

Impact of Techno-pedagogical Competency on Teacher Effectiveness of Senior Secondary School Teachers

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Abstract: This article aims to discuss the impact of techno-pedagogical competency on the teacher effectiveness of senior secondary school teachers. Correlation, t-test and ANOVA were employed on a sample of 400 senior secondary school teachers including 220 males and 180 females. Two types of data collection tools were used in the study; (TES –KU) developed by Dr. Umme Kulsum (2017, revised) and Teacher's Techno-pedagogical Competency Scale (TTPCS-RSSR) developed by Dr. Rajeshkar and K. Sathiyaraj (2017) revised. The data of the study were analyzed by using the Statistical Package for Social Science (SPSS) 22.0. Positive and significant relationship was obtained between the teacher effectiveness and techno-pedagogical competency of senior secondary school teachers. The level of techno-pedagogical competency showed a direct and proportional relationship with teacher effectiveness. Senior secondary school teachers having higher level of techno-pedagogical competency tended to have higher level of teacher effectiveness in comparison to those having lower level of techno-pedagogical competency.

Key Words: Techno-pedagogical Competency, Teacher Effectiveness, senior secondary school Teachers

i. Introduction

Teacher effectiveness is important because effective teaching helps student learning. It has become even more important as the emphasis on quality in higher education has increased. Effective learning does not occur by chance. Effective teachers have become good at what they do because they evaluate their practice. As new technologies permeate our society, they are also becoming more and more of a factor in today's classrooms. The promise of technology in education is significant. Technology offers the potential of individualized instructions for every student as students become actively engaged in and responsible for their own learning. Technology beckons educators with more opportunities for learning and increases in student achievement. The rapid development in educational technology has redefined the teaching and learning process to a greater extent. It has given a new face lift to the traditional classroom. Beaudin and Hadden (2004) revealed in their study that techno-pedagogical skill helps the students for further development, accomplishment of learning outcomes and preserve the context of designing classroom based resources through the use of ICT by the teachers. Therefore, techno-pedagogy method was an essential component of teacher education. Techno-pedagogical competency is nothing but the ability of the teachers to make use of technology effectively in teaching. Koehler and Mishra (2005) found in their study that better teaching was simply adding technology rather the introduction of technology causes the representation of new concepts and needs developing sensitivity of the dynamic, pedagogy, content and knowledge. Sathiyaraj and Rajeshkar (2013) found in their study that the techno-pedagogical expertise needs to be improved in order to equip teachers to face the students belong to the digital era and also to face the challenge in the modern classrooms. Therefore, it is must for the teachers to get acquaintance with the application of recent technological principles and gadgets in their teaching and hence there is an urgent need to examine the techno-pedagogical competency possessed by the teachers.

ii. Review of Related Literature

Aina et al. (2015) studied teacher effectiveness and its influence on students' learning. The research was conducted on teacher effectiveness and to examine its influence on student's learning. The study revealed that teacher effectiveness is very important for student learning and it could be determined through qualitative research method. The study concluded that professional focus is the hallmark of teacher effectiveness. Rupnar (2015) studied teacher effectiveness and related characteristics of trained secondary school teachers in West Bengal. A sample of 460 teachers was taken from Calcutta university affiliated B.ed colleges. Tools used were Kulsum Teacher Effectiveness scale (KTES), Teacher Aptitude test (TAT), Work Task Motivation Scale for Teachers (WTMST) and NEO-Five Factor Inventory (NEO-FFI). T-test, ANOVA and Multiple regression were used for analysis. The major findings of the study were 1) Male school teachers were found more significant than their female counterparts 2) There was significant positive correlation between teacher effectiveness of trained secondary government aided school teachers and their teacher aptitude 3) A significant positive correlation was found between teacher effectiveness of trained secondary government aided school teachers and their work task motivation from the results of correlation analysis. Survana (2015) studied teacher effectiveness in relation to emotional intelligence and personality traits of secondary school science teachers. The present study aimed to determine the relationship of teacher effectiveness, emotional intelligence and personality type of secondary school science teachers. A sample comprised of 428 secondary school teachers of Mandya District of Mysore, India. Multistage sampling technique was used. For data collection, tools like Teacher Effectiveness Scale by Umme Kulsum, Emotional Intelligence Scale prepared by the investigator himself, Eysenck Personality Inventory by Hans Eysenck were used. The major findings of the study were 1) No significant difference was found between the male and female secondary school science teachers with respect to teacher effectiveness 2) No significant difference was found between male and female secondary school science teachers in their level of emotional intelligence 3) with respect to personality type, juniors and seniors science teachers of secondary school differ with each other. Anand (2016) studied teacher effectiveness in relation to social intelligence and self-concept of secondary school teachers. This study investigated the effectiveness of secondary school science teachers in relation to their social intelligence and self-concept. A sample of 5072 teachers working in Government and private aided and private unaided schools from Mysore district were selected by multistage

sampling technique. For data collection, Teachers Social Intelligence Scale, self-concept Scale prepared by investigator himself and Umme Kulsum Teacher Effectiveness Scale were used. T-test, one way ANOVA, Pearson's product moment correlation were used for data analysis. The main findings of the study were 1) There is no significant difference between male and female teachers, teachers belonging to arts and science faculty and less and more experienced teachers with respect to total teacher effectiveness 2) there is no significant difference between male and female teachers, teachers belonging to arts and science faculty and less and more experienced teachers with respect to total social intelligence. Yaluma (2017) studied Effects of teacher effectiveness on student achievement. This study examined how teachers of various levels of effectiveness impact student achievement. Researchers analyzed multiple years of educational data, using as many data points as were available for each teacher. The authors found the distribution of teacher effectiveness resembles a bell curve, which means educators who were nearer to the middle of the curve have similar effects on student achievement, regardless of which percentile of teachers fall into. Students educated by the teachers in the 98th percentile were much better off than their peers where the teachers fall into 88th percentile. Ozdemir (2016) studied an examination of the techno-pedagogical education competencies (TPACK) of pre-service elementary school and pre-school teachers. Researcher made a descriptive study to determine the techno-pedagogical content knowledge of pre-service elementary school and pre-school teachers. A sample of 995 pre-service elementary school and pre-school teachers were selected from departments of elementary school teachers and pre-school teaching at the three state universities in the spring term of 2014-2015 academic year. The study found that the means of junior (third year) and senior (fourth year) pre-service teachers in the departments of elementary school teaching and pre-school teaching to be high. Their means were also high in the sub dimensions of TPACK competence. The TPACK means of pre-service elementary school and pre-school teachers were also found to be high. The study concluded with the statement that the pre-service education had positive effects on TPACK. Along with the education, pre-service elementary school and pre-service teachers should be provided with opportunities to use technology. Kececi and Zengin (2017) studied the technological pedagogical and content knowledge levels of science teachers. Researchers planned to observe the techno-pedagogical and content knowledge of teacher candidates. The sample consisted of 4th grade students of Firat University, Faculty of Education. In the study, partially mixed concurrent equal status design was used for the quantitative data. The data was obtained from observation forms which were filled by the researchers of the study, teacher candidates and their peers. The results of the study showed that the teacher candidates had a moderate level of techno-pedagogical content knowledge. Leema and Saleem (2017) studied Infusion of techno-pedagogy in elementary teacher education curriculum: perspectives and challenges. Researchers made an effort to review newly revised and restructured elementary teacher education curriculum of Kerala for contents to improve techno-pedagogical skills of student teachers and tried to perform analysis on the effectiveness of current contents enabling techno-pedagogical skills in the teacher education curriculum of Kerala. The study revealed that weightage in the newly revised elementary teacher education syllabus, but to facilitate pre-service teachers with the techno-pedagogical skills, the present teacher education scenario has to improve upon most of the impeding factors. Yildiz (2017) studied the factors affecting Techno-pedagogical competencies and critical thinking skills of pre-service mathematics teachers. The present study investigated whether techno-pedagogical competencies and critical thinking skills show statistically significant difference in terms of some variables and whether there is statistically significant relationship between critical thinking skills and techno-pedagogical competencies of pre-service elementary mathematics teachers. The results of the study revealed that the techno-pedagogical competencies and critical thinking skills of pre-service mathematics teachers are midlevel. On the other hand, a significant relationship was found between the pre-service teachers, mathematics teachers, critical thinking skills and techno-pedagogical competencies.

iii. Need and Importance of the Study

Today teachers are facing many challenges and are trying to keep pace with the continued progress in information resources. Changes are inevitable and therefore, a teacher is effective if he can use effective strategies to promote student's motivation to learn and integrate technology into the curriculum. Information technology (IT) if used properly has the ability to enhance relationships between teachers and students. When teachers effectively integrate technology into subject areas, teachers grow into roles of adviser, content expert and coach. But only the technological up gradation of educational institutions will not change the performance of our students unless the teachers have the positive attitude towards its adaption, use and application in the teaching learning process. Highly effective teachers have right attitude towards technology and provide opportunities for students to learn to operate in an information age.

There are a number of factors that affect teacher's performance. Previous research studies confirm that techno-pedagogical competence is one of the factor which leads to effective teaching (Sathiyaraj 2013). To be effective, teachers also need to possess techno-pedagogical skills /competencies which enable them to manage time, optimize the integration of technologies and to invest new interactive technologies congruence with the nature of subject. These skills enable the teachers to design appropriate tasks. Acquiring techno-pedagogical proficiencies will make teaching and learning a pleasurable exercise as it would lessen the pressure on the teachers and enable the students to delve deeper into the domain of knowledge. Identifying how techno-pedagogical skills will help teachers in implementing strategies easily and how to assess the potential and limits of teaching for making teaching effective is an important issue. Thus, findings from this study may provide the teachers information about the importance of adopting techno-pedagogical skills /competencies in their teaching.

iv. Materials and Methods

The present study was descriptive in nature. Target population of the study comprised of senior secondary school teachers from the Ganderbal and Srinagar district of Jammu and Kashmir state of India. A sample of 400 teachers includes 220 males and 180 females working in 100 different senior secondary schools was drawn from the target population by simple random sampling technique. As far the tools are concerned, only standardized tests were employed for obtaining valid and reliable data for dependable results. The tools used for data collection in present investigation are listed below:

- 1.) Teacher Effectiveness Scale (TES-KU) developed by Dr. Umme Kulsum (2017, revised).
- 2.) Teacher's Techno-pedagogical Competency Scale (TTPCS-RSSK) developed by Dr. Rajeshkar and Sathiyaraj (2013).

v. Objectives of the Study

1. To study the general pattern of teacher effectiveness of senior secondary school teachers.
2. To explore the level of techno-pedagogical competence of senior secondary school teachers.
3. To explore the relationship between teacher effectiveness and techno-pedagogical competence of senior secondary school teachers.

vi. Hypothesis of the Study

There will be no significant relationship between the teacher effectiveness and techno-pedagogical competence of higher secondary school teachers of Kashmir.

vii. Distribution of Sample

A Simple random sampling technique was employed by the researcher with a purpose to select a sample of 400 teachers at higher secondary school level from district Ganderbal and district Srinagar of the Jammu and Kashmir state, of India.

viii. Statistical Treatment of the Data

Descriptive and inferential techniques have been used in the present study by the investigator. To analyse the collected data for 400 higher secondary school teachers of Kashmir, SPSS Package version 22.0 has been used. Descriptive statistics such as mean, standard deviation and Inferential statistics such as t-test, one way ANOVA, Pearson's correlation coefficient and step wise regression analysis have been used.

ix. Statistical Analysis of Data, Results and Discussions**Objective No 1: To study the general pattern of teacher effectiveness of senior secondary school teachers.**

In order to study the general pattern of teacher effectiveness of senior secondary school teachers, scores on the teacher effectiveness scale were divided into five groups i.e. Most effective, Effective, Average, Ineffective and Most ineffective based on the categorization in the manual of Teacher Effectiveness Scale (TES). Percentage and number of teachers falling in each group is shown in Table 1.1 and the mean of teacher effectiveness scores is shown in Table 1.2.

Table 1.1: Category wise distribution of teachers on teacher effectiveness variable

Groups of teachers	Score Limit	Number of Higher secondary school teachers	Percentage
Most Effective	435-more	58	14.50%
Effective	367-434	181	45.25%
Average	321-366	28	7 %
ineffective	253-320	115	28.75%
Most ineffective	252-below	18	4.5%

Table 1.2: Mean and S.D of total Teacher effectiveness scores of Senior secondary school teachers of Kashmir

N	Variable	M	S.D
400	Teacher Effectiveness	372.51	85.305

On the basis of Table 1.1, it was inferred that the highest percentage of teachers were reported in effective group of teachers (i.e. 45.25%) and the lowest percentage was reported in the average group of teachers (7%). However, the percentage of teachers in Ineffective, and Most ineffective groups were found to be 28.75% and 4.5% respectively. The Most effective group was found to have 14.5% of teachers.

Further perusal of Table 1.2 showed that mean teacher effectiveness score of the total sample is 372.51 with an S.D of 85.30 which falls in the score limits of effective group revealing that most of the teachers in the senior secondary schools were found to be effective which is supported by the percentage of teachers in the effective group. However, it is also evident from the results that a sufficient number of teachers are ineffective in the senior secondary schools of Kashmir (28.75%). The results become more clear from the Fig 1.1

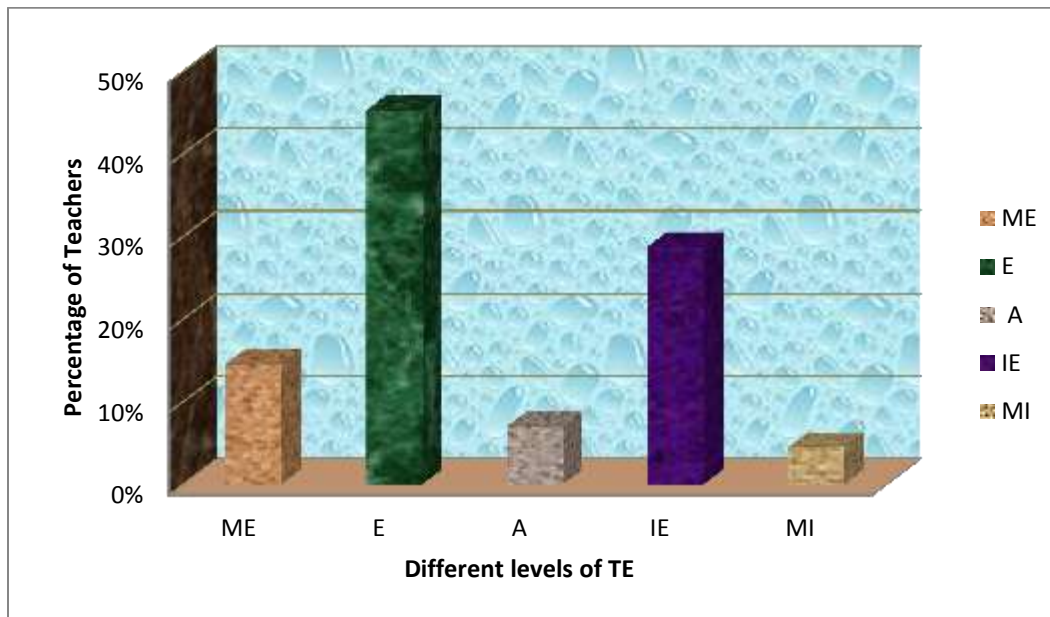


Figure 1.1: Percentage wise distribution of teachers in different groups of teacher effectiveness

Objective No.2: To explore the level of Techno-pedagogical competence of senior secondary school teachers.

To have an idea about the level of techno-pedagogical competence of senior secondary school teachers, scores on the Techno-pedagogical competence scale were divided into three groups using the norms from the manual of scale. These three groups are as follows: i) Highly Techno-pedagogical competent ii) Average Techno-pedagogical competent iii) Low Techno-pedagogical competent teachers. The number of the teachers falling in each group is presented in the Table 1.3 and the mean of total techno-pedagogical scores is given in Table 1.4.

Table 1.3: Distribution of the teachers in different groups on Techno-pedagogical competence Variable

Groups of teachers	Score Limit	Number of Teachers	Percentage
Highly Techno-pedagogical competent	0.51 and above	170	42.50%
Average Techno-pedagogical Competent	-0.5 to +0.5	98	24.5%
Low Techno-pedagogical Competent	-0.51 and below	81	33%

Table 1.4: Mean and S.D of total techno-pedagogical competence scores of senior secondary school teachers.

N	Variable	Mean	Score Limit	S.D
400	Techno-pedagogical competence	106.04	+0.19	31.611

Results from the Table 1.3 revealed that the highest percentage (42.50) of teachers was reported in the group of teachers having high techno-pedagogical competence. However, the percentage of teachers in the average techno-pedagogical competence group and low techno-pedagogical competence group were found to have 24.5 % and 33% respectively. This shows that majority of senior secondary school teachers are having high techno-pedagogical competence. This also draws support from the mean of total techno-pedagogical competence scores i.e. 106.04 which falls in the score limits of the group of teachers having high techno-pedagogical competence. The percentage distribution of teachers and the level of their techno-pedagogical competence is presented in the Fig 1.2.

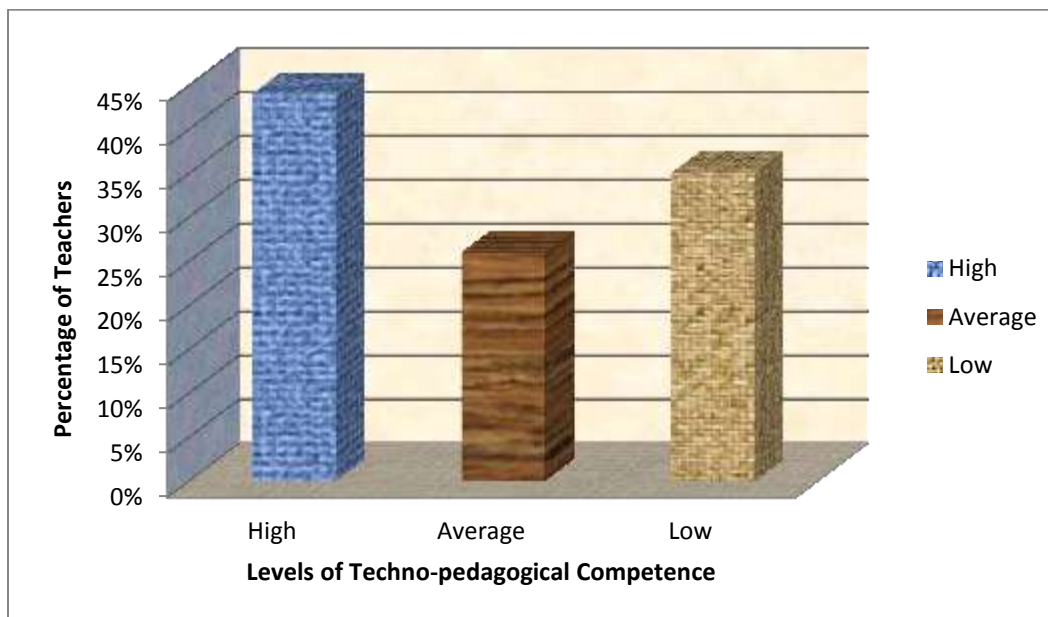


Figure 1.2: Percentage wise distribution of teachers as per their level of techno-pedagogical competence

Objective No. 3: To study the relationship between teacher effectiveness and techno-pedagogical competence of senior secondary school teachers.

Hypothesis : There will be no significant relationship between teacher effectiveness and techno-pedagogical competence of senior secondary school teachers.

In order to study the relationship between teacher effectiveness and the independent variable techno-pedagogical competence of senior secondary school teachers, Pearson product moment correlation was applied that yielded a correlation coefficient of 0.539 (Table 1.5). It means that there is a significant positive relationship between teacher effectiveness and techno-pedagogical competence, indicating that higher the teacher effectiveness, higher is the techno-pedagogical competence.

Regression analysis was also applied to find out the effect of techno-pedagogical competence on teacher Effectiveness of senior secondary school teachers. Results are presented in the table 1.5

Table 1.5: Relationship of teacher effectiveness and techno-pedagogical competence of senior secondary school teachers

Independent variable(s)	Unstandardized coefficients		Standardized coefficients	t	Pearson r
	B	Std.error	β		
Constant	218.769	12.580	.539	17.390	.539*
Techno-pedagogical competence	1.450	.114		12.753*	

*significant at 0.01 level

$R^2 = .290$; $F_{(1,399)} = 162.650$; $p < 0.01$

On the basis of Table (1.5) it is clear that techno-pedagogical competence significantly affected teacher effectiveness ($F_{(1,399)} = 162.650$; $p < 0.01$) and explained 29% of variance in teacher effectiveness. The positive β coefficient bearing significant t value supported that techno-pedagogical competence had a positive influence on teacher effectiveness of senior secondary school teachers. Therefore, the null hypothesis stating that "There will be no significant relationship between teacher effectiveness and techno-pedagogical competence of higher secondary school teachers of Kashmir" is rejected.

Discussion:

Analysis of data rejected the null hypothesis that there will be no significant relationship between teacher effectiveness and techno-pedagogical competence of senior secondary school teachers. Findings revealed that teachers having high level of techno-pedagogical competence have higher level of teacher effectiveness. It therefore, lends credence to the fact that techno-pedagogical competence is the key deciding factor for teacher effectiveness. Use of techno-pedagogical skills can breakdown some of the barriers that lead to underachievement, student disaffection and educational exclusion (Das, 2007).

Techno-pedagogical competence is very much needed for teachers in teaching and learning process, as it facilitates the effective teaching and learning. The teachers develop techno-pedagogical competence and then they may try to make use of this often in teaching and it will in turn make the learning process simple and effective. Beaudin and Haddin (2004) revealed in their study that techno-pedagogical skills

foster the students for further development, attainment of learning outcomes and maintain in the context of designing classroom based resources through the use of technology by the teachers. Therefore, techno-pedagogy method is important for teacher education. Koehlar and Mishra (2005) found in their study that teaching is not simply adding technology rather the introduction of technology causes the representation of new concepts and requires developing sensitivity to the dynamic transactional relationships among technology, pedagogy, content and knowledge.

The teacher with deep techno-pedagogical knowledge understands how student construct knowledge and acquire skills, develop habits of mind and positive dispositions towards learning. Techno-pedagogical skills are the ways to make accessible and affordable quality education to all. Thus, the teachers should adapt the techno-pedagogical competencies /skills and incorporate a number of supporting pedagogical features into instruction for better learning outcomes.

x. Findings of the Study

The main findings of the present investigation are as follows:-

- 1) Majority of the senior secondary school teachers were found to be effective. In respect of the entire sample, as many as, 14.5% of teachers are reported as most effective teachers, 45.25% teachers are effective, 7% are average, 28.75% are ineffective and only 4.5% are reported as most ineffective teachers.
- 2) Most of the senior secondary school teachers possessed the high level of techno-pedagogical competence. Out of the total sample, 42.5% were found to have high level of techno-pedagogical competence, 24.5% have average level of techno-pedagogical competence and 33% have low level of techno-pedagogical competence.
- 3) Teacher effectiveness is positively and significantly correlated ($r=.539$, $p<0.01$) with techno-pedagogical competence of senior secondary school teachers of and approximately explained 29 % of variance in their teacher effectiveness.

xii. Conclusion

The present research study was conducted on 400 senior secondary school teachers with the purpose of exploring the effect of techno-pedagogical competence on the teacher effectiveness of senior secondary school teachers. Initially the sampled teachers were assessed for their level of teacher effectiveness, techno-pedagogical competence. On the basis of results, it is concluded that senior secondary school teachers possess high level of techno-pedagogical competence, have positive attitude towards information technology and are effective in delivering their duties of instruction. Further correlation results made it clear that teacher effectiveness is positively correlated with techno-pedagogical competence and it can be concluded that effective teachers possess high level of techno-pedagogical competence. In other words, we can say that teachers' performance increases with the increase in their techno-pedagogical competency.

xiii. Educational Implications

The usefulness and effectiveness of the existing educational system largely depends upon active, competent and effective teachers. In this perspective, the present research primarily concerned with teacher effectiveness of senior secondary school teachers may have strong and useful educational implications in the existing educational setup of our country.

The observations and findings of the study on teacher effectiveness can help teachers to identify their weaknesses and strengths for further professional development. By providing the information about the teacher effectiveness of senior secondary school teachers, this research may provide guidance to teachers working in senior secondary schools on how to perform better and how to be effective in their teaching.

Findings imply that majority of the teachers in the senior secondary schools are effective but the percentage of most effective teachers is very low i.e. 14.5% only. Thus, there is need to increase the percentage of most effective teachers by making ample efforts on the part of school and state in order to get the extraordinary learning outcomes.

The present study reported a significant effect of techno-pedagogical competence on the teacher effectiveness of senior secondary school teachers. Thus, efforts should be made to develop techno-pedagogical skills both at pre-service and in-service level by arranging workshops, orientation and refresher courses.

References

- [1] Aina, J.K., Olanipekun, S.S., & Garuba, I.A. (2015). Teacher Effectiveness and its influence on students' learning. *Advances in Social Science Research Journal*, 2(4), 89-95.
- [2] Anand, N.K. (2016). Teacher Effectiveness in relation to social intelligence and Self Concept of Secondary School Teachers" (Ph.D Thesis, Education). University of Mysore, India. Retrieved Dec 20, 2017 from <http://hdl.handle.net/10603/140802>.
- [3] Beaudin, L., & Hadden, C. (2004). Developing Pedagogical skill in pre-service teachers. In *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare and Higher Education 2004*, 492-498. Norfolk, V.A: Association for the Advancement of Computing in Education.
- [4] Kececi, G., & Zengin, F.K. (2017). Observing the technological pedagogical and content knowledge levels of Science teacher candidates. *Educational Research and Reviews*. 12(24), 1178-1187.
- [5] Koehlar, M.J., & Mishra, P. (2009). What is Techno-pedagogical Content knowledge? *Contemporary Issues in Technology and Teacher Education*. 9 (1), 60-70.
- [6] Leema. M., & Saleem, T.M. (2017). Infusion of Techno pedagogy In Elementary Teacher Education Curriculum: Perspectives and Challenges. *IOSR Journal of Humanities and Social Science*, 22(1), 6-10.
- [7] Ozdemir, M. (2016). An examination of the techno-pedagogical education competencies (TPACK) of pre-service elementary school and pre-school teachers. *Journal of Education and Training Studies*, 4(10), 70-78.
- [8] Rupnar, D. (2015). Teacher effectiveness and related characteristics of trained secondary school teachers in West Bengal (Ph.D thesis). University of Calcutta, India. Retrieved from Dec 18, 2017 from <http://hdl.handle.net/10603/171451>.
- [9] Sathiyaraaj, K. (2013). A study of techno-pedagogical competencies of teachers as related to certain variables (Ph.D thesis, Education). Annamalai University, India. Retrieved Jan 3, 2018 from <http://hdl.handle.net/10603/44793>.

- [10] Survana , V.D. (2015) . A study of teacher effectiveness in relation to emotional intelligence and personality type of secondary school science teachers (Ph.D thesis, Education). University of Mysore, India. Retrieved Dec 20, 2017 from <http://handle.net/10603/94017>.
- [11] Yaluma,C. (2017). The effects of teacher effectiveness on student achievement .Thomas B. Ferdhem Institute. Retrieved Dec 1, 2017 from Flypeper Blog.
- [12] Yildiz, A. (2017). The Factors Affecting Techno-pedagogical competencies and critical Thinking Skills of Pre-service Mathematics Teachers. Malysian Online Journal of Educational Sciences, 5(2), 66-81.

