



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2019; 5(12): 362-370
www.allresearchjournal.com
Received: 11-10-2019
Accepted: 15-11-2019

Dr. Nibedita Guru
Associate Professor in
Education, Radhanath,
Institute of Advanced Studies
in Education Utkal University,
Cuttack, Odisha, India

Mihir Kumar Beura
Research Scholar, Radhanath
Institute of Advanced Studies
in Education Utkal University,
Cuttack, Odisha, India

Correspondence Author:
Dr. Nibedita Guru
Associate Professor in
Education, Radhanath
Institute of Advanced Studies
in Education Utkal University,
Cuttack, Odisha, India

Techno-pedagogical competency of higher secondary school teachers in relation to students' academic achievement in science

Dr. Nibedita Guru and Mihir Kumar Beura

Abstract

More than three decades ago computers and related information technologies were introduced to education for direct teaching and learning purposes. It started with the presentation of the software to CAL/CBT/CAI and then moving multimedia course and finally to learning management system using open and flexible learning. Every day new scientific and technological innovations are taking place. These innovations are to be implemented in the field of educational theory and practice. Technology interferes; each aspect of human life, including the field of education. Being a teacher one should know the importance of technology as it had made the student to understand easily the content deliver by the teacher. When it came to teaching theories, the Teachers should give up the mechanical approach and make it interesting by simulating problems and finding solutions to such imaginary issues. The purpose of this study is to determining the technological and pedagogical competency of higher secondary school teachers with the relation to students' academic achievement in science. This is a descriptive study. It was conducted using the survey model. This research aims to investigate whether the academic achievements in science of higher secondary school students and the techno-pedagogical competency of their teachers show statistically significant relationship in terms of some variables like gender and locale. The study was administered upon 100 teachers and 100 students of Cuttack district. And the findings of the study were revealed that majority of teachers were having moderate level techno-pedagogical competency and teachers belong to urban area were having high techno-pedagogical competency than that of rural area because of the variability in facilities available in urban and rural school. The techno-pedagogical competency of teachers and academic achievement of students are related each other.

Keywords: Techno-pedagogical competency, academic achievement, higher secondary school teachers and students etc.

Introduction

“Education is not the filling of a pail, but the lighting of a fire.”

William Butler

Education is defined as the systematic process of obtaining ability and knowledge through formal and informal exposer information ideas, experiences. It plays an important role in shaping the personality of an individual. Education now eyewitness of paradigm shift from the era of traditional chalk-and-talk teaching methodology to digitizing the pedagogical approach through technical devices and stylus is the result of development of technology. The concept of traditional class room has been changed to digital class room for constructive teaching learning process. Every new innovation is entering in the field of education, mainly to assist the teachers in effectively handling her classroom. We are living in a digital planet here the education so intricately tied to information and communication technology, the learner today and tomorrow are directly related to technologies. Technology helps learner in self-learning and personalized learning within and outside the classrooms. The teachers are using digital technologies to engage students with more personalized experiences. The ever-growing development is technology has defined teaching learning in a new way. It has given new outlook to classroom and changed the pedagogy completely. Therefore, it is necessary for teachers to get acquaintance with the integration of the technology in the classrooms.

Knowledge about the technology is important in itself, but not as a separate. Integrating technology into teaching-learning transaction has been found to transform the teacher's role from being the traditional 'Sage on the Stage' to also being a 'Guide on the side,' and students' roles also change from being passive receivers of content to being more active participants and partners in the learning process. More than three decades ago computers and related information technologies were introduced to education for direct teaching and learning purposes. It started with the presentation of the software to CAL/CBT/CAI and then moving multimedia course and finally to learning management system using open and flexible learning. Every day new scientific and technological innovations are taking place. These innovations are to be implemented in the field of educational theory and practice. Technology pervades all walks of life and almost every field of human endeavor, technological skills are becoming essential in all subject areas because the computer is now the universal vehicle for the acquisition and dissemination of information in all fields. It is closely related innovation and transformation of knowledge into new and useful product. Process of innovation requires not only creative people and organization but also the availability of technology and science and engineering talent. There is no doubt that the major challenges to be encountered in the integration of ICT in the classroom will be the pedagogical implications, the impact on the structure and content of curriculum, classroom organization and practice, and the changed role of the teacher. The last two decades have witnessed the inclusion of developments in techno-pedagogical skills in higher education systems around the world. Use of techno-pedagogical skills can break down some of the barriers that lead to underachievement, student disaffection and educational exclusion. Students and teachers of the 21st century are expected that information be accessible, instantaneous, and multidimensional. Teachers' integration of technology is stalled by the lack of successful development opportunities in the constructs of technology and pedagogy.

Educational technology

Technology also closely associated with innovations, the transformation of ideas into new and useful products or process. Education and Technology are interrelated with each other. Educational Technology is the application of the laws as well as recent discoveries of science and technology to the process of education. In other words it is said that educational technology is the application of scientific methods and techniques to education. Educational Technology is often considered to be intermixing of two aspects- technology of education and technology in education. Technology of education symbolises a technological approach to education and technology in education symbolises the application of technology to any process of the educational enterprises.

Technological competency

In general Competency means the ability to do something successfully or efficiently. Competency is defined as "adequate for the purpose, suitable, sufficient or as legally qualified, admissible or as capable". The synonyms of competency are capability, ability, proficiency, expertise, skill etc. Just as other professionals utilize specific

technologies as tools to enhance their work, teachers must likewise become adapt in putting technology to use as the field of educational software evolves with the various academic disciplines. Technology can support teachers in numerous professional activities first and foremost in stimulating learning beyond the classroom and also develop our knowledge about working with technology, tools and resources and working with technology can apply to all technology tools and resources.

Pedagogy

Pedagogy is the discipline that deals with the theory and practice of teaching. Pedagogy is derived from two Greek words "paid and agogos". "paid" means child and "agogos" means leading. So the term pedagogy literally means "to lead the child". Thus pedagogy has been defined as the art and science of teaching children. So pedagogy is the art or profession of teaching and preparatory training or instruction. It is a master plan that includes a detailed analysis of what is to be done by a teacher. Pedagogy informs teaching strategies, teacher actions, and teacher judgments and decisions by taking into consideration theories of learning, understanding of students and their needs, and the backgrounds and interests of individual students. Different types of Pedagogical Approach are as follows; Khan's (2000) listed 20 major "natural types" that he developed under the head "pedagogical" in his eight-components framework for e-learning, like Presentation, Exhibits, Demonstration, Drill and Practice, Tutorials, Games, Story Telling, Simulations, Role-playing, Discussion, Interaction, Modeling, Facilitation, Collaboration, Debate, Field Trips, Apprenticeship, Case Studies, Generative Development, and Motivation.

Pedagogical competency

Pedagogy is an art of teaching. Some strategies are better suited for teaching certain skills and knowledge than others. Some strategies are better suited considering students' background, learning strategies and abilities (Notify-RSS, 2002). The use of best pedagogy in the classroom encourages the well-being of the individual as well as community. Pedagogical competency is much more than verbal communication. It includes knowledge about different "alternatives instructional methods". Pedagogical competence also means the teaching and educational qualification of teachers and while assessing the pedagogical competency, the quality of teaching should be the prime concern of each person. Pedagogical competence is based on sound, broad and current knowledge within the subject area, as well as knowledge of student learning and subject-based teaching and learning issues.

Techno-pedagogical competency

This is the hybrid method of teaching in which ICT is used for teaching learning situation. It is the skills of the teachers effectively integrate and technology and pedagogy in the classroom and teachers having competency in techno-pedagogy integration can bring the entire world in the classroom. Techno-pedagogical competency is the ability of teachers to make use of technology effectively in teaching. A teacher having the competency in technology and pedagogy is required to have knowledge of the all existence, component, and capability of various technologies used in teaching and learning settings. For example, rather than

adopting a face to face interaction in co-operative learning an individual can it effective by taking the help of Google Docs or Google hangouts. The advancement in techno-pedagogical knowledge has given birth to latest concept of online learning. LMS, MOOCs, MOODLE are best examples of incorporating the technical knowledge in pedagogy. In techno-pedagogy, there are three areas of knowledge, namely: content, pedagogy, and technology. Content is the subject matter that is to be taught. Technology encompasses modern technologies such as computer, Internet, digital video and commonplace technologies including overhead projectors, blackboards, and books. Pedagogy describes the collected practices, processes, strategies, procedures, and methods of teaching and learning. It also includes knowledge about the aims of instruction, assessment, and student learning.

Academic Achievement

Generally speaking academic achievement was defined as "a student's academic performance in school" (Chen 2007). In trades and occupations it will mean and change in the level of skills attained as measured by marks or grades. Academic achievement is considered as one of the most desired outcome of the schooling process along with all other non-cognitive achievement. In the current research, Academic Achievement is defined as the scores obtained by XII standard students in Science subjects in their XI class end examination held in 2017.

Rationale of the Study

Technology interferes, each aspect of human life, including the field of education. The rapid development of technology has redefined teaching and learning process largely. It has given new face-lift to the traditional classroom and changed drastically the atmosphere of classroom. Every teacher should know how to use technology, pedagogy and subject area content effectively in their daily classroom teaching. It is clear that merely introducing technology to the educational process is not enough. One must ensure technological integration since technology by itself will not lead to change. Rather, it is the way in which teachers integrate technology that has the potential to bring change in the education process. For teachers to become fluent in the usage of educational technology means going beyond mere competence with the latest tools to developing an understanding of the complex web of relationships among users, technologies, practices, and tools. Teachers must understand their role in technologically-oriented classrooms. Therefore, it is important for teacher to get familiar with the recent technologies to use them effectively in their teaching. Hence, there is urgent need to examine techno-pedagogical competency of teachers. Since higher secondary schooling stage considered a stage when the students become very active and they take a lot of interest in technology hence the teachers who are teaching at higher secondary can stimulate their interest in studies by using technology. In order to fulfill the need of a high-tech classroom, teachers must possess techno-pedagogical competency. The techno pedagogical competency of the teachers is supposed to vary with reference to the facilities available in the schools and in addition to locale also.

In this context the investigator thought to conduct the study in the state of Odisha where it is very essential to bring the students to the national mainstream with the introduction of

technology and appropriate pedagogy by the teachers since the state is very often get disturbed by different elements. Further, in the entire system of education the secondary schooling period is the most vital one because it is link to the higher education. Hence, this stage needs special attention from linkage viewpoint as well as the nature of students i.e. adolescents with which this stage deals with. As such this crucial stage of education needs special attention of all. Hence, the investigator felt the need to study the techno-pedagogical competency of higher secondary school teachers, which is the most desired competency of the teachers at this level with reference to the state of Odisha.

Statement of the Problem

The investigator is keen to undertake the study entitled as "Techno-Pedagogical Competency of Higher Secondary School Teachers in Relation to Students' Academic Achievement in Science."

Objectives of the Study

The objectives of the study are as follows;

1. To assess the level of techno-pedagogical competency of higher secondary school teachers.
2. To compare the techno-pedagogical competency of rural and urban higher secondary school teachers.
3. To compare the techno-pedagogical competency of male and female higher secondary school teachers.
4. To study the techno- pedagogical competency of rural and urban male teachers.
5. To study the techno- pedagogical competency of rural and urban female teachers.
6. To find out the relationship between academic achievement in science of higher secondary school students with the techno-pedagogical competency of their teachers.

Hypotheses of the Study

The hypotheses of the study are as follows;

- 01: Majority of Higher secondary school teachers depict moderate level of techno pedagogical competency.
- 02: The techno-pedagogical competency of urban and rural higher secondary school teachers do not differ significantly.
- 03: The techno-pedagogical competency of male and female higher secondary school teachers do not differ significantly.
- 04: The techno-pedagogical competency of urban and rural male higher secondary school teachers do not differ significantly.
- 05: The techno-pedagogical competency of urban and rural female higher secondary school teachers do not differ significantly.
- 06: There is significant relationship between academic achievements in science of higher secondary school students with the techno-pedagogical competency of their teachers.

Summary of Review of Related Literature

A review of the related literature reveals that most of the studies of school satisfaction have emphasized the presumed outcomes associated with students' satisfaction and dissatisfaction. The investigator conducted a study on Techno-pedagogical Competency of Higher Secondary School Teachers in Relation to Students' Academic Achievement in Science. With the help of previous studies researcher found that the level of Techno-pedagogical Competency is affected by the gender and locale. Hence it is

essential to assess the Techno-pedagogical Competency of Higher Secondary School Teachers. In this context, the investigator has decided to undertake a study from the above reviews.

Methodology

The study under investigation intends to collect data from the higher secondary school teachers and students with regard to their techno pedagogical competency and academic achievement respectively. In this context the study needs comprehensive as well as intensive mode of data collection. Hence the study under investigation comes under the survey method of descriptive type of research.

Population

All Higher secondary school teachers of rural as well as urban higher secondary schools affiliated to Board of Secondary Education (BSE) constitute as the population of the study.

Sampling

The sample for the study was taken from both the urban and rural higher secondary schools of the Cuttack district of Odisha. Hence, both the urban and rural schools are the two strata of the study. Out of these two strata 10 secondary schools from Rural and 10 from Urban i.e. rural and urban and as a whole 20 schools were randomly selected and all the teachers of the concerned schools constituted as the sample of the study. Both the urban and rural schools are the two strata of the study. Hence, the process of sampling in the present study comes under the stratified random sampling of probability sampling methods. As a whole data were collected from 100 Higher Secondary School teachers with the locale wise break up of 50 teachers from urban and 50 from rural areas. Out of 50 teachers from urban 25 male and 25 female teachers selected, same sampling procedure followed for case of rural 50 sample teachers. Further, the investigator selected randomly 10 higher secondary schools from urban and 10 from rural out of 20 schools from each school 5 students were randomly selected as a whole 100 student were selected and the academic achievement of

students were collected from their previous year class end examination marks in science subjects.

Tool used for the study

Tools generally refer to the instrument through which data are collected. Techno-pedagogical competency scale constructed and validated by Rajasekar S and Sathiyaraj K (2013) ^[9, 10] will be used in this present study. The scale consists of 40 statements and each statements consists of 5 alternatives, viz., Always, Sometime, Rarely and never with the weightage of 5,4,3,2, and 1 and also put a mark of Tick in the box of alternative which is close to your repose. For asserting the Academic Achievement of the students, the researcher has taken the marks Scored/ Percentage of previously of each respondent in the class XI. Schools affiliated by Board of Secondary Education (BSE), Odisha.

Techniques of Data Analysis and Interpretation

For the purpose of analysis the investigator has decided to use both descriptive as well as inferential statistical techniques. The hypothesis from sr.no.01 was analyzed through descriptive statistics that is, percentage (%) and hypotheses from sr. No. 02, 03, 04, 05 was tested by using the statistical technique of ‘t’ test to find out the significance of difference between the means of the two samples. The hypothesis 06 was analyzed through Pearson’s Product Moment Correlation technique(r) to find out the significant relationship between two variables.

Data analysis, discussions and interpretation

01: Techno-pedagogical competency level of the secondary school teachers

To study the level of techno-pedagogical competency of the higher secondary school teachers the mean and standard deviation of the scores on techno-pedagogical competency were calculated and they were categorized in to three levels on the basis of their mean and standard deviation scores. As such the M+1SD, M±1SD and M-1SD is considered as having high, moderate and low level. The data pertaining to this aspect have been presented in table.

Table 1: Techno-pedagogical competency level of the higher secondary school teachers

Total no. of teachers	Mean	SD	No of teachers with percentage		
			High (132 and above)	Moderate between (65-131)	Low (64 below)
100	97.91	33.87	17 (17%)	60(60%)	23 (23%)

Table 1. reveals that out of 100 higher secondary teachers and 17%, 60% and 23% teachers belong to the category of high, moderate and low level of techno- Pedagogical competency. Hence the hypothesis i.e. majority of Higher

secondary school teachers depict moderate level of techno-pedagogical competency is accepted and it is concluded that majority of higher secondary school teachers of Cuttack have techno-pedagogical competency.

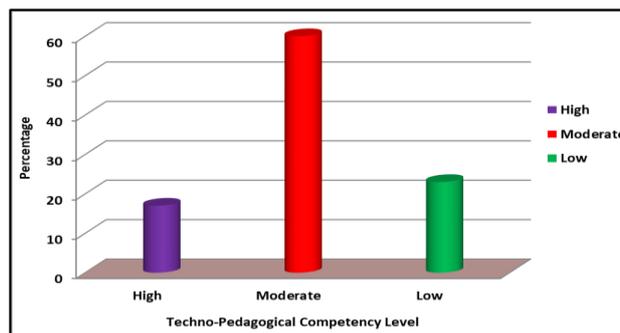


Fig 1: Histogram depicting techno-pedagogical competency level scores of urban and rural higher secondary school teachers.

02: Compare the techno-pedagogical competency of rural and urban higher secondary school teachers.

To test the hypothesis that The techno-pedagogical competency of urban and rural higher secondary school

teachers do not differ significantly the scores obtained were subjected to ‘t’ test and find the result obtained therein is presented in table.

Table 2: Significance of Mean difference on techno-pedagogical competency scores of urban and rural higher secondary school teachers

Category	Total numbers of teachers	Mean	SD	Df	SE _D	‘t’ value	Level of significance
Urban	50	113.88	26.756	98	5.99	5.332	Sig. at .01 level
Rural	50	81.94	32.894				

An analysis of the results presented in table reveals that the obtained t ratio for the difference in the techno-pedagogical competency of urban and rural higher secondary school teachers is found to be 5.332. When this t value was subjected to the testing of its significance, it was found that the obtained t value of 5.332 is much higher than the table value of t, that is, 2.61 at 0.01 level of significance with 98 degrees of freedom. Therefore, the hypothesis that reads as the techno-pedagogical competency of urban and rural higher secondary school teachers do not differ significantly is rejected and it is concluded that there exist significant

difference in the techno-pedagogical competency of urban and rural higher secondary school teachers. From the mean scores it was found that the techno-pedagogical competency of urban higher secondary school teachers is found to be higher than the techno-pedagogical competency of rural teachers.

The presents study also supported the early finding of Prakash *et al.* (2017) who concluded that the techno-pedagogical competency of urban government school teachers is better than the rural government higher secondary school teachers.

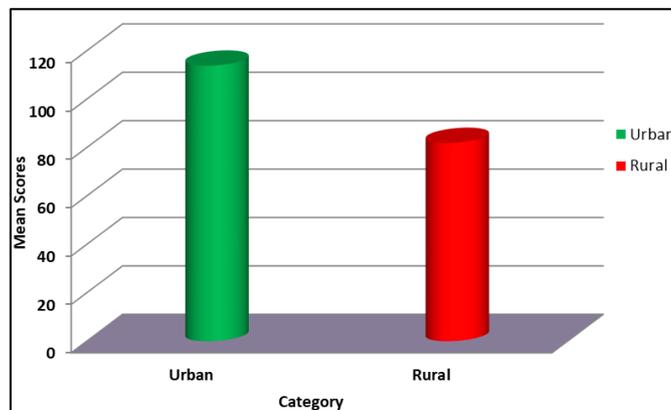


Fig 2: Histogram depicting mean scores of urban and rural higher secondary school teachers towards techno-pedagogical competency.

03: Compare the techno-pedagogical competency of male and female higher secondary school teachers.

To test the hypothesis that the techno-pedagogical competency of male and female higher secondary school

teachers do not differ significantly the scores obtained were subjected to ‘t’ test and the result obtained there in is presented in table.

Table 3: Significance of Mean difference on techno-pedagogical competency scores of male and female higher secondary school teachers

Variables	Total numbers of teachers	Mean	SD	df	SE _D	‘t’ value	Remarks
Male	50	98.12	34.138	98	6.80	0.042	Non-significant
Female	50	97.70	33.953				

An analysis of the results presented in table reveals that the obtained ‘t’ ratio for the difference in the techno-pedagogical competency of male and female higher secondary school teachers is found to be 0.042. When this t value was subjected to the testing of its significance, it was found that the obtained t value of 0.042 is less than the table value of t, that is, 1.98 at 0.05 level of significance with 98 degrees of freedom. Therefore, the hypothesis that reads as the techno-pedagogical competency of male and female

higher secondary school teachers do not differ significantly is accepted and it is concluded that there does not exist significant difference in the techno-pedagogical competency of male and female higher secondary school teachers. From the mean scores it was found that the techno-pedagogical competency of urban higher secondary school teachers is found to be higher than the techno-pedagogical competency of rural higher secondary teachers.

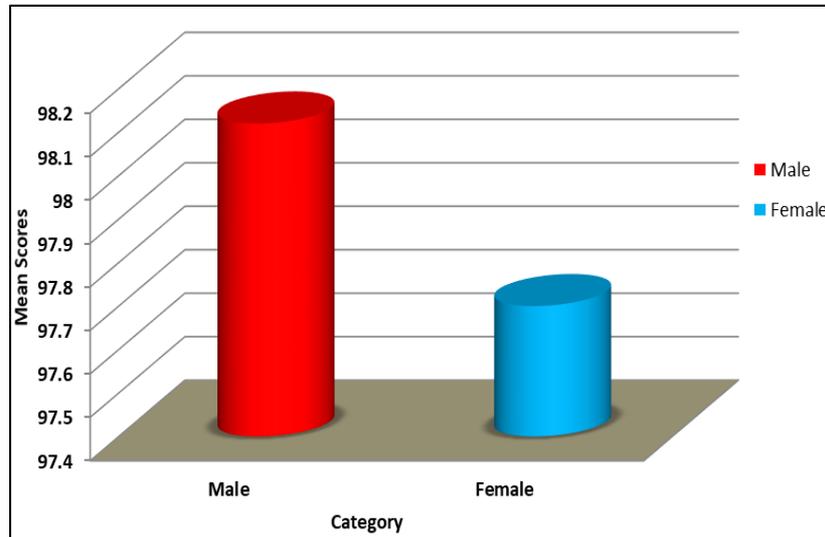


Fig 3: Histogram depicting mean scores of male and female higher secondary school teachers towards their techno-pedagogical competency.

04 Significance of mean difference in the techno-pedagogical competency of urban male and rural male higher secondary school teachers.

To test the hypothesis the techno-pedagogical competency

of urban and rural male higher secondary school teachers do not differ significantly the scores obtained were subjected to “t” scores then the result obtained there in is presented in table.

Table 4: Significance of Mean difference on techno-pedagogical competency scores of urban male and rural male higher secondary school teachers

Category	N	Mean	SD	df	SE _D	‘t’ value	Level of significance
Urban Male	25	116.80	25.727	48	8.129	4.595	Significant At. 01 level
Rural Male	25	79.44	31.473				

An analysis of the results presented in the table reveals that the obtained t ratio for the difference in the techno-pedagogical competency of urban male and rural male higher secondary school teachers is found to be 4.595 When this t value was subjected to the testing of its significance, it was found that the obtained t value of 4.595 is much higher than the table value of t, that is, 2.68 at 0.01 level of significance with 48 degrees of freedom. Therefore, the hypothesis that reads as the techno-pedagogical competency

of urban and rural male higher secondary school teachers do not differ significantly is rejected and it is concluded that there exist significant difference in the techno-pedagogical competency of urban male and rural male higher secondary school teachers. From the mean scores it was found that the techno-pedagogical competency of urban male higher secondary school teachers was found to be higher than the techno-pedagogical competency of rural male higher secondary school teachers.

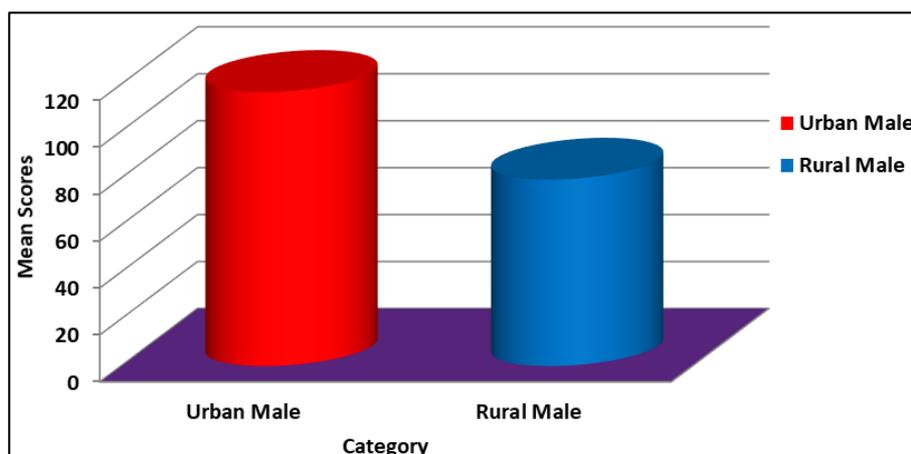


Fig 4: Histogram depicting mean scores of urban male and rural male higher secondary school teachers towards their techno-pedagogical competency.

05 Examine the techno-pedagogical competency of urban female and rural female higher secondary school teachers.

To test the hypothesis that The techno-pedagogical

competency of urban and rural female higher secondary school teachers do not differ significantly the scores obtained were subjected to “t” test and the result obtained therein is presented in table.

Table 5: Significance of mean difference on techno-pedagogical competency scores of urban female and rural female secondary school teachers.

Category	Total numbers of teachers	Mean	SD	df	SE _D	't' value	Level of significance
Urban Female	25	110.96	27.96	48	8.915	2.974	Significant at 0.01
Rural Female	25	84.44	34.72				

An analysis of the results presented in table reveals that the obtained t ratio for the difference in the techno-pedagogical competency of urban female and rural female secondary school teachers is found to be 2.974. When this t value was subjected to the testing of its significance, it was found that the obtained t value of 2.974 is greater than the table value of t, that is, 2.68 at 0.01 level of significance with 48 degrees of freedom. Therefore, the hypothesis that reads as techno-pedagogical competency of urban and rural female higher

secondary school teachers do not differ significantly is rejected and it is concluded that there exist significant difference in the techno-pedagogical competency of urban female and rural female higher secondary school teachers. From the mean scores it was found that the techno-pedagogical competency of urban female higher secondary school teachers is found to be higher than the techno-pedagogical competency of rural female teachers.

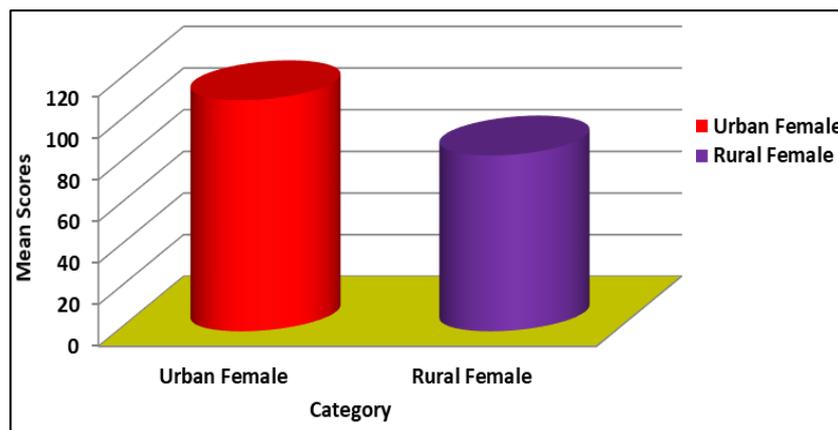


Fig 5: Histogram depicting mean scores of urban female and rural female higher secondary school teachers towards their techno-pedagogical competency.

06 Find out the relationship between academic achievements in science of higher secondary school students with the techno-pedagogical competency of their teachers.

To test the hypothesis that there will be significant relationship between academic achievements in science of

higher secondary school students with the techno-pedagogical competency of their teachers the scores obtained were subjected to Pearson's product moment correlation (r) test and the result obtained there is presented in table.

Table 6: The Relationship between academic achievements in science of higher secondary school students with the techno-pedagogical competency of their teachers.

Categories	Nos. (N)	Mean(M)	SD	df	r	Level of significance
Students	100	66.77	12.894	198	0.382	Significant at 0.01 level
Teachers	100	97.91	33.874			

An analysis of the results presented in table reveals that the obtained "r" ratio for the relationship between academic achievements in science of higher secondary school students with the techno-pedagogical competency of their teachers is found to be 0.382. When this "r" value was subjected to the testing of its significance, it was found that the obtained "r" value of 0.382 is much greater than the table value 0.138 that is at 0.01 level of significance with 198 degrees of

freedom. Therefore, the hypothesis that reads as there is significant relationship between academic achievements in science of higher secondary school students with the techno-pedagogical competency of their teachers is accepted and it is concluded that the techno-pedagogical competency of teachers and academic achievement of students are related each other.

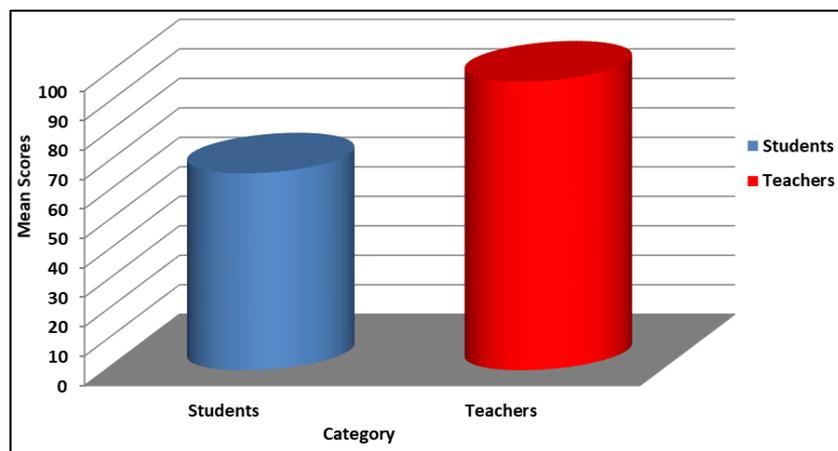


Fig 6: Histogram Depicting Mean Scores Higher Secondary School Students and their Teachers towards Techno-Pedagogical Competency.

Findings and Conclusions

The present study was planned and carried out to test the tentative hypotheses and to achieve the corresponding objective was evaluated in the light of the study. The sequence of findings and conclusions is in accordance with the objectives and hypotheses of the study.

- Majority of higher secondary school teachers of Cuttack district have techno-pedagogical competency.
- There exists significant difference in the techno-pedagogical competency of urban and rural higher secondary school teachers.
- There exists significant difference in the techno-pedagogical competency of male and female higher secondary school teachers.
- There exists significant difference in the techno-pedagogical competency of urban male and rural male higher secondary school teachers.
- There exists significant difference in the techno-pedagogical competency of urban female and rural female higher secondary school teachers.
- There is significant relationship between academic achievements of higher secondary school students with the techno-pedagogical competency of their teachers.

After analyzing above data it can be concluded that the urban school teachers are better in their techno-pedagogical competency as compared to the rural higher secondary school teachers. Further it was found that majority of teachers were having moderate techno-pedagogical competency and teachers belong to urban area were having high techno-pedagogical competency than that of rural area because of the variability in facilities available in urban and rural school. The techno-pedagogical competency of teachers and academic achievement of students are related each other.

Recommendations

- The school teachers have to be given more training in the basic educational applications of MS-EXCEL, MS-Office, MS-Words, MS-PowerPoint, etc.
- Establish Accountable agency within government development of techno-pedagogical skills among teachers.
- Proving opportunity to the teachers to visits the schools of urban cities and having chance to see the use of technology instruments in the classroom.

- Teaching with the use of modern technical facilities enhance the student learning make them capable to compete in the high-tech world.
- Assess the potential and limits of technologies for learning and share the techno-pedagogical components throughout training rather than offering a stand-alone module.
- Do not encourage the use of technology excess in the class where the student felt no need of instructor in the classroom and totally depend upon the technology.
- In the modern area of technology, teachers need to rise above from the mere knowledge giver in the class now he should be very practical try to represent things in that the student should be able to apply in his or her real life because knowledge can be getting through online resources.
- Create and support the atmosphere of the learning community within your center, where people value expertise, where they learn from each other on daily basis, value expertise and support each other.
- Government, teacher educators, teacher-training institutions and other accreditation or facilitating agencies should co-operate, realign their current efforts, and improve upon them to mentor and facilitate teacher trainees to develop their techno pedagogical skills.
- An orientation programme needs to be organized in schools to train teachers in making use of technological gadgets and the necessary instructional aids in teaching which in turn reduce their anxiety in using them while teaching.

Educational implications of the study

Every research bears some educational implications. After conducted this study we can draw out some implications. Some important implications are given below;

- The use of technology should be encouraged form the grass-root level so, the technical skills of student develop from grass-root level.
- There is need to decrease the barriers in the way of using latest technologies to increase the techno-pedagogical competency of teachers by organizing workshops for them.

References

1. Aggrawal YP. Statistical Methods Concepts, Application and Computation. Sterling Publisher Pvt. Ltd, 1998, 122-123.

2. Archambault L, Crippen K. Examining TPACK among K-12 online distance educators in the United States. *Contemporary Issues in Technology and Teacher Education*. 2009; 9(1):71-88. Retrieved from <http://www.citejournal.org/vol9/iss1/general/article2.cfm>
3. Avni Y. The Factors Affecting Techno-Pedagogical Competencies and Critical Thinking Skills of Preservice Mathematics Teachers. *Malaysian Online Journal of Educational Sciences*. 2017; 5(2):66-81.
4. Ganjalo, A, Suárez-Rodríguez JM, Belloch C, Bo RM. Training needs of teachers in ICT: Training profiles and elements of complexity. *Relieve*. 2011; 17(2). Retrieved from <https://goo.gl/dbcpzw>.
5. Khan S. New pedagogies on teaching science with computer simulations. *Journal of Science Education and Technology*. 2011; 20(3):215-232. Retrieved from <https://goo.gl/wYAjBq>.
6. Pradeep Kumar SL. A Study of Techno - Pedagogical skills of Secondary school Hindi teachers working in Kerala, *IJARIE-ISSN*. 2018; 4:2395-4396.
7. Parkash J, Hooda R. 'A Study of Techno-Pedagogical Competency among Teachers of Government & Private Schools of Haryana State', *International Journal of Current Advanced Research*. 2018; 07(1):9301-9306. Retrieved from <http://dx.doi.org/10.24327/ijcar.2018.9306.1532>.
8. Saari JR, Roslan S. Attitudes and perceived information technology competency among teachers. *Malaysian Online Journal of Educational Technology*. 2005; 2(3):70-77. Retrieved from <https://goo.gl/BTDQmi>
9. Sathiyaraj K, Singaravelu S. Techno-pedagogical competencies of higher secondary school teachers of cuddalore district. *International Journal of Teacher Educational Research (IJTER)*, 2013; 2(8). Retrieved from <https://goo.gl/4Ax9WA>
10. Sathiyaraj K, Rajasekar S. The Relationship between the Techno-Pedagogical Competency of Higher secondary School Teachers and their Anxiety towards the Use of Instructional Aids in Teaching. *International Journal of Teacher Educational Research*. 2013; 2(12):7-14.
11. Tondeur J, Pareja Roblin N, van Braak J, Voogt J, Prestridge S. Preparing beginning teachers for technology integration in education: ready for take-off? *Journal of Technology, Pedagogy and Education*. 2017; 26(2):157-177. Retrieved from <http://dx.doi.org/10.1080/1475939X.2016.1193556>
12. Tsai HC. A senior teacher's implementation of technology integration. *International Education Studies*. 2015; 8(6):151-161. Retrieved from <https://goo.gl/Ldbjmi>
13. Vaiyapuriraja, Singaravelu. Attitude of higher secondary school teachers toward using new technology. *Journal of Innovation in education and psychology*. 2011; 1(2). Retrieved from <https://goo.gl/xhPSsn>
14. Yurdakul IS. Examining techno-pedagogical knowledge competencies of pre-service teacher based on the usage of technolog: Hactteepi university egitim fake dergisi. (H.U journal of education). 2011; 40(2):397-408. Retrieved from <https://goo.gl/Z9R6p5>
15. Yusuf MO, Balogun MR. Student-Teachers' competence and attitude towards information and communication technology: A case Study in a Nigerian University. *Contemporary Educational Technology*. 2011; 2(1):125-128. Retrieved from <https://goo.gl/iAPj6G>
16. Zhang Y. A Project-Based Learning Approach to Helping Pre-Service Teachers Develop Technology Competencies, 2000. *The Technology Source Archives*. Retrieved from <https://goo.gl/ove7tr>