perspective of in-Service Teachers

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### Abstract

*The Digital India Campaign is playing a very significant role in transforming our nation into a digitally empowered society and knowledge economy. While education plays a critical role in this transformation, in return, ICT plays an important role in improving educational processes and outcomes. Thus, the relationship between ICT and education is bidirectional. ICT is no substitute but now highly considered as a powerful tool for teachers & learners in teaching-learning process. Teachers use ICT for making teaching-learning process more interesting, creative and effective. In this paper, the researcher explored the factors that determine the integration of ICT in teaching-learning process at school level based in Delhi. Descriptive survey research design was implemented in the study. The focus of the study was on identifying the factors that influence teachers teaching strategies and lead to effective and efficient integration of ICT for enhancing the quality of teaching-learning process. A self-constructed questionnaire was employed on 50 in-service teachers having 2-year B.Ed. (General) degree to know their perception about competencies, knowledge, confidence, strategies and pedagogical skills used to integrate ICT in teaching-learning process. The data was analyzed using descriptive statistics like mean, SD and percentile. The findings of the study revealed that most of the sampled in-service teachers perceived that integrating ICT enhances the quality of teaching-learning process. The determinants of ICT integration that were found to enhance the quality of teaching-learning process are teachers' self-efficacy, attitude, accessibility of ICT facilities and resources, and teachers' competencies and pedagogical skills*

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### I. INTRODUCTION

The 21st century is considered as information technology century. ICT is becoming a part and parcel of human life. ICT is very useful in almost all areas of human life. Every aspect of life is related to science and technology. Huge flow of information is emerging in all fields throughout the world. Now information & communication technology is rigorously used in educational field for making teaching-learning process successful and interesting for both learners and teachers. In addition, ICT can enhance teaching and learning through its dynamic and interactive approach which provides real opportunities for individualized instructions. In fact, innovative use of ICT can facilitate student-centered learning. It also has the potential to accelerate, enrich skills, motivate, and engage students in learning, strengthens teaching as well as provides opportunities for connection between the school and the world (Davis & Tearle, 1999). Hence, every teacher should use technologies to enhance students' learning so that it can encourage thinking, decision-making, problem-solving, reasoning and higher order thinking skills (Grabe & Grabe, 2001). The use of ICT as a tool of everyday life enhances the quality of student learning. Along with a shift of curricula from content-centered to competence-based, the mode of curricula delivery has now shifted from teacher-centered to student-centered supported with ICT (Yusuf, 2005).

Now the NPE 2020 policy mainly emphasizes on the use of ICT in teaching-learning process and the integration of

technologies to improve multiple aspects of education. An autonomous body, the National Educational Technology Forum (NETF), will be created to provide a platform for free exchange of ideas on the use of ICT to enhance learning, assessment, planning, administration, and so on, both for school and higher education. The aim of NETF will be to facilitate decision making on the induction, deployment, and use of technology.

The effective integration of ICT in the teaching-learning process with the intent of positively influencing teaching and learning has been developed over the past two decades. This can be realized through changing the way people access, gather, analyze, present, transmit, and simulate information. ICT is considered as an effective tool to support educational objectives such as skills for searching and assessing information, cooperation, communication, and problem solving which are important for the preparation of learner for the knowledge society (Kozma, 2003).

In the light of a review of past studies, it has been found that a number of researches have been conducted on the determinants of ICT integration in teaching-learning process. Some determinants of ICT integration reported in past studies included teacher's attitude, self-efficacy, pedagogical skills, knowledge of ICT skills and belief towards the integration of ICT in teaching-learning process.

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the age group of 18 to 20 years was found to be 38 per cent. There were 18.7 per cent of the respondents in the age group of 20 to 22 years whereas 8 per cent of the respondents were pertaining to the age group of above 22 years. It could be understood that 23.3 per cent of the sample respondents were studying in the 1st of UG degree course while 44 per cent of them were doing their 2nd of the degree course. The students studying in the 3rd of UG course represented 32.7 per cent of the total respondents. It is noted that 36.7 were studying in Government colleges; 12.7 per cent of them were students of Government aided colleges; and private college students participated in the survey constituted 50.6 per cent of the total respondents.

In order to fulfil the objectives of the study, further analysis has been made to examine the perception of the students towards teachers' role, students' cooperation and pedagogy and tools. The respondents have given responses for these statements in five point scale – strongly agree; agree; neutral; disagree; and strongly disagree.

### Teachers' Role

In this regard, the following variables have been included for the study for measuring the perception of students towards teachers' role.

1. Teachers explain the lessons well as in the traditional classes (T1)
2. Contents delivered are motivating the students (T2)
3. The way of delivering the contents is inspiring (T3)
4. Teachers help the students to follow the online classes (T4)
5. Teachers evaluate the performances of students and take measures for improvement of their performances (T5)

Table 2: Perception of Students Towards Teachers' Role

(N=150)

It is evident from the Table 2 that there has been significant difference in the perception of the students towards teachers' explanation of lessons as that of traditional classes. The perception of the students towards the 'contents delivered is motivating the students' are significantly different among the respondents. It is well implied from the results that there exists a significant difference in the perception of the UG students about 'the way of delivering the contents is inspiring'. It could be understood that the students had significant difference in their perception towards 'teachers help the students to follow the online classes'. The students' perception towards 'teachers evaluate the performances of students and take measures for improvement of their performances' is significantly different among them.

### Students' Cooperation

The students' perception on their cooperation towards the effectiveness of online classes has been measured with the following statements:

1. Students are attentive (S1)
2. Students interact with teachers more than the regular classes (S2)
3. Students follow the schedules properly (S3)
4. Students submit the assignments as per instructions (S4)

5. Students understand their role and attend the classes sincerely (S5)

Table 3: Perception Of Students Towards Teachers' Role

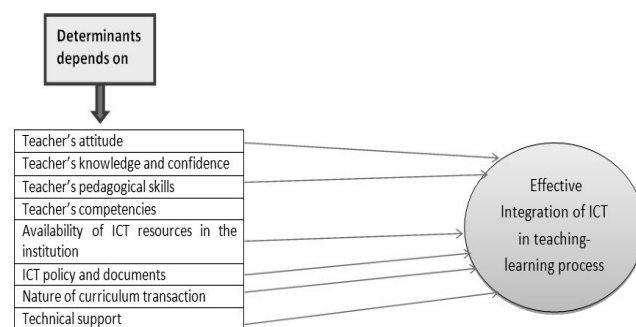
(N=150)

According to the Table 3, there was a significantly different perception among the students about their attentiveness. They have recorded significantly different perception towards 'Students interact with teachers more than the regular classes'. The perception given by the students about 'Students follow the schedules properly' is significantly different. There has been a significant difference in the perception of students towards submission of assignments as per the instructions. The students had different perception with reference to their understanding of their role and attending the classes sincerely.

### Contribution of Pedagogy and Tools

Apart from the teachers' role and students' cooperation, yet another factor is considered to be important in determining the efficacy of online classes – contribution of pedagogy and tools. The following statements have been considered for the current study:

1. Schedules for classes are informed well in advance (P1)
2. Classes are conducted according to the schedule (P2)
3. Teaching aids used are attractive (P3)
4. Lesson materials are very useful (P4)
5. Recorded videos help the students to learn repeatedly (P5)



These determinants of ICT integration into teaching-learning process enhance the quality of teaching-learning process and also enhance the outcome of learning objectives in classroom.

## II. METHODOLOGY

The descriptive survey research design was implemented for conducting the present study. Descriptive survey design is used for collecting information about people's attitudes, opinions, habits, or perception on a variety of education or social issues. Therefore, the researcher implemented this design as a guide to investigate the determinants of ICT integration in quality enhancement of teaching-learning process at school level.

### Description of the Sample

The sample consisted of 50 in-service teachers of two universities (one Central and one Private) having 2-year B.Ed. (General) degree and presently teaching in schools. The sample was chosen using simple random technique.

### Variables of the study

The perspective of in-service teachers towards the self-efficacy of determinants of ICT integration in quality enhancement of teaching-learning process was taken as the dependent variable of the study and the strategies and ICT resources utilization used by in-service teachers to enhance the quality of education was taken as the independent variable of the study.

### Measuring Instrument

A self-constructed scale having five dimensions with 20 items was used to know the perception of in-service teachers and identify the determinants of ICT integration in quality enhancement of teaching-learning process. The tool was based on 5-point Likert scale viz., strongly agree, agree, undecided, disagree and strongly disagree. The scale of each item required participants to express their views ranging from very high to very low represented by a scores from 5 to 1. The four sub-dimensions of the study were:

- (i). Use of ICT to enhance teachers' self-efficacy of teaching strategies and methodology in teaching-learning process.
- (ii). Use of ICT to enhance teachers' pedagogical skills and content knowledge.
- (iii). Use of ICT to develop 21st century skills & strategies in teachers.
- (iv). Use of ICT to enhance teachers' general and subject-specific competency.
- (v). Accessibility of ICT resources in the institution.

The tool was standardized with the help of ICT experts and experienced teachers in the field of teacher education.

### Procedure of Data Collection

Data was collected from the sample in one phase. The researcher took prior permission from the concerned authorities to collect data from the in-service teachers. After establishing a rapport with the respondents, the questionnaires were given to them and were given proper instructions to give their responses. The respondents took about an hour to complete the questionnaire.

### Statistical Analysis

The obtained data was analyzed using descriptive statistics such as Mean and Standard Deviation. The Mean score was calculating to know the level of perception of in-service teachers towards effective integration of ICT for quality enhancement of teaching-learning process. Standard Deviation was calculated to know the degree of heterogeneity in the responses of in-service teachers. Percentiles were also calculated to know the level of in-service teachers' perception.

Table 1: The researcher decided the percentile rank from 20 to 1. The researcher considered 20 ranks is equal to 100 percentages.

| Rank | Percentage | Scale         | Scores |
|------|------------|---------------|--------|
| 20   | 100        | Above average | 20-17  |
| 15   | 75         | Moderate      | 16-10  |
| 10   | 50         | Average       | 9-6    |
| 5    | 25         | Below average | 5-1    |

## III. RESULTS

The obtained data was analyzed using descriptive statistics and results are presented in the table 2 below. The study revealed that most of the sampled in-service teachers perceived that the use of determinants of ICT integration in teaching-learning process has a lot of potential to improve the quality of curricular transactions in the classroom, to enhance their teaching skills, and to facilitate learners' engagement in the teaching-learning process.

Table 2: Mean and Standard Deviation (SD) for in-service teachers' perspective towards determinants of ICT integration in quality enhancement of teaching-learning process

| Sub-Dimensions                                                                                                       | N  | Max. Possible Score | Mean  | SD    | Percentile Value       |
|----------------------------------------------------------------------------------------------------------------------|----|---------------------|-------|-------|------------------------|
| I. Use of ICT to enhance teachers' self-efficacy of teaching strategies and methodology in teaching-learning process | 50 | 20                  | 16.60 | 1.911 | P <sub>50</sub> =17.00 |
| II. Use of ICT to enhance teachers' pedagogical skills and content knowledge transaction in classroom process        | 50 | 20                  | 16.30 | 1.899 | P <sub>50</sub> =17.00 |
| III. Use of ICT to develop 21 <sup>st</sup> century skills & strategies in teachers                                  | 50 | 20                  | 15.06 | 1.811 | P <sub>50</sub> =16.00 |
| IV. Accessibility of ICT resources increase the quality of teaching-learning process                                 | 50 | 20                  | 15.20 | 1.866 | P <sub>50</sub> =16.00 |
| V. Use of ICT to enhance teachers' general and subject-specific competency and                                       | 50 | 20                  | 13.60 | 1.572 | P <sub>50</sub> =14.00 |

The values of Mean, SD and Percentile for the five sub-dimensions representing the five objectives of the study are interpreted below:

The mean score of dimension 'Use of ICT to enhance teachers' self-efficacy of teaching strategies and methodology in teaching-learning process' was 16.60, SD was 1.911 and the value of P<sub>50</sub> was 17.00. The mean value indicated an above average whereas the percentile value indicated a nearly high level of perspective of in-service teachers with regard this sub-dimension of the study with regard to self-efficacy, teachers' level of self-confidence had positive with ICT integration in the teaching-learning process. This result was consistent with the findings of Yuen and Ma (2008) who revealed that ICT utilization depends on perceived teachers' level of self-efficacy effectively determine in teaching-learning process. Sorgo (2010) also found positive correlation between ICT utilization and teachers' competence. He concluded that teachers' competence positively related to ICT integration in teaching-learning process. In addition to this, teachers' attitude had positive relationship ( $r = .71$ ) with regard to the use of ICT. This result is also consistent with the previous research findings which showed that teachers' actual ICT use related to their attitude (Keengwe & Onchwari, 2008; Lau & Sim, 2008). Thus it can be safely concluded that the in-service teachers perceived that ICT is moderately useful to enhance teachers' pedagogical skills and strategies in determinants of integration of ICT in teaching-learning process.

The mean score of dimension 'Use of ICT to enhance teachers' pedagogical skills and content knowledge transaction in classroom process' was 16.30, SD was 1.899 and the value of P<sub>50</sub> was 17.00. The mean value indicated an above average whereas the percentile value indicated a nearly

high level of perspective of in-service teachers with regard to this sub-dimension of the study. This finding reveals that the in-service teachers perceived that ICT is moderately useful to enhance teachers' pedagogical skills and content knowledge transaction in classroom process. In the same way, the findings show that of Almusalam (2001) and Lawton and Gerschner (1982) proved that teachers' attitudes have been found as the major factor to determine the use of new technologies in transaction of content in classroom settings. This implies that if teachers' attitudes are positive towards educational technology into education process, they can easily integrate ICT into their teaching and positively impact on the teaching style. Accordingly, teachers with positive attitude towards instructional technologies can foster and enhanced its integration in the classroom process (Van Braak et al., 2004).

The mean score of dimension 'Use of ICT to develop 21st century skills & strategies in competency of teachers' was 15.06, SD was 1.811 and the value of P50 was 14.00. These three values indicated an average level of perception of in-service teachers with regard to this sub-dimension of the study. With regard to teachers' competence, result indicates that teacher competence to use of ICT was average in inference of teaching skills and strategies in teaching process. So we can imply that teachers were competent in integrating ICT skills and strategies in teaching-learning process. This result was coherent with the findings of Berner (2003) who considered teachers' competence as the major factor in determining ICT utilization in teaching. In addition, teachers with didactic competences as significant factors of effective and efficient utilization of ICT in teaching-learning practices (Pelgrum, 2001). Hence, it can be safely concluded that the in-service teachers perceived that ICT is moderately useful to develop 21st century skills in teacher's competency.

The mean score of dimension 'Accessibility of ICT resources increase the quality of teaching-learning process' was 15.20, SD was 1.866 and the value of P50 was 16.00. These three values indicated an above average level of perception of in-service teachers with regard to sub-dimension of the study. The result shows that the mean scores of teachers' response about the accessibility of ICT is average. This suggests that ICT facilities such as interactive whiteboards, computers, projectors, Internet, scanner and printers, CD-ROM drives, laptop and I-pad to the class are accessible for teaching-learning activities. In this regard, the findings of Cowie and Jones (2005) indicated that the accessibility of ICT facilities encourage teachers to utilize in teaching process. Similarly, ICT infrastructure can be one of the factors that influence the use of technology among teachers (Shiue, 2007; Yildirim, 2007). Richardson (2000) also reported that many teachers integrated ICT into their teaching and learning process. Therefore, effective uses of technologies in teaching-learning process depend on the availability of sufficient hardware and software approaches. This leads to the conclusion that the in-service teachers perceived that ICT is moderately useful to enhance accessibility of ICT resources increase the quality of teaching-learning process.

The mean score of dimension 'Use of ICT to enhance teachers' general and subject-specific competence' was 12.32, SD was 1.572 and the value of P50 was 12.00 respectively. These values indicated a below average level of

perception of in-service teachers with regard to this sub-dimension of the study. This leads to the conclusion that the in-service teachers perceived that ICT is below moderately useful to enhance teachers' general and subject-specific competency.

The mean scores for each dimension of the study are depicted in figure 1 below:

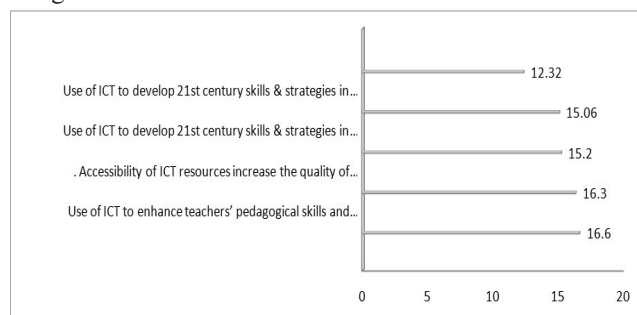


Figure 1: Graphical Representation of Mean Scores for the five dimensions of the Study

The percentile rank scores for each dimension of the study are depicted in figure 2 below:

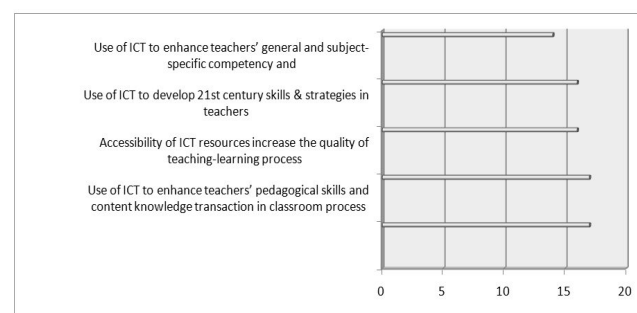


Figure 2: Graphical Representation of Percentile Scores for the five dimensions of the Study

#### IV. DISCUSSION AND RECOMMENDATIONS

The findings revealed that the perception of in-service teachers towards the effective integration of determinants of ICT in quality enhancement of teaching-learning process was moderate. As a whole the sample had moderately high perception towards the effective use of ICT determinants in enhancing teachers' pedagogical skills and strategies. They also perceived that the use of ICT to enhance teachers' pedagogical and content knowledge was effective to an average extent. The use of ICT to develop 21st century skills in teachers was also perceived by them as effective to some extent.

This finding also confirmed that the attitudes of teachers towards technology greatly influence their adoption and integration of ICT determinants into their teaching. Teachers' attitude plays an important role in the teaching-learning process that utilizes ICT. Also the in-service teachers perceived that the use of ICT had average effect on the enhancement of teachers' general and subject-specific competence.

An overall moderate perception of in-service teachers towards the effective integration of ICT determinants in quality enhancement of in-service teacher could be due to the reason that ICT was not being effectively used in their institutions. Another reason may be that the in-service teachers are habitual to be taught through conventional methods of teaching which can be accomplished with limited resources and does not require expertise of other knowledge of contents. It could also be that the in-service teachers are either techno-phobic or lack awareness of using ICT resources effectively to enrich the learning experiences of the learners.

The teacher educators play a very significant role in framing the perception of learner towards effective integrating determinants of ICT in quality enhancement of teaching-learning process. The reason for moderate perception of in-service teachers in this regard could be that the teacher educators themselves are not using ICT effectively in their daily teaching practices. The finding of this study is consistent with Yildirim (2007) who found that access to ICT facilities is one of the effective ways to enhance teachers' pedagogical skills use of ICT in teaching-learning process. They might either be reluctant to use ICT resources available to them or they lack the required competence to use ICT effectively which could be a reason for moderate perception of in-service teachers for effective use of ICT.

Another reason could be that both in-service teachers and learners are highly motivated to effectively integrate ICT to enhance the quality of content transaction in an interesting way and easily and effectively to understand the concept. Unfortunately the institutions themselves are lacking the required ICT resources or do not make them available to teachers to prevent damage of resources or to avoid making extra arrangements to use these resources such as keeping a technical assistant, providing a room enabled for using ICT resources effectively, etc.

All these probable causes could be the reasons for a moderate perception of in-service teachers towards effective integrating of determinants of ICT in quality enhancement of in-service teacher in teaching-learning process.

## V. CONCLUSION

Based on the findings of the present study, it could be concluded that integration of ICT in teaching-learning process is largely determined by teachers' self-efficacy, attitude towards ICT, the characteristics of technologies, accessibility of ICT facilities, and teachers' competence.

The effective and efficient use of ICT determinates in teaching-learning process enhances the teaching skills and strategies which primarily focus on inculcating 21st century skills and competencies in the teachers, and enhance and enrich their overall teaching experience. Significant development of ICT provides to transform ICT related skill and abilities in creative and dynamic ways in teaching-learning process. This knowledge, skill, strategy, confidence and attitude are the ones that teachers need to acquire throughout their life. These determinants enhance the professional competencies among the teachers.

The judicious use of ICT resources can potentially prove to be facilitative to transform the content and competencies and comprehension of teachers in dynamic way in classroom into a 21st century classroom. There is an urgent need for those directly or indirectly involved in teaching-learning process to critically reflect upon how they use ICT and related resources in teaching-learning process and how their usage can be modified or improved to obtain maximum benefits.

## VI. LIMITATIONS

This research may be limited to the knowledge and confidence of in-service teacher towards the competencies and self-efficacy of using ICT in teaching-learning process. This study limited to in-service teacher in real classroom process as well as teacher may be different aptitude regarding technologies in education, so that study only some parameter to check regarding the use of ICT in teaching-learning process.

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