RESEARCH PAPERS

GENDER DIFFERENCES IN PROFESSIONAL AND DIGITAL COMPETENCIES AMONG SECONDARY SCHOOL TEACHERS IN JAMMU AND KASHMIR: A DESCRIPTIVE AND CORRELATIONAL ANALYSIS

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ABSTRACT

This study examines the professional and digital competence of secondary school teachers, focusing on the influence of gender on these competencies in Jammu and Kashmir, India, and the relationship between them. The population comprised secondary school teachers from the Ganderbal educational zone, which includes 29 secondary schools (14 government, 15 private). Six schools were selected through stratified random sampling, with 10 teachers from each school ensuring gender representation. Data was collected using the Professional Competency Scale and the Teachers' Digital Competence Scale. Percentage statistics, mean, S.D., T-test, and correlation analysis were employed to analyze the results and test the hypotheses. Findings revealed that male secondary school teachers exhibit high professional and digital competencies, with significant differences between male and female teachers across various dimensions. The study also identifies a significant positive correlation between professional and digital competence among the teachers. It highlights the importance of teachers adapting to changing educational paradigms to effectively discharge their duties and prepare students for the demands of the modern workforce.

Keywords: Professional, Digital Competencies, Gender Differences, Secondary School Teachers, Jammu and Kashmir, Teacher Training, Digital Literacy.

INTRODUCTION

Professional and digital competence are two essential attributes for teachers in the educational landscape. Professional competency encompasses a teacher's expertise in their subject matter, pedagogical techniques, and classroom management skills. It enables teachers to effectively convey knowledge, inspire students, and create a positive learning environment (Morze et al., 2018). A professionally competent teacher is well-prepared, adaptable, and capable of addressing diverse student needs, fostering student engagement, and promoting critical thinking.

Digital competency is increasingly crucial in education. As technology evolves, teachers must be proficient in using digital tools and platforms for teaching and learning. Digital competency equips educators with the skills to integrate technology into their lessons, making

learning more interactive and accessible (Liakopoulou, 2011). It also enables teachers to adapt to remote or hybrid learning environments, which have become more prevalent due to various factors, including global events like the COVID-19 pandemic. Professional competency and digital competency for secondary school teachers hold immense significance in the evolving landscape of education (Hayati, 2019).

In a technology-driven world, teachers must possess a robust set of professional skills and digital competencies to effectively engage and educate their students (Mojab et al., 2011). Professional competency encompasses teaching methodologies, subject knowledge, and classroom management, all of which directly impact the quality of education. Digital competency, on the other hand, pertains to teachers' abilities to harness technology as a powerful educational tool, fostering digital literacy among students (Baumert & Kunter, 2013). This study is vital as it helps educators adapt to the changing educational paradigms, ensuring they can deliver relevant and engaging lessons that prepare students for the demands of the modern workforce. Furthermore, understanding the interplay between professional and digital competencies can lead to the development of targeted teacher training programs, ultimately enhancing the quality of education for secondary school students (Khorshidi & Ekrami, 2011).

1. Significance of the Study

Digital India is a flagship program of the Government of India with a vision to transform India into a digitally empowered society. This study emphasizes that there should be Wi-Fi in all schools, colleges, and universities. School books should be converted into e-books. Attendance in offices should be biometric, open data platform to easy access to information for citizens, IT for jobs, etc.

There are many challenges for this program, as the majority of teachers in the schools are not in a position to take advantage of digital devices and technology. Most of the people could not use even the simple computers, projectors, or even Android mobile phones (Shallu et al.,

2019). However, COVID-19 has changed the academic landscape as students and teachers are forced to study and teach remotely at home, supported by a variety of digital tools. As NEP 2020 has emphasized that there shall be a marriage between technology and teachers, as such, assessing and developing the digital competence of secondary school teachers is vital for the success of school education. Teachers with high digital and professional competence can easily understand and interpret online learning material and perform well in online learning (Wang et al., 2021). There have been a limited number of studies investigating the digital competence of teachers, especially at the school education level. This study aims to examine the status of digital and professional competencies of teachers. To drive the digital transformation within Indian education institutions, it is paramount to understand the technological skills and knowledge of teachers and to think of the measures through which these can be developed or increased.

2. Review of Related Studies

Studies have been carried out on digital competency. Tzaflkou et al. (2023) showed that the female teachers reported significantly lower scores in digital competence and school's development, but they reported higher scores in professional development. Dar and Ponraj (2022) revealed that female teachers have higher digital competence as compared to male teachers. The results further stated that teachers who have digital competence are more effective than those who have low digital competence. Dias-Trindade and Albuquerque (2022) revealed that a significant difference was found among junior and senior teachers on digital competence. However, senior teachers were found high on digital competence as compared to junior teachers. Jain and Shetty (2022) showed that there is no significant difference between male and female teachers in digital competence. Arifin and Puspitorini (2022) revealed that increasing teacher digital competence included holding laptop conferences, internal IT drills, and rewards. These strategies increase the digital competence among teachers.

Perifanou et al. (2021) showed that teachers mostly used digital tools for evaluating, planning, assessing the student, and also performing various activities through digital tools, it helped students to become effective teachers and helps in developing digital competence among teachers. Cabero-Almenara et al. (2020) revealed that the instrument has high reliability globally across several dimensions and further suggested the need for continued work on such an instrument to develop teachers' digital competence. Kuzminska et al. (2019) revealed that the digital economy depends on digital competency, so we need to implement digital education at a high level in education. Further study showed that teachers performing all educational tasks by using IT in the institutions and students were also found to have a very high level of digital competency. The study further shows that both the teachers and students are able to utilize ICT in the teaching and learning process.

Studies have been conducted on professional competency among teachers at various levels of education. Rather and Sofal (2023) revealed that both gender and length of service affect the emotional stability of school teachers in India. Addam (2020) revealed a significant relationship between the teachers' level of professional competence in the area of self-management and their proficiency level in mathematics (Estose et al., 2018). Arur et al. (2020) revealed that a pre-service teacher education program should be given to teachers in order to prepare the potential teachers. This was essential for ensuring that the graduates of the pre-service programs would possess competences and traits as required for successful agricultural science teachers (Ramesh & Krishnan, 2020). Bhullar (2019) showed that the private school teachers had better teaching/professional competency than government school teachers, and it was also revealed that private school teachers had better self-efficacy than government secondary school teachers.

Sumamol (2018) showed that there was a significant difference in teacher competency and professional commitment of guest teachers of higher secondary schools. Rather and Sofal (2023) revealed that male university teachers exhibit more effectiveness and contentment as compared to their female counterparts. Mustafa (2013) showed that there is a significant difference between male and female leaders on various areas of professional competency. However, male administrators were found to be high on professional competency, as the government sector seems to be less motivated to use ICTs (Hasibuan, 2013).

Despite studies that have been carried out on secondary school teachers with respect to various related areas like teaching competence, self-efficacy, job satisfaction, emotional maturity, and self-concept, only a few studies have been conducted on professional and digital competencies. There is no such type of study that could evaluate the professional and digital competencies of secondary school teachers. On the basis of these observations, this study has found that there is a need to undertake research on the professional and digital competencies of secondary school teachers in Jammu and Kashmir, India. The effort has been taken to fill the gray areas while assessing and evaluating the professional and digital competencies of sample teachers through targeted interventions.

3. Objectives of the Study

- To study the professional and digital competence of secondary school teachers.
- To study the influence of gender on professional and digital competence of secondary school teachers.
- To compare male and female secondary school teachers on professional and digital competence.
- To find out the degree of relationship between digital competence and professional competence of secondary school teachers.

4. Hypotheses of the Study

- Male and female secondary school teachers differ significantly on professional competence.
- Male and female secondary school teachers differ significantly on digital competence.
- There is a significant relationship between digital competence and professional competence of secondary school teachers.

5. Operational Definitions of Terms and Variables

- *Professional Competence:* According to Hemberg and Hemberg (2020), competence is having the requisite knowledge, skills, and abilities to provide quality services as defined by the technical and ethical standards of the profession. In this study, professional competence is the score obtained from the sample subjects on the professional competence scale standardized by Savan et al. (2009). This scale consisted of 35 items spread over 5 dimensions.

- *Digital Competence:* According to Ferrari and Punie (2013), digital competence is "the confident, critical, and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion, and participation in society. In this study, the digital competence is the score to the scores obtained from the sample subjects on the digital competence scale developed by Ramakrishna (2017). This scale consisted of 50 items with five dimensions.

6. Research Design and Instrumentation

This study was carried out using the descriptive method of the researcher. The population for this study consisted of secondary school teachers of Ganderbal District, Jammu and Kashmir, India. According to the available information, there are 29 secondary schools in the educational zone of Ganderbal, out of which 14 were government schools and 15 were private schools. This study has selected six secondary schools. 10 secondary school teachers were selected from each school. The 60 sample subjects were selected through stratified sampling technique. Among the 10 secondary school teachers, both male and female were selected.

7. Description of Tools

- *Professional Competence Scale:* This study employed Savan's Professional Competence Scale (SPCS). The scale is based on 35 items distributed among 5 dimensions, which include competency in activity-based teaching and challenges, competency in a child-centered approach, competency in teaching and learning and their

display, competency in evaluation techniques, and competency in adopting novel strategies. The Split-Half Method was used by the experts to determine the reliability of this instrument. Finally, 0.79 reliability of coefficient was found by applying the Brown Prophecy Formula. The validity was found to be 0.958.

- *Digital Competence Scale:* This study employed the Teachers Digital Competence Scale by Ramakrishna. The scale is based on 50 items distributed among five dimensions, i.e., knowledge of digital practice, expertise in using digital technology for teaching and learning, evaluating and authorizing online information, managing and communicating digital data, and collaborating and sharing digital data for teaching and learning. The test-retest method was used by the experts to determine the reliability of this instrument. Finally, 0.89 reliability of the coefficient was found. The validity was found to be 0.78.

8. Analysis of Data

8.1 Descriptive Statistics

Table 1 shows the level of professional competence of secondary school teachers. The data reveals that 26.66% of secondary school teachers were found to be high on professional competence, whereas a significant percentage (55.00%) seemed to be average on professional competence. It was observed that a small percentage of 18.33% of secondary school teachers were found to have low professional competence.

Table 2 shows the level of male and female secondary school teachers on professional competence. The data reveals that a sizable percentage (30.00% male and 23.33% female) of secondary school teachers were found to be high on professional competence, whereas a significant percentage (56.66% male and 53.33%

Range of Scores	Levels of Professional Competence	N	Percent
229 and Above	High	16	26.66%
213 - 228	Average	33	53.00%
197 - 212	Low	11	18.33%
Total		60	100.00%

Table 1. Levels of Professional Competence of Secondary School Teachers (N=60)

Levels of Professional Competence	Male Secondary School Teachers		Female Secondary School Teachers	
	N	Percent	N	Percent
High	9	30.00%	7	23.33%
Average	17	56.66%	16	53.33%
Low	4	13.33%	7	23.33%
Total	30	100.0	30	100.0

Table 2. Levels of Professional Competence of Secondary School Teachers with respect to Gender (N=60)

female) seemed to be average on professional competence. It was observed that a small percentage (13.33% male) and a good percentage (23.33% female) secondary school teachers were found to have low professional competence.

Table 3 shows the levels of digital competence of secondary school teachers. The data reveals that a sizeable percentage of 31.66% of secondary school teachers were found to be high on digital competence, whereas a significant percentage (53.33%) seemed to be average on digital competence. It was observed that a small percentage of 15.00% secondary school teachers were found to have low digital competence.

Table 4 shows the level of male and female secondary school teachers on digital competence. The data reveals that a sizable percentage (36.66% male) and a small percentage (26.66% female) of secondary school teachers were found to be high on digital competence, whereas a significant percentage (50.00% male) and

Levels of Digital Competence	N	Percent
High	19	31.66%
Average	32	53.33%
Low	9	15.00%
Total	60	100.00%

Table 3. Levels of Digital Competence of Secondary School Teachers (N=60)

Levels of Digital Competence	Male Secondary School Teachers		Female Secondary School Teachers	
	N	Percent	N	Percent
High	11	36.66%	8	26.66%
Average	15	50.00%	17	56.66%
Low	4	13.33%	5	16.66%
Total	30	100.0	30	100.0

Table 4. Levels of Digital Competence of Secondary School Teachers with respect to Gender (N=60)

56.66% female seemed to be average on digital competence. It was observed that a small percentage of 13.33% male and a good percentage of 16.66% female secondary school teachers were found to have low digital competence.

8.2 Inferential Statistics

Table 5 shows the mean comparison of male and female secondary school teachers on professional competency. The results reveal that significant differences were reported on competency in activity-based teaching and hurdles, competency in teaching-learning and their display, competency in evaluation techniques, and competency in adopting novel strategies as dimensions of professional competency. However, no significant difference was found in competency in the child-centered approach dimension.

Table 6 shows the mean comparison of male and female secondary school teachers on digital competency.

The results reveal that a significant difference was found in knowledge of digital practice, expertise in using digital technology for teaching and learning, and managing and communicating digital data dimensions of digital competency. However, no significant difference was found in evaluating and authorizing online information or collaborating and sharing digital data for the teaching and learning dimension of digital competency. The results also reveal that the mean score favors the male secondary school teachers with a mean value of 167.01 than their counterparts with a mean value of 166.80. The t-value came out to be 5.83, which is significant at the 0.01 level of significance. This states that male secondary school teachers possess higher digital competence than female secondary school teachers.

Table 7 shows that the correlation value of 0.69 between digital competency and professional competency in relation to teachers suggests a perfect positive linear relationship. In this context, it implies that as digital competency increases in teachers, their professional competency also increases in a proportional and direct manner, and vice versa.

This correlation suggests that teachers who possess strong

Dimensions	Gender	N	Mean	S.D.	t-value	Level of Significance
Competency in activity-based teaching & hurdles	Male	30	28.80	3.58	4.49	Sig. at 0.01 level
	Female	30	25.67	2.10		
Competency in child centered approach	Male	30	9.63	2.15	1.11	Insignificant
	Female	30	8.99	2.38		
Competency in teaching-learning & their display	Male	30	15.48	2.30	2.19	Sig. at 0.05 level
	Female	30	14.80	2.07		
Competency in evaluation techniques	Male	30	22.78	2.59	3.94	Sig. at 0.01 level
	Female	30	21.12	2.20		
Competency in adopting novel strategies	Male	30	21.08	2.07	3.47	Sig. at 0.01 level
	Female	30	20.11	2.12		
Overall Professional Competency	Male	30	168.17	4.21	2.04	Sig. at 0.05 level
	Female	30	166.80	5.21		

Table 5. Mean Comparison of Male and Female Secondary School Teachers on Professional Competency

Dimensions	Gender	N	Mean	S.D.	t-value	Level of Significance
Knowledge of digital practice	Male	30	25.96	2.63	4.66	Sig. at 0.01 level
	Female	30	27.41	3.30		
Expertise in using digital technology for teaching and learning	Male	30	8.23	2.21	2.78	Sig. at 0.05 level
	Female	30	9.25	2.93		
Evaluating and authorizing online information	Male	30	16.82	2.05	1.40	Insignificant
	Female	30	17.26	2.35		
Managing and communicating digital data	Male	30	20.76	2.17	3.06	Sig. at 0.05 level
	Female	30	21.80	2.61		
Collaborating and sharing digital data for teaching and learning	Male	30	21.25	2.11	0.84	Insignificant
	Female	30	21.24	2.09		
Overall Digital Competency	Male	30	167.01	6.79	5.83	Sig. at 0.01 level
	Female	30	161.73	6.91		

Table 6. Mean Comparison of Male and Female Secondary School Teachers on Digital Competency

Variable	Correlation	Level of significance
Digital competence Vs Professional competence	r = 0.69	Significance at 0.01 level

Table 7. Correlation Analysis of Digital Competency and Professional Competency of Secondary School Teachers (N=60)

digital skills are highly likely to excel professionally. It indicates that the digital landscape is a significant contributing factor to success in the professional realm for teachers.

9. Discussion

9.1 Professional Competence

The descriptive statistics revealed that a significant proportion of secondary school teachers (53%) were found to have average levels of professional competence, with only 26.66% being classified as high and 18.33% as low. When analyzed by gender, it was observed that a slightly higher percentage of male teachers (30%) fell into the high competence category compared to female teachers (23.33%). Conversely, a notable percentage of female teachers (23.33%) were found in the low competence category, compared to only 13.33% of their male counterparts. These findings suggest that while a substantial proportion of teachers possess average professional skills, male teachers appear to have a slight edge in achieving higher levels of competence. This could be linked to societal norms and expectations that provide men with greater access to leadership roles and professional development opportunities, as suggested by Mishra (2024). However, over half of both male and female teachers fall into the average category, which highlights the need for more robust professional development programs across the board to enhance teacher effectiveness.

9.2 Digital Competence

The data on digital competence shows competence

shows that 31.66% of teachers were found to be highly competent, with 53.33% falling into the average category and 15% into the low category. Gender-specific analysis indicated that a higher percentage of male teachers (36.66%) were classified as highly digitally competent compared to female teachers (26.66%). However, a greater percentage of female teachers (56.66%) were in the average category, and slightly more female teachers (16.66%) were in the low competence category compared to male teachers (13.33%). The higher digital competence among male teachers could be attributed to greater exposure to technology and possibly more training opportunities in digital literacy, which aligns with the findings of Kumar et al. (2023). Nevertheless, the large percentage of teachers in the average category suggests that both male and female teachers require further training to fully integrate digital tools into their teaching practices.

9.3 Gender Differences in Competencies

The inferential statistics revealed significant gender differences in various dimensions of professional and digital competencies. Male teachers showed significantly higher competence in activity-based teaching, evaluation techniques, and adopting novel strategies. These findings are consistent with studies that suggested male teachers have more opportunities for professional development in these areas, which may explain their higher competence levels (Lekha & Kumar, 2024). On the other hand, female teachers demonstrated higher expertise in using digital technology for teaching and managing digital data. This aligns with the study by Sharma and Suri (2024), which indicated that female teachers may be more adaptable and proactive in integrating technology into their teaching practices, possibly due to the need to balance professional and personal responsibilities more efficiently.

9.4 Correlation between Digital and Professional Competence

The strong positive correlation (r = 0.69) between digital and professional competence suggests that teachers with higher digital skills are likely to exhibit higher professional competence. This finding is significant as it underscores the importance of digital literacy in enhancing overall teaching effectiveness (Abiodun-Oyebanji et al., 2020). It supports the argument that integrating technology into teacher training programs can have a profound impact on their professional growth and success, as highlighted by Kumar et al. (2023).

10. Findings of the Study

The findings of the study revealed that 26.66% of secondary school teachers exhibited high professional competence, while 55.00% were found to have an average level. Among them, 30.00% of male teachers and 23.33% of female teachers displayed high professional competence, whereas 56.66% of males and 53.33% of females showed average levels. Regarding digital competence, 31.66% of secondary school teachers were identified as high, while 53.33% were classified as average. Specifically, 36.66% of male teachers and 26.66% of female teachers exhibited high digital competence, while 50.00% of males and 56.66% of females showed average competence. The study further revealed significant differences between male and female secondary school teachers in various dimensions of both professional and digital competence. A significant positive relationship was reported between digital competence and professional competence among secondary school teachers.

11. Educational Implications

Administrators and planners must prioritize various factors when designing teaching content. Respondents highlighted that teachers should diagnose student abilities, create both short-term and long-term plans, involve staff in institutional planning, and effectively manage daily schedules. Additionally, governments and policymakers should ensure the proper utilization of funds allocated for orientation programs, awareness initiatives, and regular training on teaching skills and Information and Communication Technology (ICT). These efforts are essential to improve digital competency, job satisfaction, and teaching effectiveness.

The study emphasizes the link between student achievement and the professional competence of

teachers. Administrators should focus on critical areas such as assessment practices for teacher growth, organization of curricular and extracurricular activities, and development of teaching materials. Teachers with strong professional competence employ logical and sequential teaching methods, significantly enhancing classroom experiences. Continuous professional development is essential, and school management should encourage teachers to participate in in-service training programs. Training in modern teaching techniques is vital to meet evolving standards, while governments must ensure consistent access to such programs.In the current technology-driven education system, digital competence plays a crucial role in enhancing teaching quality. It involves the effective use of technology for communication, information, and problem-solving. Policymakers and trainers should develop action plans to provide digital skills training for teachers, empowering them to improve their professional capabilities. The integration of innovative research techniques further supports student progress and teacher growth. Professionally competent teachers employing effective strategies create better academic outcomes and foster an environment conducive to holistic learning.

Conclusion

This study on gender differences in professional and digital competencies among secondary school teachers in Jammu and Kashmir provides important insights into the varying skill levels and capacities of male and female educators in the region. The findings highlight that male teachers demonstrate higher levels of both professional and digital competencies compared to their female counterparts. Additionally, the significant positive correlation between professional and digital competencies suggests that proficiency in one area likely enhances abilities in the other, underscoring the interconnected nature of these essential skills in modern education.

These results underscore the need for targeted professional development initiatives to address gender disparities in teacher competencies, particularly digital skills, which are increasingly crucial in today's technology-driven educational environment. Strengthening competencies across genders not only benefits individual teachers but also enhances the overall quality of education, equipping students with relevant skills for the digital age. By recognizing and addressing these gender differences, educational authorities in Jammu and Kashmir can promote a more equitable and effective teaching workforce, ultimately fostering a more inclusive learning environment that prepares students for the demands of the future.

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