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Digital Competence and Self-Efficacy as Predictors of Teacher Effectiveness Among Secondary School Teachers

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Abstract

The study examined the effectiveness of 200 teachers from secondary schools, ensuring equal representation with 100 teachers from government schools and 100 from private schools. The data was collected using the Teacher Effectiveness Scale by Umme Kulsum, the Digital Competence Scale by Shipra Shrivastava and Kiran Lata Dangwal and the Teacher Self-efficacy Scale by N. Ashraf and S. Jamal. The result of the study showed that teacher effectiveness is positively related to digital competence. It was also found that self-efficacy was significantly associated with the effectiveness of teachers in secondary schools. Further digital competence among teachers was found to be a stronger predictor of teacher effectiveness as compared to self-efficacy.

Keywords: Digital Competence, Secondary School Teachers, Teacher Effectiveness, Teacher Self-Efficacy

1. Introduction

In the realm of education, the pivotal role of teachers in shaping the future of society cannot be overstated. The concept of teacher effectiveness has garnered considerable attention from researchers, policymakers and educators alike. Teacher effectiveness refers to a teacher's ability to positively impact outcomes of student learning. It involves a wide range of abilities, teaching methods and interpersonal skills. Kothari Commission (1964-66)[1] stated, "Of all the different factors that influence the quality of education and its contribution to national development, the quality, competence and character of teachers are undoubtedly the most significant". Also as mentioned in the National Policy of Education[2], 1986, "The status of the teachers reflects the socio-cultural ethos of a society and no people can rise above the level of its teachers". Thus the need for effective and efficient teachers is clearly evident in all these reports. Good[3] claimed that teacher effectiveness is the level of achievement a teacher attains in fulfilling instructional responsibilities and other duties outlined in their contract and required by the demands of their position. Anderson[4] asserted that teachers who regularly achieve objectives that prioritise the learning of their students are effective teachers. Stronge and Tucker[5] characterised teacher effectiveness as an assessment of the academic progress shown by students throughout their time spent in a classroom under a teacher's instruction. Parihar[6] opined that effective teachers are those who regularly accomplish their objectives that are either directly or indirectly connected to student learning. The tactics used to accomplish this aim require reorientation in light of shifting demands and priorities in teacher education. The term "teacher effectiveness" commonly refers to the focus on students, their academic performance, the teacher's conduct and the implementation of classroom

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procedures and behaviours aimed at enhancing student outcomes. Teacher effectiveness encompasses various factors beyond student achievement, including sufficient and relevant subject knowledge, the ability to integrate different subjects, identifying students' learning needs, using questions to engage and challenge students, conducting proper evaluation, providing feedback and taking responsibility for learning outcomes. (Ko J, Sammons P, Bakkum L)[7].

Teacher effectiveness, in the contemporary period, has its roots in digital competence and self-efficacy among many other factors. Digital competence is the most common term used to describe technological skills. According to Ilomaki, Kantosalo and Lakkala[8], digital competence is understood to encompass a wide range of complex skills, including cognitive, motor, sociological and emotional abilities that users must possess in order to use digital environments effectively. It extends beyond mere proficiency with software or operating digital gadgets. Ferrari[9], describes digital competence as the set of knowledge, skills and attitudes (including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks, solve problems, communicate, manage information, collaborate, create and share content and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socialising, consuming and empowerment. Therefore, digital competence encompasses a broad spectrum of abilities and proficiencies, which include knowledge of information science, computer literacy and media and communication abilities.

It is comprised of technological know-how for using digital technology, the capacity to meaningfully utilise digital technology for work, education and daily life in general in a variety of tasks, the ability to assess digital technology critically and the motivation to engage in digital culture.

Dar and Ponraj[10] performed research on the effectiveness of teachers and their digital skills in Shopian District, Jammu and Kashmir. A stratified random sampling technique was used to select a sample of 330 high school teachers, comprising 190 males and 140 females, holding regular and contract positions. Research findings suggest that teachers who are more skilled digitally outdo those who are less skilled. Kumar[11] investigated the effectiveness of prospective teachers by assessing their techno-pedagogical skills and digital competence as criteria on a sample of 700 final year B.Ed. prospective teachers studying in the government, government-aided and self-financing B.Ed. colleges of three districts namely Chennai, Kancheepuram and Tiruvallur of Tamilnadu. The research finding revealed a significantly positive relationship between digital competence and teacher effectiveness, techno-pedagogical skills and teacher effectiveness and digital competence and techno-pedagogical skills of prospective teachers. Similarly, Ramkrishna and Phogat[12] explored the correlation between teacher effectiveness and their digital competence, randomly selecting a sample of 150 teachers from ten different schools in Bihar's Saran District. The result indicated a positive relationship between the effectiveness of secondary school teachers and their digital competence.

'Self-efficacy' is the phrase used to denote an individual's belief in their capability to accomplish a task or attain a specific objective successfully. It pertains to an individual's confidence in their capacity to regulate their actions, impact their environment, and sustain motivation while striving to achieve their goals. Albert Bandura defines self-efficacy as the belief in one's capabilities to organise and execute the courses of action required to manage prospective situations. Whereas teacher self-efficacy in the educational sphere is defined as, a teacher's belief in his or her own capability to organise and execute courses of action required to successfully accomplish a specific teaching task in a particular context (Tschannen-Moran, Hoy and Hoy[13]). Ormrod[14] regarded teacher self-efficacy as a personal belief in the ability to plan, instruct and accomplish instructional objectives. He further highlighted that self-efficacy exists in many domains of human functioning like professional and private behaviours. Guskey and Passaro[15] represented self-efficacy as the extent to which a teacher believes to influence students' behaviour, academic achievement and pupil difficulties which lower his learning motivation. Zee and Koomen[16] related teacher self-efficacy with classroom instruction and student outcomes. They additionally emphasised that high self-efficacy among teachers correlates with setting higher annual objectives, implementing effective instructional practices and classroom policies and employing creative classroom management approaches.

Verma[17] studied the impact of self-efficacy, work Motivation and demographic variables on school teacher's

teaching effectiveness. For the study, 200 teachers teaching in government and private schools affiliated with CBSE and HBSE in Haryana state were selected through random sampling. The results reveal that the "teaching effectiveness" and teachers' occupational self-efficacy are positively and significantly correlated. Biasutti and Concina[18] conducted a study on 160 music teachers specialising in instrumental and vocal music in Italy. The study suggests that music teacher effectiveness can be predicted by their self-efficacy. Sehgal, Nambudiri and Mishra[19] conducted a study on a sample of 6,020 sixth to twelfth-grade students and 575 teachers at the secondary school level who were selected from 25 privately run schools. The study established a positive correlation between teacher effectiveness and self-efficacy.

The literature review of digital competence, self-efficacy and teacher effectiveness reveals that a sizable number of studies have been conducted on the aforementioned variables. However, there is still a dearth of studies revealing the impact of self-efficacy and digital competence on teacher effectiveness of teachers in secondary schools as digital competence and self-efficacy as variables of study have gained prominence in recent years, especially in the context of teachers. Thus, this study in hand has been undertaken with the following objectives:

- To determine the degree of correlation between the effectiveness of secondary school teachers and their digital competence.
- To examine the correlation between self-efficacy and the level of teacher effectiveness in secondary school teachers.
- To investigate the conjoint effect of digital competence and self-efficacy on the effectiveness of secondary school teachers.

2. Sample and Sampling Techniques

The current study adopts a descriptive survey methodology, wherein a sample of 200 secondary school teachers is chosen from both government-funded and privately-funded schools in the Hamirpur district of Himachal Pradesh. The Pearson correlation coefficient is employed to ascertain the relationship between the variables under investigation. The regression technique is employed to determine the combined impact of these variables. The data collection instruments utilised in this study included the Teacher Effectiveness Scale by Umme Kulsum, the Digital Competence Scale by Shipra Shrivastva and Kiran Lata Dangwal, and the Teacher Self-Efficacy Scale by N. Ashraf and S. Jamal.

The paper posts the following hypotheses:

- There exists a significant relationship between teacher effectiveness and digital competence of secondary school teachers.
- There exists a significant relationship between teacher effectiveness and self-efficacy of secondary school teachers.
- The conjoint effect of digital competence and self-efficacy on teacher effectiveness of secondary school teachers is higher than their individual effects.

3. Results and Discussions

Hypothesis 1 stating 'There exists a significant relationship between teacher effectiveness and digital competence of secondary school teachers', was tested using the Product Moment correlation technique on teacher effectiveness and digital competence. A significant correlation coefficient of 0.83 was observed at the 1% level, suggesting that the variables exhibit a positive and statistically significant relationship. This led to the conclusion that the digitally competent secondary school teachers are more effective as teachers whereas the secondary school teachers, who have less digital competence, are less effective. Hence, the aforementioned result validates hypothesis 1, indicating a significant relationship between teacher effectiveness and the digital competence of secondary school teachers. The findings of Pallapati and Esther[20], Sang G, Wang K, Li S, Xi J, Yang D[21], Cattaneo, Antonietti and Rauseo[22] and Khaloufi AE and Laabidi H[23] also supported the result of a significant relationship between the digital competence of teachers and their effectiveness.

Hypothesis 2 stating 'There exists a significant relationship between teacher effectiveness and self-efficacy of secondary school teachers', was tested using Pearson's Product Moment correlation technique on variable of teacher effectiveness and self-efficacy. A significant correlation coefficient of 0.67 was observed at the 1% level, suggesting that teacher effectiveness and self-efficacy are significantly and positively correlated. Hence, it may be concluded that secondary school teachers with

Table 1. Conjoint effect of digital competence and self efficacy on teacher effectiveness of secondary school teachers

Variable	R	R^2	% Variance	F	Inference	Step-up Regression Equation
YX_1	0.833	0.694	69.4	448.19	Sig at 0.01 level	$Y=125.36+7.84X_1$
YX_2	0.668	0.447	44.7	159.76	Sig at 0.01 level	$Y=-276.06+3.30X_2$
YX_1X_2	0.848	0.720	72.0	253.00	Sig at 0.01 level	$Y=-51.82+6.52X_1+1.06X_2$

Y - Teacher Effectiveness. X_1 - Digital Competence. X_2 - Self-Efficacy

higher self-efficacy are more effective as teachers, whereas secondary school teachers with low self-efficacy have low teacher effectiveness, leading to the confirmation of hypothesis 2. The findings of Malinauskas[24], Adeyemo and Chukwudi[25], Raju and Vardhini[26], and Devamma[27] also established the predictive influence of self-efficacy on teacher effectiveness.

Hypothesis 3 of this study aims to evaluate the predictive efficiency of digital competence and self-efficacy in determining teacher effectiveness among teachers in secondary schools stating, 'The conjoint effect of digital competence and self-efficacy on teacher effectiveness of secondary school teachers is higher than their individual effects'. To test this hypothesis, regression analysis was employed, the result of which is depicted in the subsequent table (Table 1).

The results indicate that the effect of digital competence on teacher effectiveness of teachers in secondary school was found to be significant at a 1% level (F (1, 198) = 448.19). The processed value of R^2 of digital competence on teacher effectiveness of secondary school teachers (YX_1) is 0.694. This suggests that the influence of digital competence on the effectiveness of secondary school teachers is 69.4%. The effectiveness of teachers in secondary school can be predicted by the equation:

Teacher Effectiveness = 125.36+7.84 x Digital Competence

This implies that with each additional unit of digital competence, the effectiveness of secondary school teachers increased by 7.84 units.

The impact of self-efficacy on teacher effectiveness of teachers in secondary schools was found to be significant at a 1% level (F (1, 198) = 159.76). The processed value of R^2 of self-efficacy on teacher effectiveness of secondary school teachers (YX_2) is 0.447 which indicates that self-efficacy contributes 44.7% to the effectiveness of secondary school teachers. The teacher effectiveness of secondary school teachers can be predicted with the equation:

Teacher Effectiveness = -276.06+3.30 x Self-efficacy

i.e., With each additional unit of self-efficacy, the effectiveness of secondary school teachers increased by 3.30 units.

Further at the 1% level of significance, the combined effect of digital competence and self-efficacy on the effectiveness of secondary school teachers was found to be significant with an F-ratio of 253.00. The calculated R^2 value of 0.720 for the relationship between teacher effectiveness, digital competence and self-efficacy (Y1X1X2) suggests that digital competence and self-efficacy account for 72% of the variance in teacher effectiveness among secondary school educators.

The fact that the value of the percentage of variance (72%) for the combined effect of digital competence and self-efficacy on the effectiveness of secondary school teachers increases from the percentage of variance (69.4%) for digital competence and (44.7%) for self-efficacy suggests that the combined effect of digital competence and self-efficacy conjointly on the effectiveness of secondary school teachers is greater when considered together than when each factor is considered separately.

The predictive equation for the teacher effectiveness of secondary school educators is as follows:

Teacher Effectiveness = -51.82+6.52 x Digital Competence+1.06 x Self-Efficacy

Hence, it can be concluded that the conjoint effect of digital competence and self-efficacy on teacher effectiveness of secondary school teachers is higher than their individual effects (Hypothesis 3).

4. Conclusions and Educational Implications of the Study

The study revealed that digital competence and self-efficacy among teachers in secondary schools exhibit a significant and positive correlation with teacher effectiveness. It was also found that digital competence and self-efficacy can both independently and conjointly

predict teacher effectiveness of secondary school teachers with digital competence emerging as a stronger predictor than self-efficacy.

The study emphasises how crucial self-efficacy and digital competence are for secondary school teachers to be more effective. This calls for the schools and education systems to prioritise providing professional development opportunities to enhance the digital skills of the teachers along with the efforts to enhance their self-efficacy by providing them adequate support and encouragement which can further improve teacher effectiveness. The results also suggest that curriculum and pedagogy should be updated to incorporate digital technologies so that teachers with higher digital competence can effectively integrate technology into their teaching practices, leading to more engaging and effective instruction. Digital competence may be viewed as a crucial factor by schools in the selection and recruitment of teachers. The study highlights the need for ongoing professional development programs that focus on both digital competence and self-efficacy. For teachers to be more effective in the classroom, these programs should be customised to fit their specific needs.

Overall, the research emphasises the importance of digital competence and self-efficacy in predicting teacher effectiveness among secondary school teachers. Schools and education systems can use these findings to design strategies that support teachers in developing these skills, ultimately improving student outcomes.

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