

ICT in Secondary Education and its Teachers

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Abstract

Incorporating information and communication technologies (ICT), particularly the internet, into classroom instruction presents significant opportunities for enhancing education by enabling innovative digital teaching methods. Due to these advancements, national curricula have been revised to reflect the evolving needs and possibilities brought about by ICT integration. This paper explores the various elements influencing the adoption of internet-based learning in classrooms. By utilizing semi-structured interviews and focus group discussions, the research seeks to understand how teachers' beliefs and motivations impact their willingness to integrate the internet into their teaching practices. The study also investigates whether educators' attitudes and enthusiasm toward digital tools are just as crucial as technological investments in fostering educational advancements. Successfully embedding the internet into classroom instruction necessitates not only proper technological infrastructure but also a supportive mindset among educators. Prior studies indicate that further exploration is needed to assess teachers' perspectives on using online resources, as their viewpoints may significantly shape adoption levels. To gain a comprehensive insight into this issue, instructors from diverse subject areas have been included in this research to analyze variations in opinions across different disciplines.

Keywords: Technology, teachers, motivations, education.

Introduction

The rapid advancements in Information and Communication Technologies (ICT) have influenced various aspects of life, including education (Tezci, 2009). Between 2002 and 2014, the ICT sector experienced significant growth (ibid), with its global ranking improving from 71st place in 2010 to 46th in 2013. The incorporation of digital tools, particularly the internet, into educational settings has become an area of increasing focus (Jamieson-Proctor, Watson, Finger, Grimbeek & Burnett, 2007, cited in Oner and Bumen, 2012), as these technologies introduce dynamic learning environments that reshape traditional teaching methods (Volman & Van Eck, 2001). Consequently, national curricula have been adapted to align with the evolving capabilities and requirements of ICT. Governments have taken steps to supply schools with digital infrastructure and internet connectivity to drive educational innovation (Tezci, 2009).

Given the transformative impact of the internet on learning and instruction, it is essential to explore the factors influencing its adoption in classrooms, particularly in developing nations. Understanding these determinants can contribute to enhancing teaching quality and student outcomes. This study employs a qualitative research design to examine the elements driving internet integration in secondary schools across the Andhra Pradesh and Telangana regions of India. High school educators participated in interviews to share insights into how their perspectives and motivations shape the implementation of digital learning tools.

Findings suggest that while investments in ICT infrastructure are crucial for bringing the internet into classrooms, educators' willingness and attitudes toward technology play an equally significant role.

Several factors, including personal beliefs, prior experience, familiarity with digital resources, and overall mindset, influence how teachers utilize the internet in instructional settings. However, despite receiving adequate training and possessing digital proficiency, many educators still hesitate to incorporate internet-based learning into their teaching practices. Therefore, successfully embedding the internet in classroom instruction requires not only technological readiness but also a supportive and proactive approach from educators.

Literature Review

The role of the internet in classroom teaching has been widely studied, with research examining both its effectiveness and the factors that influence its adoption. Two primary perspectives exist regarding its integration into education. One viewpoint emphasizes the role of government policies and initiatives in driving internet usage in schools. The other argues that teacher experiences, motivations, and expectations ultimately determine whether the internet becomes a part of daily teaching practices. According to this second perspective, educators may either embrace or resist internet integration, regardless of the resources provided. However, this perspective often overlooks the importance of beliefs, self-confidence, skills, and knowledge in shaping a teacher's willingness to incorporate technology into the learning process (Galanouli & McNair, 2001; Alev, 2003; Jones, 2002; Markauskaite, 2007, cited in Tezci, 2011).

Governments worldwide have made considerable efforts to promote the use of ICT in education (World Bank, 2013). Between 1997 and 1998, several nations adopted ICT-based educational initiatives supported by the World Bank, which aimed to improve access to quality education by supplying computers and related equipment to schools (OECD, 2005). Despite these efforts, a key issue identified was the lack of proper training on how to integrate these tools into teaching, along with insufficient educational software (World Bank, 2013). This suggests that while infrastructure is crucial, it is not the sole factor in ensuring successful implementation.

A significant body of research has emphasized government policies as the driving force behind internet integration in classrooms. However, some scholars argue that teacher motivation is a more decisive factor than the mere provision of technology. This study builds upon Everett Rogers' (1995) theory, which posits that an individual's attitude toward technology determines its adoption and widespread use (Dillon & Morris, 1996). In the context of education, teachers who perceive internet-based learning as beneficial are more likely to integrate it into their classrooms (Rogers, 1995). While technological infrastructure is necessary, Rogers (1995, p.208) asserts that teachers will only adopt the internet in teaching if they believe it offers advantages over traditional methods. ICT tools such as the internet can facilitate the dissemination of knowledge and foster educational development on both national and global scales (Orr, 2003).

The process of innovation adoption occurs when a new idea, tool, or practice is introduced and communicated through various channels within a social system (Rogers, 1987, cited in Windahl et al., 2008). Digital platforms, television, and interpersonal networks contribute to this diffusion process (Orr, 2003). The internet, by making information widely accessible, can shape perceptions and encourage the adoption of new teaching strategies. Through online resources, educators can expose students to emerging ideas and innovations, further motivating both students and teachers to integrate digital tools into learning (Melkote, 1952; Steeves, 2001).

Henry Jay Becker (2000) found that teachers who engage in professional development activities and collaborate with peers are more likely to embrace internet-based teaching. This aligns with Rogers' (1995) theory, which suggests that social interactions influence the diffusion of technology. Similarly, Erdogan

Tezci (2009) argues that a teacher's level of experience with digital tools directly impacts their likelihood of using the internet in education. According to Tezci, the more knowledgeable a teacher is about ICT, the greater their inclination to incorporate it into their lessons. This supports the idea that teacher competence, rather than just school policies, plays a pivotal role in technological integration.

Tezci (2009) also emphasizes that merely providing schools with computers and internet access does not automatically lead to their effective use in education. He states that "technology does not have an educational value" unless teachers actively integrate it into their teaching strategies. Decision-makers in education must therefore prioritize investments in teacher training, ensuring that educators have the necessary skills to make meaningful use of digital resources. Tezci's study reveals that the more teachers are trained, the more positive their attitudes toward ICT become.

In a related study, Yasemin Gulbahar and Ismail Guven (2008) found that teachers with a favorable attitude toward the internet and ICT are more likely to use these tools in their teaching. Conversely, those with negative perceptions often avoid integrating technology into their classrooms. This aligns with Tezci's (2011) claim that unfamiliarity with digital tools leads to resistance. Additionally, Gulbahar and Guven (2008) point out that inadequate in-service training prevents teachers from effectively utilizing ICT in education.

Yong Zhao and Paul Conway (2003) explore teacher resistance to internet integration in their study, "From Luddites to Designers: Portraits of Teachers and Technology in Political Documents." They identify two key barriers to digital adoption in classrooms: inadequate access to hardware and software, and insufficient teacher preparation. While schools may have ICT infrastructure, Zhao and Conway argue that it is no longer viable for educators to rely solely on traditional teaching methods. Instead, professional development programs must be designed to equip teachers with the skills needed to navigate technological advancements. They also highlight that some educators actively resist technology due to concerns over job security and the fear that digital tools will replace their role in the classroom.

Resistance to technological change is further explored by Kailash Joshi and Thomas Lauer (1998), who argue that the introduction of new tools into professional settings can induce stress and lead to resistance. According to Martinko et al. (1996, p.322), resistance manifests as low usage, complete avoidance, or even counterproductive behaviors. Similarly, Liette Lapointe and Suzanne Rivard (2005) suggest that teachers weigh both the risks and benefits of technology before deciding whether to integrate it into their teaching. Traditional classroom routines, such as reliance on blackboards or PowerPoint presentations, may also influence educators' perceptions of internet-based learning. On the other hand, teachers who embrace ICT demonstrate a more proactive attitude toward technological integration (Saga & Zmud, 1994).

Wim Veen (1993), in his research on Dutch secondary schools, argues that teacher attitudes have a greater influence on internet adoption than government investments in ICT infrastructure. Despite government efforts to supply schools with computers and low-cost internet access, only 9% of secondary school teachers used digital tools in their lessons (Veen, 1993). This study suggests that simply providing technology is insufficient—educators must be willing and able to incorporate it into their teaching. Veen classifies teacher motivations into two categories: beliefs and skills. He found that many Dutch educators resisted digital integration to maintain their preferred teaching styles, illustrating that teacher attitudes are often a more significant barrier than a lack of resources.

Becker and Riel (2000) further support this argument by stating that teachers who participate in professional training can influence their peers to adopt similar practices. This aligns with Rogers'

diffusion of innovations theory, which emphasizes the role of interpersonal influence in technological adoption. While ICT tools are becoming more prevalent in schools, their actual usage remains inconsistent. What remains unexplored in much of the existing literature is the reasoning behind teachers' reluctance to adopt internet-based teaching methods. Understanding these perspectives is essential for developing effective strategies to encourage the meaningful integration of digital tools in education.

Methodology

The internet has become an integral part of modern education, serving as a valuable tool for teachers to enhance lessons and provide students with additional learning resources. This research focuses on the incorporation of the internet into teaching and learning, as well as the factors influencing its integration. The study specifically examines teachers' perspectives, motivations, and beliefs regarding internet usage in the classroom. To explore these aspects in depth, semi-structured interviews and focus group discussions have been selected as the primary research methods.

A qualitative research approach has been adopted because it enables participants to express their personal experiences, views, and motivations in detail (Bryman, 2004). As Robinson (1998) pointed out, the process of integration is subjective, context-dependent, and often contested. Therefore, qualitative methodologies are essential as they provide an avenue for respondents to articulate their thoughts in an unfiltered manner (cited in Castles et al., 2002, p.133).

Sampling and Participants

This study focuses on secondary school teachers from the Andhra Pradesh and Telangana regions. A snowball sampling technique was employed to identify participants. This non-random sampling method allows current respondents to refer additional teachers who meet the study's criteria (Atkinson & Flint, 2001). The decision to use snowball sampling was driven by the challenge of locating suitable participants, particularly since the research was conducted during the summer break. This method facilitated participant recruitment through existing contacts.

In total, 48 teachers participated in the study. Interviews were conducted over the phone and via Zoom, during which participants discussed their experiences with internet use in the classroom, the rationale behind their choices, their awareness of school policies, and the challenges they encountered. The study included 26 individual semi-structured interviews, as well as three focus group discussions with 5-6 participants each. The focus groups were organized based on age, with one set comprising younger teachers (24-36 years old) and another consisting of older teachers (37-55 years old). Each interview session lasted approximately 30 minutes.

Research Purpose

Over the past decade, the Information and Communication Technology (ICT) sector has expanded rapidly, drawing considerable attention to its role in education. ICT has become a vital component of the economy and has significantly influenced teaching and learning. As technology advances, societies worldwide are transitioning into knowledge-based economies. Digital tools, particularly the internet, foster innovative teaching methodologies and help students develop essential skills such as collaboration, communication, critical thinking, and lifelong learning (Plomp et al., 1996).

Governments across the globe invest heavily in ICT infrastructure for schools, allocating substantial budgets annually to support digital education (Tezci, 2011). The internet is widely regarded as an essential element of the school curriculum (Al-Mahmood & Gruba, 2007; International Technology Education Association, 1996; Niederhauser & Stoddart, 2001; Papanastasiou & Angeli, 2008, cited in Tezci, 2011).

A review of the existing literature reveals a gap in research examining how the internet is utilized in classrooms and for what specific purposes. Most studies attribute internet integration either to teacher motivation or to national policies, often treating these factors as independent rather than interconnected. This research aims to bridge that gap by investigating secondary school teachers' perspectives on internet use in classrooms, their motivations, and their general attitudes toward technology. Additionally, previous studies have not extensively explored teachers' opinions on the effectiveness and challenges of using the internet for instruction. To gain a more comprehensive understanding, this study includes teachers from a range of subject areas to assess how perspectives vary across disciplines.

Data Analysis

The collected data from both semi-structured interviews and focus group discussions were transcribed and examined using thematic analysis. According to Virginia Braun and Victoria Clarke (2006, p.79), this method helps in "recognizing, interpreting, and describing recurring themes within the dataset." Identifying common themes streamlined the analysis process, ensuring consistency across all responses. Relevant quotations were extracted to support key findings under each thematic category.

Results

The study's findings are organized according to the following research questions:

- What factors encourage or discourage teachers from incorporating the internet into their teaching practices?
- In what ways do educators utilize the internet during classroom instruction?
- What are teachers' perceptions regarding the role of the internet in education?
- How does the availability of ICT tools influence the integration of the internet into teaching and learning?
- To what extent does ICT training impact teachers' ability to effectively use the internet in the classroom?

Internet Use in Schools and Related Policies

When asked about their awareness of internet usage in their schools, all participants acknowledged that they had a clear understanding of how frequently the internet was used in their respective institutions. Both the interview and focus group participants emphasized that the internet plays a significant role in modern society, influencing multiple aspects of life beyond education, a point also reflected in prior research.

However, many teachers admitted to being unfamiliar with specific school-level policies regarding the use of ICT and the internet in teaching and learning. Interestingly, while some were aware of

national ICT policies, those who had this awareness tended to use the internet less frequently in their classrooms. The primary reason given by these teachers was that their subject areas did not heavily rely on internet resources compared to others. Nonetheless, all participants agreed that neither school nor national policies significantly impacted their decision to integrate the internet into their teaching. This suggests that internet usage in education is ultimately determined by the teacher's own discretion rather than external guidelines.

Although earlier studies (Zhao & Conway, 2003) have emphasized that teacher motivation plays a key role in internet adoption, findings from this study indicate that subject matter also influences internet usage. For instance, teachers specializing in arts and social sciences reported using the internet far less frequently than their counterparts in language, biology, chemistry, and physics.

During the second focus group session, a social studies teacher, aged 34, shared an insightful perspective on national policies related to internet integration:

"The state controls how history is taught, so we are required to follow a set curriculum that highlights what the government deems important. For example, we might focus on positive aspects of the Mughal Empire. The guidelines are quite rigid, and since we are provided with all the necessary materials, there is little need to supplement our lessons with internet resources." (Focus Group 2, Interviewee 4)

This observation raises an interesting contradiction: despite efforts to establish an information-based society by investing in ICT infrastructure and internet connectivity, certain subjects—such as social sciences—remain restricted in how they incorporate digital tools due to government-imposed curricular constraints.

The same teacher further explained his preference for traditional teaching methods:

"Social sciences have a unique nature. The way it is taught does not alter the content itself. I prefer using CDs and DVDs to keep students engaged and actively participating." (Focus Group 2, Interviewee 4)

Similarly, another teacher from the first focus group admitted to using the internet only when absolutely necessary:

"Many of my colleagues frequently use the internet to enhance their teaching, but I tend to rely on it only when I have no other option. For instance, if I'm doing research and can't find enough information in academic journals or books, then I turn to the internet for additional resources." (Focus Group 1, Interviewee 2)

ICT Training in Schools

Teachers in social sciences and the arts were generally reluctant to incorporate internet-based activities into their lessons. However, a significant number had participated in ICT training programs organized by their schools. These training sessions improved their knowledge and skills in utilizing online resources for teaching. Among the eleven teachers who took part in the semi-

structured interviews, eight had undergone ICT training at their respective schools. The findings here offer an interesting contrast to previous studies. Earlier research suggested that teachers who received such training were more inclined to integrate the internet into their lessons (Curaoglu et al., 2007; Zhao & Conway, 2003). However, educators interviewed in this study stated that training alone did not encourage them to use online resources for instruction.

"At my school, whether or not teachers use the internet in their classrooms depends entirely on the subject they teach. For instance, English teachers—including myself—actively incorporate it into lessons. I rely on it regularly, and there was one occasion when the internet was down for forty-five minutes, making it incredibly difficult for me to conduct my class." (Interviewee 5)

Although ICT professional development courses were not available at all schools, every teacher who took part in this study confirmed that their institutions provided the necessary technological infrastructure and internet access. Nevertheless, as discussed earlier, the structure of certain subjects, such as history and social sciences, limits how much teachers can integrate digital resources into their lessons. Interestingly, all participants reported that secondary schools in their region had functional internet connectivity.

Teachers' Perspectives on the Internet

One of the study's objectives was to explore teachers' general opinions about the internet. Participants were asked about their internet usage outside the classroom, the purposes for which they used it, and whether they could go a full day without it. As expected, responses varied. However, the overall sentiment toward the internet was positive. Teachers aged between 40 and 50 reported using the internet less frequently in their personal lives, while those aged 23 to 39 used it more regularly. This pattern was unsurprising, given that teachers in the 23-39 age group were also more likely to use the internet for instructional purposes.

Interestingly, some participants aged 30 and above, despite having received training and being well-versed in internet usage, expressed a preference for avoiding it whenever possible. This contrasts sharply with the younger teachers, many of whom stated that they "could not imagine life without the internet." These findings challenge the notion that familiarity with technology directly correlates with increased usage, contradicting earlier arguments made by Erdogan Tezci (2009).

"I completed training on designing internet-based learning activities for my classes. While I understand how to create and implement these activities, I don't feel compelled to use them in practice. I tend to favor traditional teaching methods. [...] ICT training is available for all teachers, regardless of their subject area." (Interviewee 4)

This presents a thought-provoking contradiction—while many educators acknowledge the internet's usefulness in everyday life, some still hesitate to incorporate it into their teaching practices.

Experiences and Motivations

Since this study focuses on how the internet is incorporated into classroom instruction, it was essential to explore the specific ways teachers utilize it. However, despite the increasing presence of digital technologies in schools, the actual extent of their use remains uncertain. Among the most

common responses was using the internet to access links embedded in PowerPoint presentations.

Nearly all participants acknowledged that incorporating the internet into their lessons enhanced both teaching quality and student engagement. Many teachers expressed that online resources significantly streamlined lesson delivery, enabling quick access to multimedia content such as videos and images. Nonetheless, there were exceptions. As noted earlier, some educators deliberately avoided relying on the internet, believing that easy access to information discouraged effort. This perspective is intriguing, as previous studies suggested that teachers with favorable attitudes toward technology were also more inclined to integrate it into their teaching (Gulbahar & Guven, 2008; Kozma, 2003; Tezci, 2009).

While this may indicate a connection between positive views on the internet and frequent usage, it does not necessarily mean that frequent users incorporate it into their teaching practices. This suggests that those who hold negative perceptions of the internet tend to exclude it from their instruction. This aligns with Tezci's (2011) argument that individuals unfamiliar with digital tools often develop a skeptical outlook toward them. Moreover, this research supports the idea that teachers with high confidence in their technological abilities are more likely to utilize digital resources in their classrooms. For some educators, their experience with traditional library research has influenced their desire to encourage students to use online sources more frequently.

Discussion

Studies indicate that a teacher's motivations, beliefs, and perceptions influence the extent to which they integrate the internet into their teaching. While professional development programs have provided educators with opportunities to improve their digital literacy, many still resist incorporating the internet into their instruction.

A significant number of participants mentioned that a school's financial situation plays a role in determining the level of internet integration in classrooms. By ensuring access to digital infrastructure, both governments and schools have facilitated the use of technology in education. With a range of diverse and credible sources available online (Ehman, 2002; Saye, 2002; White, 2002), teachers can foster critical thinking and problem-solving skills in students, contributing to their long-term development. Additionally, by supplying schools with digital tools, authorities indirectly attempt to highlight the value of internet-based learning (Friedman & VanFossen, 2010). This outcome aligns with expectations, as the mere presence of technology often acts as an incentive. However, the study also demonstrates that teacher attitudes and motivation play an even more significant role in determining internet adoption.

The findings reveal that teachers' willingness to use the internet differs based on the subjects they teach. Previous studies have not extensively examined how subject-specific factors influence internet use in classrooms. Science educators tend to incorporate digital tools more frequently than their counterparts in the social sciences. While this result was somewhat anticipated, an unexpected discovery was that some younger teachers—despite regularly using the internet in their personal lives—chose not to integrate it into their teaching. They expressed concerns that over-reliance on the internet could encourage passivity and decrease effort, thereby discouraging them from utilizing it. In contrast to previous studies, which suggested that younger teachers and those experienced with technology were more inclined to integrate it into their lessons, the present study found that some of these teachers avoided it altogether. According to these participants, the shift toward internet-based learning has led to a decline in students visiting libraries.

Educators who did incorporate the internet into their teaching primarily used it to supplement their lessons with multimedia resources, such as videos, images, and interactive activities. However, a key challenge cited was the level of control exerted by both government policies and school network restrictions, which often limited internet accessibility. While not all online sources are reliable, they provide a broad overview of various topics. Ultimately, both younger and older participants agreed that the internet plays a valuable role in their daily lives.

Conclusion

In summary, the integration of the internet into secondary school education is a complex issue. This study argues that while investments in ICT infrastructure are crucial for promoting digital learning, teacher attitudes and motivation are equally vital. The extent to which educators utilize the internet in their classrooms is influenced by factors such as their beliefs, experience, knowledge, and general disposition toward technology. However, the study also highlights that even teachers who have received training and possess sufficient technological experience may still opt not to incorporate digital resources into their lessons.

Analysis of both semi-structured and focus group interviews revealed that, although a portion of teachers prefer not to use the internet for instructional purposes, all participants acknowledged its broader significance and utility.

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