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EDUCATION

Attitude of Science Teachers in the use of ICT at Secondary School Level

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Abstract

Information and communication technologies (ICT) has emerged as one of the most important aspects of human life and it has affected every aspect of school working including administration, time table, lesson delivery, project work, evaluation, examination system etc. ICT have made teaching-learning process more relevant for the learner and connected to real life. In present study, attitude of science teachers in the Use of ICT at Secondary School Level in Vizianagaram District was studied. The purpose of this study was to reveal science teachers' attitudes toward Use of ICT in Secondary School level and then explore the relationship between teachers' attitudes and factors which are related to teachers' personal characteristics (gender, age, general and professional qualification, professional experience, school management and locality). In order to collect data, an instrument was developed by researchers and administered to 100 science teachers almost uniformly distributed in secondary schools of Vizianagaram district. The data were analyzed using various statistical methods like mean, SD, 't' test and F-test were the statistical techniques used. The score obtained by different groups are compared across the variables. The results are discussed in light of previous research studied; suggestions and Recommendations for further research were also suggested.

Introduction

An appropriate educational technology in the hands of competent teachers can ensure better teaching learning process. At present the role of the teachers in educating the children is difficult with other responsibilities. The classrooms are overcrowded, with heavy amount of syllabi however the pupils are expected to gain knowledge. To improve the level of understanding different methods of teaching should be adopted by the teacher. Similarly to develop the interest of pupils in learning new technology must be used by the teacher. However in order to enrich the meaningful development of independent study habit ICT must be integrated in education and in order to create purposeful development of self –confidence in learning, and alternative process of teaching has to be adopted.

More over in the fast developing world, where knowledge explosion is taking place in every sphere, it is unreasonable to expect the spoken or written words alone to convey the volume of relevant information to the learner. Therefore, there is a need of media for even better communication. Multimedia is a unique medium with features of quality, audiovisual recording and instant feedback. It can be conveniently used to convey well-designed information with varying special effects. The use of such technology in the institutions will motivate the teaching community and create learning conditions. Further the involvement of teachers in the process of production reduces the dependency of teacher on technology expert who are not in general academicians.

The development in telecommunication has impacted enormously on the application of ICTs and their uses. Telecommunication technologies coupled with computer technology have enhanced network based information and communication platforms, such as the internet. Telecommunications infrastructures in particular have become the driving forces of ICTs as they have the capability to link all various ICT elements together irrespective of locations and to provide a converging platform for these elements.

The convergence of the various elements of ICTs has enhanced development in all spheres of human activities. Robin Mansell and UtaWehn (1998:1) stated that advanced microelectronics-based Information and Communication Technologies (ICTs) are at the heart of recent social and economic transformation in both the industrialised and many developing nations. In 1995 and 1997, the United Nations Commission on Science and Technology for Development

(UNCSTD) investigated the benefits and risks of ICTs. The result of this investigation showed many instances where the use of ICTs efforts‟ widespread social and economic benefits. There were also many instances where ICTs were making no differences in the lives of people in the developing countries. The result also showed that the diffusion of these technologies in the extremely uneven throughout the developing world. As a result of this, there is a 3 high risk that technologies and services will deepen the disadvantages of those without the skills and capabilities to make the investments required for building innovative ICT based societies (Mansell and Wehn, 1998:1)

Need and significance of the study:

Information and Communication Technology (ICT) is a major factor in shaping the new global economy and producing rapid changes in society. Within the past decade, the new ICT tools have fundamentally changed the way people communicate and do business. They have produced significant transformations in industry, agriculture, medicine, business, engineering and other fields. They also have the potential to transform the nature of education, where and how learning takes place, and the role of students and teachers in the learning process. Science teachers must also gain technical skills and they also must learn how to instruct the learner. They need to change their classroom practice and use ICT in order to make the learning effective. Teachers can present many multimedia resources to improve their teaching efficiency. They can also design different teaching activities which may also help the students to think and operate actively. The new technologies challenge conventional conceptions of both teaching and learning methods and material, and by reconfiguring how teachers and learners gain access to knowledge, and implications for conventional teaching and learning processes. To meet these challenges, secondary schools should also embrace the new technologies and appropriate new ICT tools for learning. They must also move toward transforming the traditional paradigm of learning. It is observed that teacher training institutes are using ICT in their training rarely. The structure and content of teacher training programmes on ICT in education are underdeveloped. Therefore the investigator felt it is necessary to study or conduct research on the use of ICT at Secondary School Level. If the Teacher education institutions do not assume a leadership role in the transformation of education then they will be left behind in the swirl of rapid technological change .For education to reap the full benefits of ICT in learning

,it is essential that pre-service and in-service teachers are able to effectively use these new tools for learning .Teacher education institutions and programmes must provide the leadership for pre-service and in-service teachers and model the new pedagogies and tools for learning. The teacher training institute must also provide leadership in determining how the new technologies can best be used in the context of the culture, needs of the society so that skilled teachers are produced. Though there is advancement in ICT, however it is observed that teachers using ICT rarely in teaching and learning. Therefore investigator was interested to study attitude of science teachers in the Use of ICT at Secondary School Level.

Objectives of the study:

1. To study the level of Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.
2. To study the significant difference among the perceptions of science teachers based on their demographic variables i.e., gender, age, general and professional qualification, professional experience, school management and locality towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.

Hypotheses of the present study

1. There is no significant difference between the perceptions of male and female category science teachers towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.
2. There is no significant difference among the perceptions of science teachers based on their age group towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.
3. There is no significant difference between the perceptions of B,Sc, and M.Sc., qualified science teachers towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.
4. There is no significant difference between the perceptions of B.Ed., and M.Ed., qualified science teachers towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.
5. There is no significant difference among the perceptions of science teachers based on their professional experience towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.
6. There is no significant difference among the perceptions of science

teachers based on their locality towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.

7. There is no significant difference among the perceptions of science teachers based on their school management towards Attitude of Science Teachers in the use of ICT at Secondary Level in Vizianagaram District.

Review of Related Literature:

Iema Heemskerk, Monique Volman, Wilfred Admiraal and Geert ten Dam (2012) conducted a study on Inclusiveness of ICT in Secondary education: students appreciation of ICT tools. The study revealed that students learn more when working with the tools. Further students appreciate to work in an exploratory and cooperative way with the opportunity to try things for themselves and consult their fellow students. It was also found that the girls seemed to be attracted to ICT tools with instructions that are easy to understand and work with.

Bulent CAVAS (2009) studied on " A study on science teachers' attitudes toward information and communication technologies in education". Integration of Information and Communication Technologies (ICT) into education has been an important concern in many countries. Recently, Turkish Ministry of Education has also done great efforts and major financial investments to implement ICT into teaching and learning environments. However, as in many developing countries, ICT tools are provided to teachers without considering their attitudes toward ICT. The purpose of this study was to reveal Turkish primary science teachers' attitudes toward ICT in education and thenexplore the relationship between teachers' attitudes and factors which are related to teachers' personal characteristics (gender, age, computer ownership at home, and computer experience). In order to collect data, an instrument (STATICTE) was developed by researchers and administered to 1071 science teachers almost uniformly distributed in 7 geographic regions of Turkey. In data analyses, descriptive statistics were used todescribe and summarize the properties of the mass of data collected from the respondents. The results indicate that Turkish science teachers have positive attitudes toward ICT and although teachers' attitudes toward ICT do not differ regarding gender, it differs regarding age, computer ownership at home and computer experience. It is hoped that the outcomes of this study can be used in shaping innovation practices in the Turkish Educational System.

Cavas and Kesercioglu (2003) aimed to investigate the science teacher‟s attitude towards Computer Assisted Learning (CAL).The result showed that the majority of science teachers hold positive attitude towards CAL and no gender difference exists between science teachers Computer Assisted Leaning Attitudes. Atlun (2003)found that pre-service teacher‟s cognitive styles were not affected by their attitudes towards computers. Gulbahar (2008) reported that lack of in-service training and insufficient technological infrastructures were the factors that have a significant influence on the effective use of technology by instructors. Deniz (2005) indicated that male teachers have more positive attitudes than their female counterparts .According to Akkoyunlu (1996) there was a meaningful relationship between pre-service teacher‟s knowledge about technology and their attitudes towards technology. She also found that pre-service teachers with more information about technologies have more positive attitude towards the use of technologies in teaching and learning environments. A study carried out by Ocak and Akdemis (2008) revealed that science teacher‟s computer literacy level is related to their computer use and also computer literacy level of the teachers increases their integration of computer applications in their teaching.

Design of the Study

The researcher followed the survey method of the descriptive research. For this investigation the questionnaire had been considered as a suitable tool for the collection of data. The questionnaire consisted of 15 statements as perceived by the Science Teachers.

Reliability and Validity:

For the purpose of the present study the split- half method was adopted. The split-half reliability co-efficient for the Attitude of Science Teachers in the use of ICT at Secondary Level as perceived by science teachers was 0.84 and for the validity of the scale it is based on the content and construct validity.

Administration of Tool:

The tool was administered among science teachers, necessary instructions were given in filling the tool. All the respondents followed the instructions and filled the tool by reading the all the items carefully.

Data Collection:

The investigator personally visited the sampled schools and administered the tool among the sampled respondents. The data collected through questionnaire was used for analytical purposes.

Statistical Techniques Used:

The statistical techniques used mainly for analytical purposes were means, standard deviations were used To study the significant differences in between the socio-economic variables, 't'-test and 'F-test (ANOVA) have been used by the investigator with the help of Statistical Package for Social Sciences (SPSS).

Table 1: Overall perceptions of teachers towards Attitude of Science Teachers in the Use of ICT at Secondary School Level

N	Min.	Max.	Mean	Mean Percent	Std. Dev.
100	15	75	49.26	65.68	4.10

Table 1 observed that, science teachers expressed above average perceptions towards Attitude of Science Teachers in the Use of ICT at Secondary School Level. The mean and mean percentages are 49.26 which 65.68% on their total score.

Table 2. Mean comparison between the perceptions of male and female category science teachers towards Attitude of Teachers in the Use of ICT at Secondary School Level.

Gender	N	Mean	SD	t-value	p-value
Male	65	51.36	3.10	2.11*	0.04
Female	35	53.78	3.33		

Table 2, observed that, the mean perception scores of male category science teachers towards Attitude of Science Teachers in the Use of ICT at Secondary School Level was 51.36 whereas it was for female category science teachers was 53.78 and the SD values are 3.10 and 3.33 respectively. The 't'-value was 2.11 and the p-value was 0.04, which was significant at 0.05 level. This shows that, there is a significant difference between male and female category science teachers perceptions and female category science teachers perceived high than that of male category science teachers.

Graph-1: Mean comparison between the perceptions of male and female category science teachers towards Attitude of Teachers in the Use of ICT at Secondary School Level.

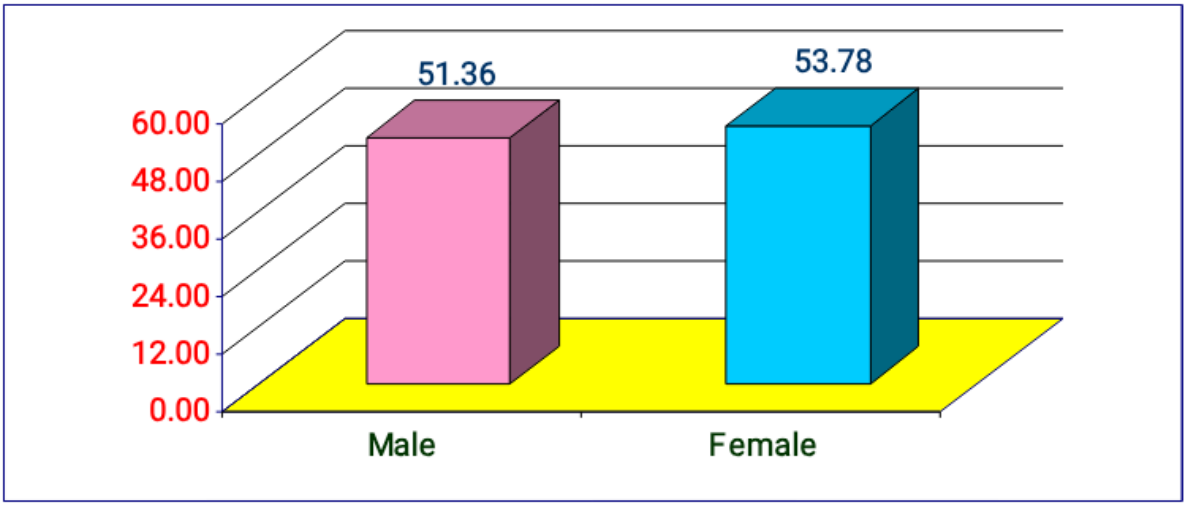


Table 3. Mean comparison among the perceptions of science teachers based on their age group towards Attitude of Teachers in the Use of ICT at Secondary School Level.

Age	N	Mean	SD	F-value	p-value
Below 35 Years	17	51.44	2.89	4.05**	0.00
35 to 50 Years	61	55.50	3.20		
Above 50 Years	22	52.78	3.46		

Table 3, observed that, the mean perception scores of science teachers based on their age group towards Attitude of Science Teachers in the Use of ICT at Secondary School Level, the mean scores of below 35 years age group science teachers was 51.44 whereas it was for 35 to 50 years was 55.50 and it was for above 50 years was 52.78 and the SD values are 2.89, 3.20 and 3.46 respectively. The 'F'-value was 4.05 and the p-value was 0.00, which was significant at 0.01 level. This shows that, there is a significant difference among the perceptions of science teachers based on their age group and 35 to 50 years age group science teachers perceived high than that of below 35 and above 50 years age group science teachers.

Graph-2: Mean comparison among the perceptions of science teachers based on their age group towards Attitude of Teachers in the Use of ICT at Secondary School Level

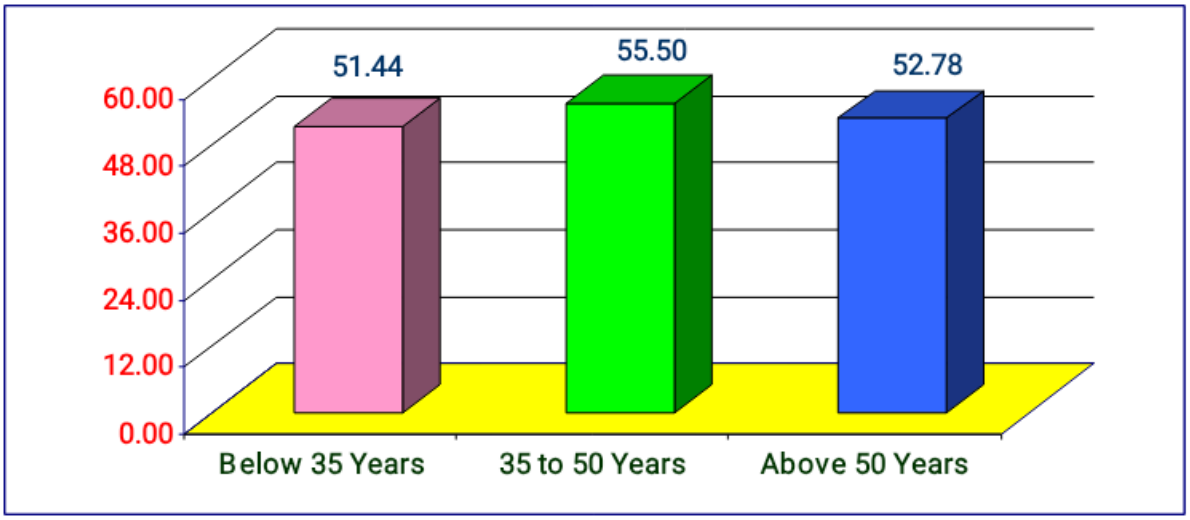


Table 4. Mean comparison between the perceptions of B.Sc. and M.Sc., qualified science teachers towards Attitude of Teachers in the Use of ICT at Secondary School Level.

General Qualification	N	Mean	SD	t-value	p-value
B.SC.,	84	50.73	3.14	3.88**	0.00
M.SC.	16	53.29	2.92		

The 4 table gives us the information that the mean score and standard deviation of science teachers having B.Sc., as a General qualification are 50.73 and 3.14 and teachers having M.SC. as a general qualification are 53.29 and 2.92. The 't' value stands at 3.88 and the p- value is 0.00 which is significant at 0.01 levels respectively. This shows that, there is a significant difference between B.Sc.., and M.Sc., qualified teachers in their perceptions and M.Sc., qualified teachers perceived high towards Attitude of Science Teachers in the Use of ICT at Secondary School Level than that of B.Sc., qualified teachers.

Graph-3: Mean comparison between the perceptions of B.Sc. and M.Sc., qualified science teachers towards Attitude of Teachers in the Use of ICT at Secondary School Level.

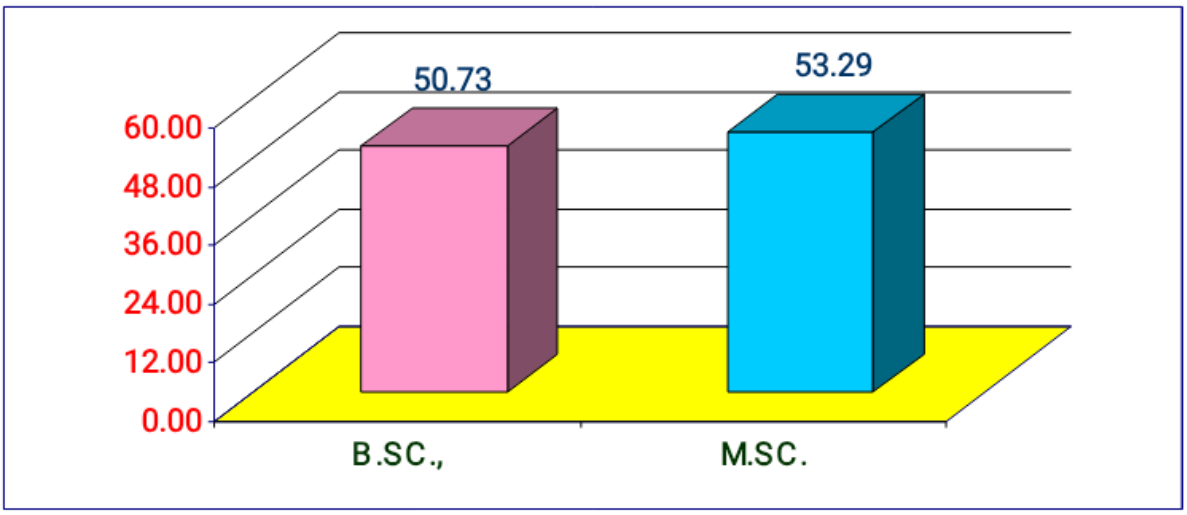


Table 5. Mean comparison between the perceptions of B.Ed. and M.Ed., qualified science teachers towards Attitude of Teachers in the Use of ICT at Secondary School Level.

Professional Qualification	N	Mean	SD	t-value	p-value
B.Ed.,	78	52.07	2.86	4.03**	0.00
M.Ed.,	22	49.82	3.12		

The 5 table gives us the information that the mean score and standard deviation of science teachers having B.Ed as a professional qualification are 52.27 and 2.86 and teachers having M.Ed as a professional qualification are 49.82 and 3.12. The 't' value stands at 4.03 and the p- value is 0.00 which is significant at 0.01 levels respectively. This shows that there is a significant difference between B.Ed., and M.ED., qualified teachers in their perceptions and B.Ed., qualified teachers perceived high towards Attitude of Science Teachers in the Use of ICT at Secondary School Level than that of M.Ed., qualified teachers.

Graph-4: Mean comparison between the perceptions of B.Ed. and M.Ed., qualified science teachers towards Attitude of Teachers in the Use of ICT at Secondary School Level.

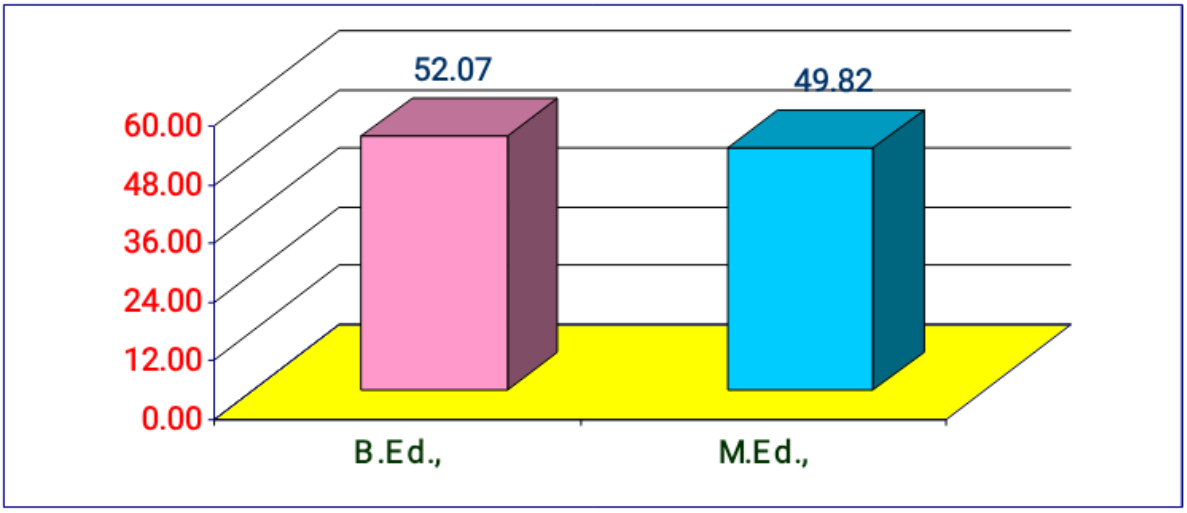


Table 6. Mean comparison among the perceptions of science teachers based on their professional experience towards Attitude of Teachers in the Use of ICT at Secondary School Level.

Professional Experience	N	Mean	SD	F-value	p-value
Below 10 Years	17	51.23	3.11	3.62**	0.00
10 to 20 Years	62	55.17	2.91		
Above 20 Years	21	53.56	3.28		

Table 6, observed that, the mean perception scores of science teachers based on their professional experience towards Attitude of Science Teachers in the Use of ICT at Secondary School Level, the mean scores of below 10 years professional experience of science teachers was 51.23 whereas it was for 10 to 20 years was 55.17 and it was for above 20 years was 53.56 and the SD values are 3.11, 2.91 and 3.28 respectively. The 'F'-value was 3.62 and the p-value was 0.00, which was significant at 0.01 level. This shows that, there is a significant difference among the perceptions of science teachers based on their professional experience and 10 to 20 years professional experience of science teachers perceived high than that of below 10 and above 20 years professional experience science teachers.

Graph-5: Mean comparison among the perceptions of science teachers based on their professional experience towards Attitude of Teachers in the Use of ICT at Secondary School Level.

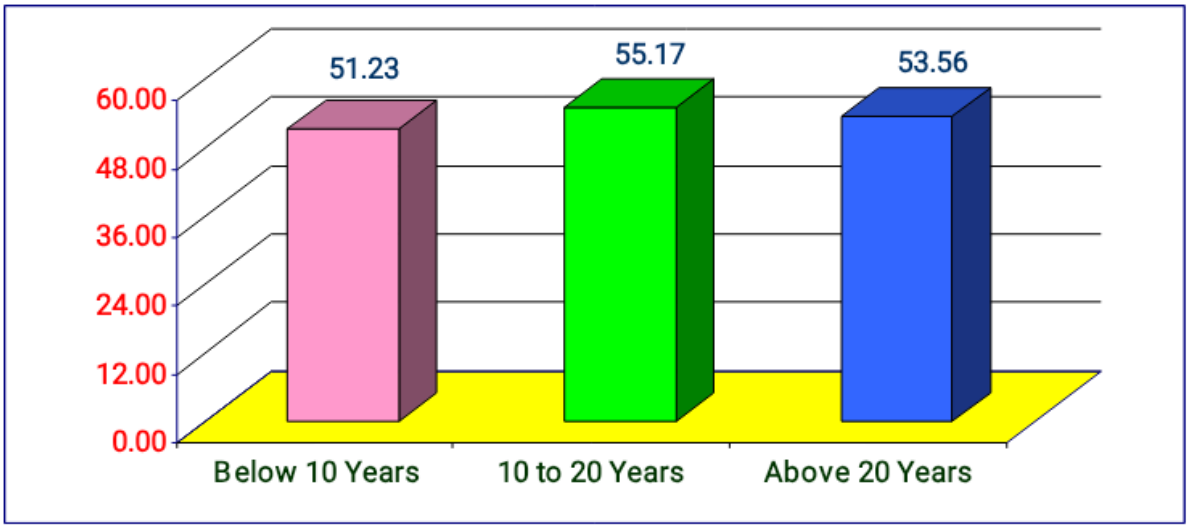


Table 7. Mean comparison among the perceptions of science teachers based on their locality towards Attitude of Teachers in the Use of ICT at Secondary School Level.

Locality	N	Mean	SD	F-value	p-value
Rural	50	52.34	3.45	2.99**	0.03
Urban	25	53.18	3.12		
Tribal	25	50.73	2.82		

Table 7, observed that, the mean perception scores of science teachers based on their locality towards Attitude of Science Teachers in the Use of ICT at Secondary School Level, the mean scores of rural area science teachers was 52.34 whereas it was for urban area teachers was 53.18 and it was for tribal area science teachers was 50.73 and the SD values are 3.45, 3.12 and 2.82 respectively. The 'F'-value was 2.99 and the p-value was 0.03, which was significant at 0.05 level. This shows that, there is a significant difference among the perceptions of science teachers based on their locality and urban area science teachers perceived high than that of science teachers working in rural and tribal localities.

Graph-6: Mean comparison among the perceptions of science teachers based on their locality towards Attitude of Teachers in the Use of ICT at Secondary School Level.

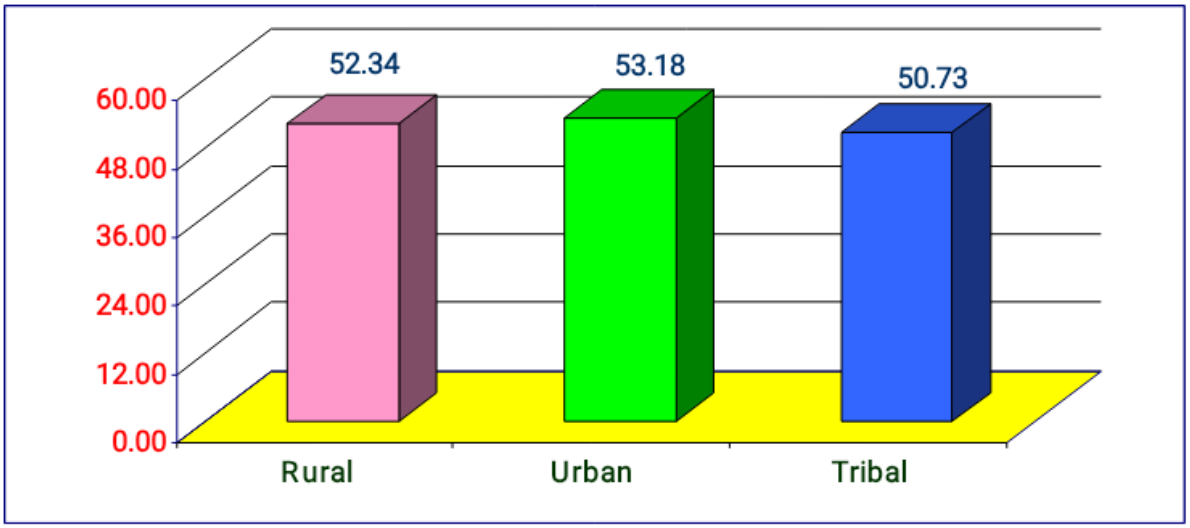
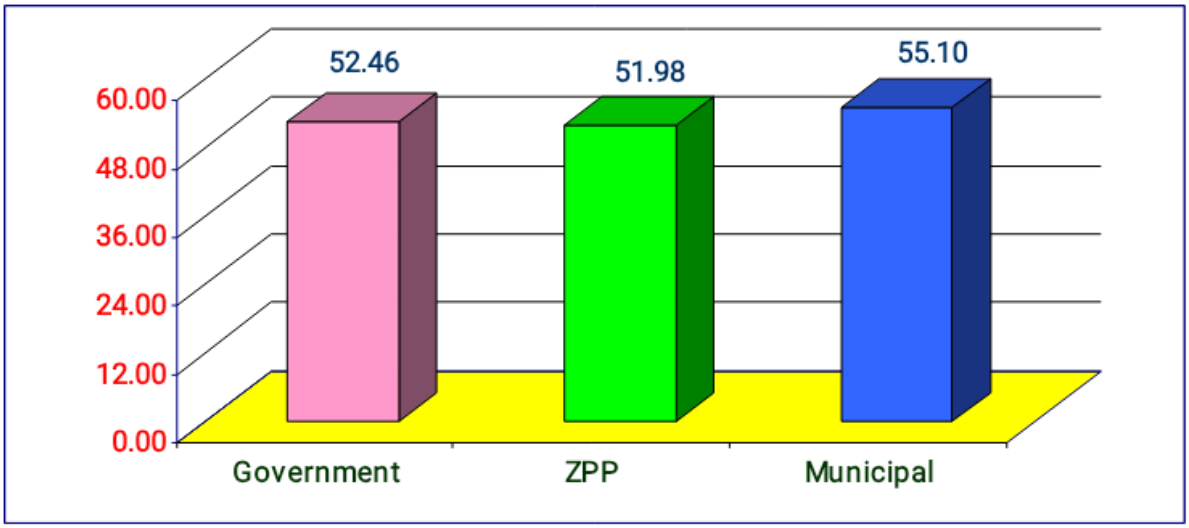


Table 8. Mean comparison among the perceptions of science teachers based on their school management towards Attitude of Teachers in the Use of ICT at Secondary School Level.

School Management	N	Mean	SD	F-value	p-value
Government	28	52.46	3.23	4.78**	0.00
ZPP	58	51.98	2.76		
Municipal	14	55.10	3.02		

Table 8, observed that, the mean perception scores of science teachers based on their school management towards Attitude of Science Teachers in the Use of ICT at Secondary School Level, the mean scores of science teachers working in Government schools was 52.46 whereas it was for teachers working in ZPP schools was 51.8 and it was for science teachers working in Municipal schools was 55.10 and the SD values are 3.23, 2.76 and 3.02 respectively. The 'F'-value was 4.78 and the p-value was 0.00, which was significant at 0.01 level. This shows that, there is a significant difference among the perceptions of science teachers based on their school management and science teachers working in Municipal schools perceived high than that of science teachers working in rural and tribal localities.

Graph-7: Mean comparison among the perceptions of science teachers based on their school management towards Attitude of Teachers in the Use of ICT at Secondary School Level.



Major Findings:

1. Science Teachers expressed above average perceptions towards Attitude of Science Teachers in the Use of ICT at Secondary School Level
2. There is a significant difference between male and female category science teachers perceptions and female category science teachers perceived high than that of male category science teachers.
3. There is a significant difference among the perceptions of science teachers based on their age group and 35 to 50 years age group science teachers perceived high than that of below 35 and above 50 years age group science teachers.
4. There is a significant difference between B.Sc.., and M.Sc., qualified teachers in their perceptions and M.Sc., qualified teachers perceived high towards Attitude of Science Teachers in the Use of ICT at Secondary School Level than that of B.Sc., qualified teachers.
5. There is a significant difference between B.Ed., and M.ED., qualified teachers in their perceptions and B.Ed., qualified teachers perceived high towards Attitude of Science Teachers in the Use of ICT at Secondary School Level than that of M.Ed., qualified teachers.
6. There is a significant difference among the perceptions of science teachers based on their professional experience and 10 to 20 years professional experience of science teachers

perceived high than that of below 10 and above 20 years professional experience science teachers.

7. There is a significant difference among the perceptions of science teachers based on their locality and urban area science teachers perceived high than that of science teachers working in rural and tribal localities.
8. There is a significant difference among the perceptions of science teachers based on their school management and science teachers working in Municipal schools perceived high than that of science teachers working in rural and tribal localities.

Conclusion:

The provision of technology resources do not guarantee effective teaching and learning as well as improving the academic performance of learners. The study revealed that the prevalence level of incompetence of science teachers in the use of computer technology in the preparation and delivery of their lessons and instructions. However, the science teachers have positive attitude in the use of ICT in teaching science subjects in secondary schools without gender, age and location influencing the teachers' attitude in the use of ICT in teaching science subjects in secondary schools. Therefore, to bring about the much-needed changes in the performance of teachers and learners, especially science teachers. Teachers should be persuaded of the effectiveness and assistance/help of these resources in improving or refining education. There is the need for teachers to possess the requisite knowledge, skills, behaviour and positive attitude to guide the preparation of lesson notes which emerges in the context of the current upsurge in the integration of computer technology for science subjects in secondary schools. This study therefore recommends an operational guideline policy, campaigns, workshops seminars, training and re-training of teachers for the integration of computer and its software packages into the teaching and learning of science subjects if not all subjects through direct practical experience

Suggestions:

Here, the investigator has laid down some possible suggestions for further improvement of the study of teacher's attitude in the use of ICT at Secondary School Level.

- Efforts should be made to provide short duration training course for the teachers so that they can use ICT while teaching. Thus the

systematic use of ICT is an urgent in the teaching learning process.

- One of the factors which affect the teacher's attitude is the unavailability of different ICT devices in the schools. Hence efforts should be made to provide relevant facilities of ICTs in schools.
- Confidence level of the teacher is also an important factor which affects the attitude of the teachers towards ICT. For this the school should organize an orientation programme for the teachers.
- The ICT is a major challenge for teacher's professional development. They must also learn how to instruct learners and they have to acquire pedagogical experiences. Teachers need to change their classroom practice in order to use ICT and make the teaching learning effective and meaningful.
- Teachers also need time to get a much deeper understanding of ICT resources and materials available and also cover the internet in order to become confident in how to use ICT in their teaching.

References:

Albirini, A. (2006) Teachers' attitudes toward information and communication technologies: the case of Syrian EFL teachers. Computers and Education, 47(4), 373–398.

Altun, T. (2007). Information And Communications Technology (ICT) In Initial Teacher Education: What Can Turkey Learn From Range of International Perspectives? Journal of Turkish Science Education, 4 (2), 45- 60.

Bayhan, P., Olgun P. & Yelland, J. N. (2002). A study of pre-school teachers' thoughts about computer-assisted instruction, Contemporary Issues in Early Childhood, 3(2), 298-303.

Biljana, N. C., Zvezdan, A., & Dragan, C. (2022). Attitudes of teachers to using information and communication technology in teaching-advantages and obstacles. International Journal of Cognitive Research in Science, Engineering and Education, 10(2), 69-76.

Cavas, B. and Kesercioglu, T. (2003). Primary Science Teachers' Attitudes toward Computer Assisted Learning. Ege Journal of Education, 3(2), 35-43.

Debbarma, D., & Das, J. (2019). Attitude of teachers towards using ICT in

schools: a study in Tripura. Research and Reflections on Education, 17(4), 1-7.

Jones, T., and Clarke, V. A. (1994). A computer attitude scale for secondary students. Computers Education, 22(4), 315–318.

Koohang, A. A. (1987). A study of the attitudes of pre-service teachers towards the use of computers. Educational Communication and Technology Journal, 35(3), 145-149.

Philadelphia. Reece, J., and K. Gable (1982). The development and validation of a measure of general attitudes toward computers. Educational and Psychological Measurement 42, 913-916.

Winter S., Chudoba K. and Gutek B. (1998) Attitudes toward computers: when do they predict computer use? Information and Management 34, 275–284.