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Assessment of Teachers' Knowledge With Respect to Gender at Secondary Level: A Comparative Study in Indian Context

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Abstract- Teachers' knowledge can be enriched through self-upgrading and professional training. Their knowledge is highly responsible for professional development, especially at the secondary level, with regard to gender, knowledge varied from person to person. Therefore, this study aimed to compare the knowledge of teachers in the states of Uttar Pradesh and Assam in India at the secondary level. The descriptive survey method applied to compare these secondary school teachers of Assam and Uttar Pradesh with regard to gender and their knowledge in teaching profession. Stratified random sampling technique used to undertake the 100 secondary school teachers from Cachar district of Assam and 100 secondary school teachers of Allahabad district of Uttar Pradesh. After collecting the data from teachers about their knowledge in teaching profession, t-test and analysis of variance used to draw inferences. Based on these two analyses, a significant difference was found in teachers' knowledge in Indian context at the secondary level. However, no significant difference was observed for teachers' knowledge with respect to gender.

Keywords: Teacher knowledge, Teacher pedagogical knowledge, Professional development, Professional training

I. INTRODUCTION

Nowadays, Teachers need a variety of skills, knowledge and training to become proficient in teaching profession. For effective teaching and learning process in the real classroom situations, not only single skill or knowledge is sufficient. To be a teacher requires extensive and highly organized bodies of knowledge

(Shulman, 1986) and the single factor which seems to have the greatest power to carry forward our understanding of the teacher's role is the phenomenon of teachers' knowledge (Elbaz,1983). So Teachers should knowledge about their subject content as well as pedagogical knowledge so that teachers can respond all the questions asked by the students.It will achieved by the teachers' depth knowledge of specific subject, content knowledge and pedagogical knowledge.

Conceptualizing the teacher knowledge is a complex problem and it is an essential construct from the perspective of students as well as teachers. Teachers' knowledge includes three broad concepts general pedagogical knowledge (principles and strategies of classroom management and organization that are cross-curricular), content knowledge (knowledge of subject matter and its organising structures) and pedagogical content knowledge ((the knowledge which integrates the content knowledge of a specific subject and the pedagogical knowledge for teaching that particular subject), (Shulman, 1986). Pedagogical component includes knowledge of teaching methods, classroom management, knowledge of classroom assessment and adaptivity whereas psychological component incorporates knowledge of learning process and knowledge of individual student characteristics (Voss, Kunter and Baumert, 2011 and König et al., 2011). Teachers' pedagogical content knowledge is the key ingredient to promote professional growth of teachers because it represents prior knowledge, basic concepts, theories and epistemology. Pedagogical content knowledge incorporates appropriate conceptual representation in order to address learners' difficulties and misconceptions (Darling-Hammond, 1997).

1.1 Rationale of the study

Literature supports that teacher subject matter of knowledge is important base for secondary school teachers (Ryan, 2017). To assess the depth of knowledge, assessment tool has been also developed (hill et al, 2014) while taking gender in to consideration with teacher depth of knowledge, some contradictory results have been found. Some literature found that significant difference was found in teachers' knowledge with regard to gender (Kathy,2017) but some literature revealed that there were no influence of gender on teachers' depth of knowledge (Öztürk, 2013). That is why, it is significant to further test the teachers' depth of knowledge with regard to gender in teaching profession. Some researchers revealed that male teachers have high mean scores than female teachers on teachers' knowledge. (Bas & Senturk, 2018). So it is necessary to further reexamine the teachers' depth of knowledge in teaching profession and compare the teachers' depth of knowledge with regard to gender in teaching profession. The novelty of the study is that no comparative study has been found with special reference to both regions of Indiaand with respect to tool and level of education.

I.II. Research Questions

After gone through literature review and significance of the study, the following question raised as:

Q1: Is there any difference in knowledge of secondary school teachers with special reference to Allahabad district of Uttar Pradesh and Cachar District of Assam?

Q2: Does Gender has any effect on Teachers' knowledge?

I.III.Objectives of the study

1. To compare the knowledge of secondary school teachers of Allahabad district of Uttar Pradesh and Cachar District of Assam.
2. To compare the knowledge of secondary school teachers in terms of gender.

II. LITERATURE REVIEW

II.I. Teachers' subject matter knowledge, content knowledge and pedagogical knowledge

It is true that subject matter knowledge is necessary for school teachers and it is fact that teachers have limited subject matter knowledge (Ryan S. Nixon, Kathleen M. Hill & Julie A. Luft (2017). In secondary schools to teach the basic concepts, theories and subject content, teachers' depth knowledge is necessary. Teacher knowledge as a purely theoretical concept was subsequently critiqued for lacking empirical evidences and for being a messy concept. This messy concept has been represented in current standards in to subject specific areas like science and mathematics (National Council of Teachers of Mathematics, 2014). What should be known by teachers and competencies to be possessed by teachers were discussed under the heading of pedagogical content knowledge. (Timur & Tasar, 2011). For effective instruction, researchers (e.g., Ball, Thames, & Phelps, 2008; Magnuson, Kracik, & Borko, 1999) developed the framework and exposed multifaceted interaction between content and pedagogical knowledge. Literature (Tim Burgess, 2013) suggested a framework for examining the knowledge of primary teachers, engaged in teaching statistics and recognized that teacher knowledge is a dynamic and dependent on context of the classroom and students with in it. Similarly research work (Irvine-Niakaris and Kiely, 2015) on reading comprehension and language teaching (Andrews,2007) has elucidated for understanding the complexity of teacher knowledge. Some researchers (Hill et al, 2004) develop an assessment tool to measure teacher knowledge in mathematical operation to check the relationship between teacher knowledge and student achievement. Teachers' content knowledge plays an important role in student performance at lower secondary schools and there is a significant association between teachers' content knowledge and student performance. (Tchoshanoy, M. et al, 2017) Pedagogical content knowledge has been described and refined by Ball, Thames, and Phelps (2005). There is substantial evidence on the importance of pedagogical content and content knowledge, proof on general pedagogical knowledge is scarcer (Guerriero, 2017).Some exploratory study (Julie, Joseph, Taylor, Janet, April, Christopher, Wilson & Molly(2019) measured the pedagogical content knowledge and validated

the model of teacher professional knowledge and also examined the impact of professional development intervention on academic content knowledge general pedagogical knowledge and pedagogical content knowledge. Therefore, Pedagogical content knowledge is as important as content knowledge and professional knowledge. (Mandacı Şahin, Yenmez, Özpinar and Köğçe, 2013). A self-assessment study (Khalid, 2018) investigated the teachers' knowledge in terms of technology, pedagogy and content, revealed that significant difference found in technological content knowledge with regard to teaching subjects and teaching experience. The seven domains of knowledge created by the combination of technological, pedagogical and content were discussed in a single framework (Harris, Mishra and Koehler, 2007; Mishra and Koehler, 2006) and pedagogical content knowledge establishes the connection between pedagogy and content knowledge (Shulman, 1986)

II.II Teachers' knowledge in terms of gender:

The influence of gender on beginning teachers' perception of their technological pedagogical content knowledge assessed in Australian context and found the both male and female responded the knowledge high especially in mathematics content knowledge and significant difference between male and female teachers in terms of how they rated their knowledge. (Kathy, 2017). Similarly a contradictory result has been found that there is no significant interaction effect of mathematics teachers' content knowledge, pedagogic knowledge, students' gender and school type on students' academic achievement in algebra. In terms of gender variable, an investigation in Turkish context revealed that there is a statistical significant difference between male and female in-service teachers regarding the level of technological knowledge, Pedagogical content knowledge, and technological pedagogical content knowledge sub-dimensions and showed that male in-service teachers have higher mean scores in these sub-dimensions than their female colleagues (Bas & Senturk, 2018). Further study indicated that teachers' pedagogical content knowledge perceptions of teachers are influenced by other demographic variables (i.e. occupational experience, educational level, teaching level, etc. Similarly study (khalid, 2018) revealed that significant difference found in teachers' knowledge on the basis of their gender and teaching experience. Similarly literature revealed that pre-service teachers technological pedagogical content knowledge did not vary significantly depending on gender and grade level. (Can, Dogru & Bayir, 2017). Study also reported that the pre-service classroom teachers' technological knowledge, content knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge and technological pedagogical content knowledge are not affected from gender (Öztürk, 2013).

III. Methods and Materials

This study is based on descriptive research. In the present study, the survey method was employed to investigate teachers' knowledge with regard to gender in teaching profession. The main purpose of survey method is to describe the characteristics of a population (Fraenkel & Wallen, 2009). Survey are the methods for gathering information about the characteristics, actions or opinions of a large group of people (Pinsonneault and Kraemer, 1993)

The total number of secondary school teachers of Cachar district from Assam and Allahabad district from Uttar Pradesh were the population of the study. Among them 200 secondary school teachers were selected as sample of the study. All the samples were collected by following stratified random sampling technique.

The survey instrument on teacher knowledge was based on likert scale, adopted from professional development scale constructed by Dr. Yodida Bhutia for mapping the respondents' knowledge in teaching profession. Statements were related to general pedagogical knowledge and pedagogical content knowledge. The inventory has five point options (e.g. Always, usually, occasionally, seldom, never). All the Positive items were scored with 4,3,2,1 & 0 respectively and all the negative statements were scored with 0,1,2,3 & 4 respectively.

After developing the survey instrument, the researcher administered the instrument among the sample to assess the teachers' knowledge. Initially the sample were selected and the researcher request to respond the scale. After getting the consent, the researcher met each and every participant to get the response towards the tool. This process was continued upto 3 months and finally the data were collected and analysed.SPSS version 21 used to analyse the collected data. In this study paired t-test and one way ANOVA was used to draw the inferences.

IV. RESULTS AND DISCUSSION

The descriptive analysis showed the comparisonof secondary schoolteacher knowledge of cachar and Allahabad district and same is depiceted in table 4.1.

Table 4.1: Comparison of teachers' knowledge throuth t-test

Districts	No	Mean	SD	t-value
Cachar(Assam)	100	39.62	5.28	3.44*
Allahabad (UP)	100	36.68	6.72	

*Significant at .05 level

The table 4.1 shows thatthe calculated t- value is 3.44 at 0.05 level which is greater than the table value 1.97 for secondary school Teachers' knowledge of Cachar and Allahabad district. It confirms that there is significant difference in teacher knowledge of secondary school teachers of Cachar and Allahabad district. From the above table it is clear that significant difference was found between the professional development of secondary school teachers of Cachar and Allahabad.To confirm the above results the further analysis of data was done with the help of inferential statistics ANOVA and the results were depicted in the table4.2.

Table4.2: Comparison of teachers' knowledge through ANOVA

		Sum of Squares	Df	Mean Square	F

Teacher Knowledge	Between Groups	7324.60	6	1220.77	691.13
	Within Groups	340.90	193	1.77	
	Total	7665.50	199		

From the observation of above table4.2, it is clear that calculated sum of squares value of teacher knowledge score of secondary school teachers of Cachar and Allahabad between groups and within groups are 7324.60 and 340.90. Mean square of between groups and within groups is 1220.77 of df 6 and 1.77 of df 193. For the teacher knowledge of secondary school teachers, the calculated F value 691.13 was found which is greater than the table value of said df that shows there was significant difference in teacher knowledge of secondary schools of Cachar and Allahabad district.

To compare the teachers' knowledge of secondary school teachers in terms of gender, further t-test has been applied to draw the results and depicted in table4.3.

Table 4.3: Comparison of teachers' knowledge in terms of gender through t-test

Districts		No	Mean	SD	t-value
Cachar	Male	50	39.94	5.48	0.604
	Female	50	39.30	5.11	
Allahabad	Male	50	36.54	6.02	0.037
	Female	50	36.82	7.42	

Table 4.3 shows the calculated t-value for teacher knowledge of secondary school male and female teachers of Cachar district is 0.604 at 0.05 level, which is less than the table value 1.984. It shows that there is no significant difference in knowledge of secondary school male and female teachers of Cachar district. In case of Allahabad district, the calculated t-value of male and female secondary school teachers for teacher knowledge of Allahabad district is 0.037 at 0.05 level, which is less than the table value 1.984. It shows that there is no significant difference in knowledge of male and female secondary school teachers of Allahabad district.

To confirm the above inferences, further analysis of data was done with the help of inferential statistics ANOVA and depicted in below table 4.4.

Table 4.4: Comparison of teachers' knowledge in terms of gender through ANOVA

	District		Sum of Squares	Df	Mean Square	F
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Teacher Knowledge	Cachar (Assam)	Between Groups	2610.40	5	522.08	329.00
		Within Groups	149.16	94	1.59	
		Total	2759.56	99		
	Allahabad (UP)	Between Groups	4303.28	6	717.21	391.24
		Within Groups	170.48	93	1.83	
		Total	4473.76	99		

The above table 4.4 confirms that the F-value of male and female teachers of Cachar district with regard to their knowledge (df 5/94, 329.00) was not significant. Similarly F-value of male and female teachers of Allahabad district with regard to their knowledge (df 6/93, 391.24) was not significant. Similar results have been found in study of teacher' knowledge in terms of gender. (Öztürk, 2013)

V. CONCLUSION

After comparing the teachers' knowledge of two different states - Assam and Uttar Pradesh - of India, it was found that there was significant difference in their knowledge while comparing the teachers' knowledge in terms of gender there was no significant difference was found in these both states of India. This study showed the variations in teachers' knowledge with special reference to North East India and North India on teachers' knowledge. Therefore teachers' knowledge is significant vary from context to context and play a role of precursor in professional development of secondary school teachers in indian context. Demographic variable like gender does not have any strong influence on teachers' knowledge in indian context.

Teachers' knowledge is highly responsible for professional development at each level of education, from primary to higher. Teachers' content and pedagogical knowledge can be enhanced through the collaboration of colleagues in workplace as well as outside the workplace. For strengthening pedagogical knowledge and skills, teachers are using latest technology like advance web 2.0 technology in indian classrooms. Workshops and conferences related to teaching subject are better means of boosting teachers' content, pedagogical and technological knowledge. Pedagogical knowledge of teachers can enriched through in-service teacher training program run by teacher training institutions and other educational bodies in indian context. Therefore, teachers' knowledge is a significant construct for self upgrading and key dimension in professional development of teachers at all levels of education in order to bring reform in student learning performance.

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