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# The Influencing Factors of ICT Integration in Secondary School Education: A Review of Literature

Subhas Ch Mandi
Research Scholar, Dept. of Education, Bankura University
Email: chsubhas6@gmail.com
&
Dr. Chandni Sarkar
Assistant Professor and Ph.D. Supervisor, Dept. of Education, Bankura University

**Abstract**
*The employment of information and communication technology (ICT) in all levels of education has become indispensable in this 21st century. Many studies proved that the application of ICT in the teaching-learning process enhances the academic outcomes of learners. India's National Education Policy-2020 recommends that the stakeholders of education integrate ICT into the teaching-learning process to enhance the quality of education. In order to integrate ICT into the teaching-learning process effectively and sustainably, the stakeholders of school education, including teacher education institutions, teachers, students, parents, administrators, and state education department, must consider the influential factors of ICT integration. Effective integration of ICT in education can only be possible with the active participation of teachers who are the very important stakeholders of education. Keeping this view into consideration, the present study engaged in identifying the influencing internal factors of ICT integration in secondary school education from teachers' perspectives. The study systematically reviewed the relevant research articles from the academic database Google Scholar and various organizational reports from Google to attain the aforementioned research objective. It is found that ICT skills, self-efficacy, attitude towards ICT, perception, pedagogical knowledge, pedagogical belief, motivation are the major influential factors that have a great impact on teachers' ICT integration in their classroom teaching practices.*
***Keyword:*** *ICT integration, Internal Factors, Secondary Education*

## Introduction

**Background:** ICT comprises a variety set of technological devices and resources that are involved in creating, gathering, storing, disseminating, and evaluating information (UNESCO Institute of Statistics, 2022). ICT is being used extensively by the states all over the world to resolve their respective issues. It has become possible to transform the world into a "global village" by the effective application of ICT (Martens et al., 2010). ICT has been putting its significant impact on the education sector, as well as on other sectors such as commerce, agriculture, health, and tourism. ICT has enabled schools to create a dynamic, proactive, and conducive learning environment in classrooms (Hatlevik & Arnseth, 2012). It enables educators to shift their teaching approach from being teacher-centered to student-centered (UNESCO Bangkok, 2003). With the implementation of ICT in classroom instruction, teachers can greatly encourage their students. They can illustrate complex concepts in a simplistic manner through the use of ICT. ICT has introduced an innovative teaching and learning atmosphere to educational systems worldwide, eliminating barriers related to time and location in education. "ICT allows students to enhance their creativity, problem-solving skills, and other advanced cognitive abilities" (UNESCO Bangkok, 2003). According to Lewin & McNicol (2015), the 21st-century skills such as critical thinking, communication, creativity, and digital literacy can be fostered among individuals through ICT. The effective application of ICT results in improvements in quality of education (Kapur, 2019; Devi, Rizwaan, & Chander, 2012). ICT helps all the states around the world immensely in achieving the goal 'Education for All' (UNESCO, 2011). By the effective application of ICT globally, we can attain SDG-4, which emphasizes on providing inclusive and equitable quality education as well as providing lifelong learning opportunity for all by 2030 (*ASIA-PACIFIC SUSTAINABLE DEVELOPMENT GOALS OUTLOOK,*2017; Montoya, 2019; United Nations, 2024). The central government of India has introduced several educational policies since India's independence to enhance the quality of education at all levels. The most recent educational policy is the National Education Policy-2020, which recommends integrating ICT into the teaching-learning process for providing equitable quality education to learners (Ministry of Education, G.O.I., 2020).

To implement any educational policy, teachers, being the important stakeholders of education, play a pivotal role; their active role makes it possible to achieve any educational goal (Singh, 2013; Victoria, 2018). Teachers of digital era are expected to become proficient in using digital technologies due to the emergence of digital

classroom and ICT-integrated curriculum; their classroom teaching practices should be aligned with societal progress and technological advancement; they must utilize ICT in their teaching-learning process to enable learners for the "knowledge society" of this digital age (Ghavifekr et al., 2012; Ghavifekr et al., 2014). Lloyd (2005) referred ICT integration as the application of ICT in education. Malhotra (2014) added that integration of ICT means the application of ICT in the teaching-learning process in such a way so that learners actively can enhance their academic achievement. Teachers should harness ICT in the educational process to ensure all-round development of learners (Manco-Chavez et al., 2020). ICT has transformed the educational system from teacher-centered to learner-centered (Kapur ,2019). ICT has made quality education accessible to all at a very low cost (Ghavifekr & Rosdy, 2015). The stakeholders of school education should take all the related factors of ICT integration from teachers' perspectives into consideration while they are making any ICT-related decisions. Understanding the responsible factors of ICT integration helps the stakeholders of school education - to make data-driven decisions (Pelgrum, 2001), to utilize resources optimally (UNESCO, 2009), to identify and overcome the barriers to the successful integration of ICT in classroom teaching-learning process (Bingimlas, 2009), to ensure equitable, quality and inclusive education for all children (UNESCO, 2009; Pelgrum, 2001), to create conducive teaching-learning environments in schools that encourage creativity, flexibility, and continuous development in the application of ICT (Hew & Brush, 2006; Bingimlas, 2009). Understanding the factors of ICT integration is crucial to implementing ICT purposefully, sustainably, and equitably. With this view, the present study tried to find out the factors related to ICT integration.

**Significance of the study**

The present study may provide valuable information and insights to the stakeholders of secondary school education, including teacher education institutions, secondary school teachers, school administrators, and state education department , regarding the incorporation of ICT in teaching and its connection with internal factors that affect this integration. Additionally, it may assist secondary teacher education institutions in structuring their teacher education programs to focus on developing digital competencies, clear perception in educators, fostering an ICT culture within schools, and effectively integrating digital technologies into the educational process.

**Research Objectives**

The present research has the following objective-

To explore the internal factors of ICT integration in secondary school education from teachers' perspectives.

**Research Method**

This literature review was carried out systematically by using PRISMA framework (as used by Enorme et al., 2024). The aim of this literature review was to analyze the studies related to the major internal factors of ICT integration in secondary school education from the perspective of teachers worldwide. At first, searching of related literature was carried out in the academic databases Google Scholar by using the phrase "the factors of ICT Integration in school education from teachers' perspectives". Initially a total of 17800 were identified. All these records were first screened based on their titles. Then the abstracts of the records with the keywords such as " ICT Integration" , "Use of ICT" , " Factors of ICT Integration" , and "Secondary School Education" were analyzed to identify the studies that were relevant to the present study. This screening process helped the researcher to narrow down to 61 potentially relevant studies. Various organizational reports were also reviewed to construct the background of the present study and to explain its context and rationale.

The following criteria were included for the review:

- The studies involving secondary school teachers' (pre-service and in-service) technology integration in their teaching-learning process.
- The studies published between 2000-2024.
- The type of studies accepted : Empirical studies.
- The studies published in English.
- Publication type: peer-reviewed journal articles, conference papers, and reputable organizational reports.

The following criteria were not included for the review:

- The studies involving primary school teachers' (pre-service and in-service) technology integration in their teaching-learning process.
- The studies published before 2000 and after 2024.
- The studies published in languages other than English.

**Findings and Discussion**

**Internal Factors of ICT Integration:**

Several internal factors including psychological factors, such as *personality* (Perkmen & Cevik ,2010), *constuctivist belief* (Sang et al., 2010), *attitude and belief* ( Teo,2008a; Mustafina,2016 ; Kundu, 2018; Meher et al., 2020; Ikwuka et al., 2020), *self-efficacy* (Teo, 2008b; Gbemu et al., 2020), *confidence* (Buabeng-Andoh, 2012), motivation (Karsenti et al.,2006), *ICT skills* (Dutta & Hazra, 2023 ; Buabeng-Andoh, 2012 ; Rastogi & Malhotra,2013), *perception* ( Venkatesh & Bala, 2008) greatly influence how a teacher integrates ICT into classroom. The key influencing internal factors of ICT integration are -

**ICT Skill:**

Teachers need various skills to be effective in their roles. ICT skill is one of the essential 21st century skills that teachers must have (International Bureau of Education, 2022). According to the European Union, digital or ICT competence is considered one of the eight key skills that students of the 21st century should acquire for their academic and personal growth and for active participation in society (Dzhurylo & Shparyk, 2019). ICT competent teachers can make students proficient in using ICT (Dzhurylo & Shparyk, 2019). ICT Skills refer to one's ability to apply various ICT tools in his or her daily life; to identify his or her information-related challenges, find information efficiently, and evaluate reliability, authority, and potential biases of sources of information; to organize and summarize information by the responsible use of best available ICT tools; and to communicate with people ethically and effectively by the use of suitable ICT tools available (*What is ICT Skills / IGI Global*, n.d.). The Organization for Economic Co-Operation and Development (2009) highlighted the importance of professional development in "ICT Teaching Skills" for secondary school teachers in Chapter 3 of its report titled "Creating Effective Teaching and Learning Environments: First Results from TALIS".

There is a positive relationship between ICT skills and the integration of ICT in the classroom (Alazam et al., 2012). "Digital Skill" is necessary for using ICT in education (Manco-Chavez et al., 2020). Successfully integrating ICT means understanding how to communicate and apply new technological developments while helping students gain new knowledge through ICT in the classroom, which depends on these skills (Melo, 2018, as cited in Manco-Chavez et al., 2020). The incorporation of ICT in education facilitates and improves student learning (Manco-Chavez et al., 2020). In addition, it has upgraded the quality of education (Kapur, 2019). ICT integration enhances the quality , accessibility and cost-effectiveness of education ( Ghavifekr & Rosdy , 2015). Worldwide, ICT has been considered as an important tool that affect teaching effectiveness and student learning (Chen et al., 2015). ICT Skill is not an only important factor of ICT integration. Bandura (1977) pointed out in his "Social Learning Theory" that an individual's psychological factors and environmental factors influence his or her behavior (Zhang et al., 2021). Likewise ICT integration depends on psychological factors, personal factors and Organizational factors.

**Self-Efficacy:**

According to Bandura (1997), self-efficacy is a belief in one's capabilities to plan and carry out actions required to attain specific goals (Dhillon & Singh, 2023, p.11). It is widely accepted that self-efficacy significantly affects teachers' behaviors and achievements (Sabic et al., 2022, p.354). Building on Bandura's idea of self-efficacy, Compeau & Higgins (1995) defined ICT self-efficacy as one's own belief in his or her ability to use ICT effectively; this belief drives him or her to make decisions about ICT adoption and ICT integration (Papastergiou, 2010, as cited in Alahakoon & Somaratne, 2018). Teachers who have strong ICT self-efficacy are more likely to utilize ICT in their teaching processes (Joo et al., 2018, as cited in Sabic et al., 2022). Studies identified several factors that affect teachers' self-efficacy- age and gender (Scherer & Siddiq, 2015, as cited in Sabic et al., 2022), school climate and culture (Slutsky, 2016; Gamze & Yondem, 2022; Nguyen et al., 2023), attitudes toward ICT (Sabic et al., 2022), ICT experience (Sabic et al., 2022), and ICT skills (Techatassanasoontorn & Tanvisuth, 2008).

**Attitude:**

Studies also show that attitude is one of the important psychological factors of ICT integration into teaching and learning process . Attitude can be described as "the way in which a person views and evaluates something or someone; a predisposition or tendency to respond positively or negatively towards a certain idea, object, person, or situation" (Vargas-Sanchez et al., 2016, Attitude). A person's integrity and consistency in their feelings, beliefs, and behaviors are shaped by their attitude (Tavsancil, 2005, as cited in Semerci & Aydin, 2018). The attitude toward ICT integration can be analyzed through three dimensions: cognitive (perceptions and beliefs), affective (preferences and emotional responses), and behavioral (actions or intentions based on cognitive and affective responses) (Vargas-Sanchez et al., 2016). Many studies showed that teachers' positive attitudes toward ICT have a great impact on their use of ICT in teaching (Semerci & Aydin, 2018). There is a positive relationship between teachers' self-efficacy regarding ICT and their attitudes toward using ICT in the classroom (Coban & Atasoy, 2019).

**Perception:**

A critical factor of ICT integration is the positive perception of teachers regarding the usefulness of ICT and the ease of using ICT (Venkatesh & Bala, 2008; Du et al., 2023; Aurangzeb et al., 2024; Nawaz & Nasreen, 2024) and

its ease of use (Du et al., 2023; Venkatesh & Bala, 2008). Inan & Lowther (2009) found that teachers' perceptions of ICT significantly influence how they incorporate it into their teaching. Julmukya & Sujarwati (2024) also showed that a positive view of ICT among teachers leads to its effective use in real classroom settings. According to Abel et al. (2022), favorable views of ICT usability strengthen positive attitudes toward its application in teaching, ultimately impacting the effective integration of ICT in classrooms.

**Pedagogical Knowledge and Belief:**

In TPACK model , Mishra & Koehler (2006) depicted that teachers require more than just having technological competences for the effective integration of ICT into their classroom teaching-they need to know what to teach (*content knowledge)* and how to teach (*pedagogical knowledge*). The teachers who understand pedagogy well can use technology aligning with instructional goals; they can use suitable digital tools to meet the diverse needs of the students; they can design meaningful learning experiences (Mishra & Koehler , 2006; Koehler, 2013) Teachers must have in-depth knowledge in their subjects as well as the knowledge about how to teach the subject matter with the help of technology.

Teachers having student-centered belief (constructivist) integrate ICT more in their classroom teaching than the teachers who held teacher-centered belief (Ertmer, 2005; Ertmer et al., 2012; Tondeur et al., 2017, Buabeng-Andoh, 2019; ;Almerich et al., 2024).

**Motivation:**

Teachers' motivation is one of the psychological factors of ICT integration (Karsenti et al., 2006; Teo, 2008b).Teachers who have high motivation for teaching with technology are more inclined to explore and adopt digital tools; both *intrinsic* and *extrinsic* motivational factors are influential for the effective ICT integration in classroom teaching ( Teo, 2008b; Kisirkoi, 2015; Ounis, 2016; Mirzajani et al., 2016; Bas & Bastug, 2021).

**Conclusion**

From the perspectives of secondary school teachers, internal factors have a great impact on how well ICT integrates into teaching and learning. Factors like teachers' technological skills, pedagogical knowledge, self-confidence, motivation, attitudes toward ICT, and openness to change strongly affect how well teachers use technology in the classroom. Teachers who possess strong ICT skills and good beliefs about technology's utility are more likely to use ICT effectively in their classroom teaching. On the other hand, low confidence, resistance to change, and limited comprehension about how to use technology in teaching can hinder successful integration. To support teachers' readiness and enthusiasm for ICT integration, it is crucial to address these internal factors through ongoing training, mentorship, and supportive school environments. Improving these internal aspects ultimately leads to more engaging and tech-rich learning experiences for students.

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