

ICT Competency and Academic Achievement of Integrated B.Ed. Students in relation to Gender, Stream and Locality

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ABSTRACT

Having sufficient knowledge and adequate skills about technology & networking is known as ICT Competency. The aim of the study is to know the relationship between ICT competency & Academic Achievement of integrated B.ED students of Gangadhar Meher University, Sambalpur. Descriptive correlational method was adopted for this study. The sample consists of 210 Integrated B. ED students selected through stratified purposive sampling technique. The data was collected through the ICT competency tool developed by Dr. Manmohan Gupta. The obtained data were analyzed through Mean, Standard Deviation, t-test & Pearson's correlation method. The result revealed that positive negligible correlation between ICT competency and academic achievement.

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Introduction

The present era is the age of information & communication technology. The development of ICT has made life simpler. The usage of ICT has increased dramatically over the past few decades in many spheres, including business, education & industry. Now the educational institutions all over the world are integrating ICT with teaching learning process in order to provide knowledge and skills to the learners to meet the challenges of educational environment. ICT has changed how students read, write, compute & communicate. (Zhang, Zhang & Zhang, 2008). Jeelani (2011) found that "it is only through education & the integration of ICT in education that one can teach students to be participants in the growth process in this era of rapid change.

The use of ICT in all levels of education is required because ICTs give both teacher & students more flexibility to adopt learning and teaching individually according to their needs, but the integration of ICTs at different levels & various types of education in a developing country like India is most challenging.

Information & communication technologies refer to all communicational technologies, including the internet, wireless networks, mobiles, computers, software's, video conferencing, social networks sites, wifi zone, world wide web, web2.0 and others media application and services enabling users to access, store, retrieve, transmit & manipulate information in a digital form.

Role of ICT in education

Presently there are four areas of education namely teaching, learning, curriculum & educational programme. ICT has been added essentially in the 21st century as the fifth potent area of education (Sampath, 2011). ICT makes education system more productive, interesting, gives more powerful instruction & also able to extend the educational opportunities to masses & creating information rich learning environment. ICT makes the things more realistic and thus helps the learners to understand the entire concept very clearly.

ICT can improve the quality of higher education by promoting experiment, researches and innovations, adopting the new strategies in the teaching-learning process and integrating the new information with the best practices (Sudipta, 2015). In 1998 UNESCO world education reports stressed the importance of ICTs in higher education to generate quality education. ICT stimulates the learners to acquire quality research through

team work, time management, analytical thinking, global consciousness, basic communication, problem solving & guided instruction (Singaravelu & Muthukrisnan, 2007).

ICT enhanced learning environment facilities active collaborative, creative, integrative and evaluative learning as an advantage over the traditional method. ICT introducing innovative pedagogies into the classroom, improving overall standard of education by reducing the gap between the quality of education in urban and rural area.

The role of the teacher is very much important in teaching-learning process. Teacher is the facilitator of learning. ICT cannot replace the teacher; it can aid teacher in the process of teaching and make the teaching-learning process more interactive.

From the above discussion it is defined that all most all the classroom is changed its look from the traditional to ICT based. Now the teachers as well as students participate in classroom Discussion using technology. Now education is based on child centric education. So, the teacher should prepare to cope up with different technology for using them in the classroom for making teaching-learning effective. ICT becomes the ideal medium for the effective implementation of some student-centered techniques, such as project-based learning which puts the students in the role of innovators. ICT has made it possible to communicate more effectively & quickly and to express ideas in more pertinent ways. Since it is a useful tool for gathering knowledge, teacher can encourage their pupils to look for information from a variety of sources, making them more informed than they were before. In this context, ICT is very essential for prospective teachers.

Background of the study

ICT can be used in multiple purposes. Researchers have suggested that ICT can be used in Medical, Engineering, Agriculture, Defense, E-governance, E-commerce, Banking & transport. By accessing more information via.

ICT, students can use them as building blocks to learn more also students who effectively organizing ICT information can learn more efficiently by accurately and correctly (Hwang, Wu & Chen, 2012).

Furthermore students who use ICT can able to communicate well and show their knowledge clearly on assessments to obtain higher scores from their teachers. Nowadays, teachers are using ICT more in classroom learning activities and assigning more such activities for the students at home (Pegler, Kollwyn & Crichton, 2010), So students with greater ICT competency might benefit from their familiarity with the ICT tools. By contrast, students who are high competent in ICT can use it to quickly overcome technological problem to engage in the activity and learn in a better way. From the literature it is also found that students with higher ICT competency have higher academic achievement (Basri et al. 2018; Hussain et al. 2021; Haolei 2021). However, it is found that use of ICT in education distracted the students as they spend more time on watching non-academic contents (Miller et al.). As a result, they engage less in the learning process and their academic achievement is low (Gabbels et al., 2020; Salomon & Kolikant, 2016). The relationship between ICT competency & Academic achievement might also differ with regard to gender. As male students are more ICT competent than female, so it shows much greater variation in ICT skills than female students (Corneliusson, 2011). Basri et al. (2018) found that ICT adoption resulted in the improvement of academic performance of female students more than male students.

From the previous studies it also found that teaching of science subject through ICT are most compelling & effective than social science and literature subject (Hussain 2021; Safdar 2015), but Babita Sharma and Jessy Abraham (2015) found that ICT competency helps the social science & literature subject in theory examination. It also observed that from reviews, researchers have been conducted in different level of education specifically in higher education whereas a few researches have been conducted teacher education. So, it is a potent question in front of the researchers is ICT Competency among the students enhance the academic achievement of four-year Integrated B.Ed students.

Review of the related literature

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Rationale of the study

In today's scenario ICT plays a significant role in all the fields. By using ICT all fields show a tremendous development. In the education field also, ICT plays a major role by increasing the capacity of the learners. Today's teachers also to be more competent in order to meet the growing demands in the education field. The focus of ICT is to bring out the attention of students. Now a day, it is necessary for all the teachers to be competent in using ICT tools in the classroom. So, ICT competency plays a very crucial role for the four-year Integrated B. Ed students, those who are prospective teachers. The present study will enhance in making the students technology oriented to use all the ICT tools competently. On the other hand, the policymakers will be benefitted from this study in formulating appropriate policies for adoption and development of ICT infrastructure in the educational sector and to generate the ICT competent teachers.

Objectives of the study

1. To find out the level of ICT competency among Integrated B. Ed students.
2. To identify the relationship of ICT competency with the academic achievement.
3. To find out the difference in ICT competency between the boys & girls.
4. To find out the difference in ICT competency between the Science & Arts Integrated B. Ed students.
5. To find out the difference in ICT competency between urban & rural students.
6. To study the significant difference between correlation (ICT competency & Academic achievement) of science stream & arts stream students.

Hypotheses

HO₁: There is no significant difference in ICT competency between science & arts Integrated B. Ed students.

HO₂: There is no significant difference in ICT competency between boys & girls Integrated B. Ed students.

HO₃: There is no significant difference in ICT competency between urban & rural Integrated B. Ed students.

HO₄: There is no significant difference between two correlations (ICT Competency & Academic Achievement) of science stream & arts stream.

Operational definition of the variables

ICT Competency- In the present study, it refers to the scores obtained by the students in the ICT Competency scale developed by Manmohan Gupta 2017.

Academic Achievement- academic achievement refers to the sum total of achievement of knowledge, skills of the students. In the present study, the mark obtained in the previous semester by the integrated B. Ed students is considered as the academic achievement score.

Method of the study

The research was designed to study the relationship of ICT competencies & academic achievement. Descriptive Correlation survey method was adopted by the investigator for this study.

Population of the study

The complete collection of human and non-human entities having common attributes from a defined demography under study is known as a population, all the Integrated B. Ed

students of Gangadhar Meher University, Sambalpur district was considered as the population for the present study.

Sample & sampling technique

The sample refers to the representative fraction of the entire population in order to generalize the findings in a credible manner. A total number of 210 integrated B. Ed students were taken as a sample from this university through stratified-purposive sampling technique. This includes 120 students of arts stream & 90 students from science stream.

Tools used

ICT competency scale

ICT competency means use of hardware & software as well as internet & networking in teaching-learning process. In the present study, the investigator used ICT competency scale developed & standardized by Dr. Manmohan Gupta in order to collect data. The scale published in collaboration with the National Psychological Corporation, UG-1, Nirmal Heights, Agra, India. The scale consists of 28 items divided into two dimensions, using hardware & software devices and using internet & networking.

The reliability of the present competency scale was estimated by two methods. In split-half method, the total scores' coefficient of correlation was 0.82. and in test-retest method, the reliability was found to be 0.695, which is significant at 0.01 level of significance. Along with that, the ICT competency scale had a high face validity.

Academic achievement score

The academic achievement is the core of wider term educational growth which represents the amount of knowledge obtained by the students in different subjects of study. It enables the students to know where they stand. Academic achievement generally refers to the degree of competence acquired by the students in an academic context from different sources of knowledge or the subject area. In the present study, academic achievement refers to previous semester marks obtained by the Integrated B. Ed students.

Statistical techniques used

The study was completely based on a quantitative approach, so as to reach a valid & consistent conclusion, the investigator used simple percentage for the level of ICT competency of Integrated B. Ed students, at the same time for testing data analysis, we made use of descriptive statistics such as; mean, standard deviation and inferential statistics such as; Test of significance difference between two groups: Means (t-test) & Pearson's correlation method.

Analysis and interpretation

Level of ICT competency of integrated B. Ed. students

One of the major objectives was to find out the level of ICT competency of Integrated B. Ed. students.

The investigator uses ICT competency scale. The number of students & their percentage in different levels given in Table no. 1.

Table 1: Level of ICT Competency of the Students

Level of ICT competency	No. of students	Percentage (%)
Extremely high	53	25.23%
High	55	26.19%
Above average	59	28.10%
Average	36	17.14%
Below average	6	2.86%
Low	1	0.48%
Total	210	100%

The table 1 represents the information about the level of ICT competency of Integrated B. Ed. students, which

revealed that 25.23% of students have extremely high ICT competency, 26.19% of students have high ICT competency, 28.10% have above average ICT competency, 17.14% have average ICT competency, 2.86% have below average and 0.47% have low ICT competency. It shows that maximum number of student's have above average level of ICT competency.

Table 2: Level of ICT Competency among Science Stream

Level of ICT Competency	No. of Students	Percentages (%)
Extremely high	28	30.43%
High	19	20.65%
Above average	29	31.52%
Average	15	16.30%
Low	1	1.1%
Total	92	100%

The table 4.2 represents the information about the level of ICT competency of science students of Integrated B. Ed, which reveals that 30.43% of students have Extremely High ICT competency, 20.65% of students have High ICT competency, 31.52% have Above Average ICT competency, 16.30% have average ICT competency, 1.1% have low ICT competency. It shows that maximum number of student's have Above Average level of ICT competency.

Table 3: Level of ICT Competency among Arts Stream

Level of ICT Competency	No. of Students	Percentages (%)
Extremely high	25	21.18%
High	36	30.50%
Above average	30	25.42%
Average	21	17.80%
Below Average	6	5.1%
Total	118	100%

The table 4.3 represents the information about the level of ICT competency of arts students of Integrated B. Ed, which reveals that 21.18% of students have Extremely High ICT competency, 30.50% of students have High ICT competency, 25.42% have Above Average ICT competency, 17.80% have average ICT competency, 5.1% have Below ICT competency. It shows that maximum number of student's have High level of ICT competency.

Stream Wise Variation in ICT Competency

In order to compare the ICT competency of science and arts stream of integrated B. Ed students, the researcher has calculated the M, SD and t-values of the ICT competency scores. This core is presented in Table 4.

Difference in ICT Competency Scores of Integrated B. Ed Students in Relation to Stream

Integrated B.Ed students	N	M	SD	't'-value	Remarks
Arts	120	108.32	14.98	1.723	Non-significant
Science	90	111.75	13.69		

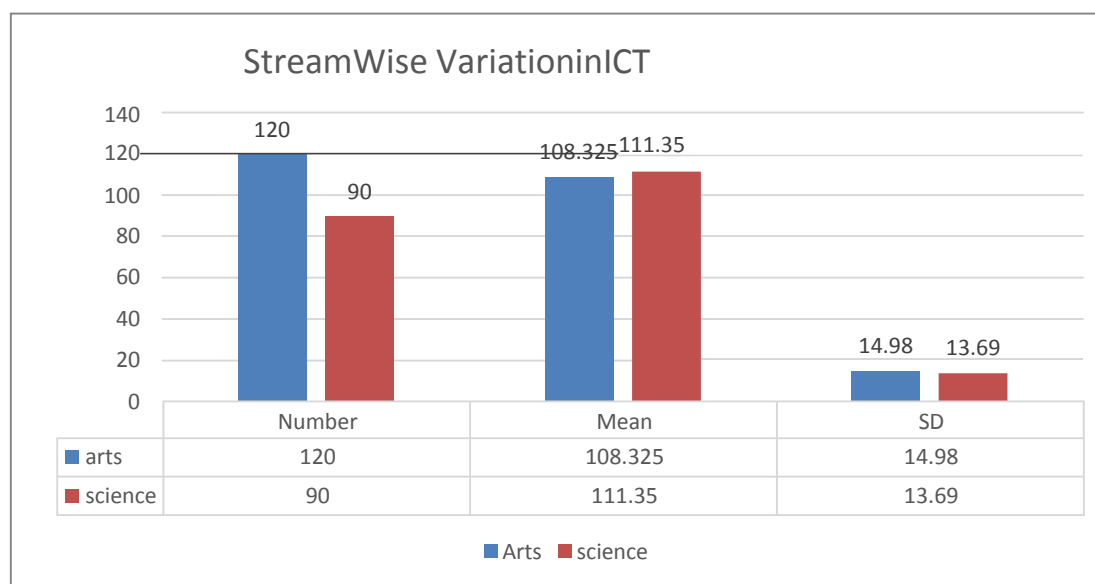


Table 4 reveals that the mean value (108.32) of arts students is slightly lower than the science students (111.75), but the SD value of arts students (14.98) is greater than the science students (13.69). In order to test hypothesis, the investigator has computed 't'-value and figure 1 supports the findings.

Figure 1: StreamWise Variation in ICT Competency

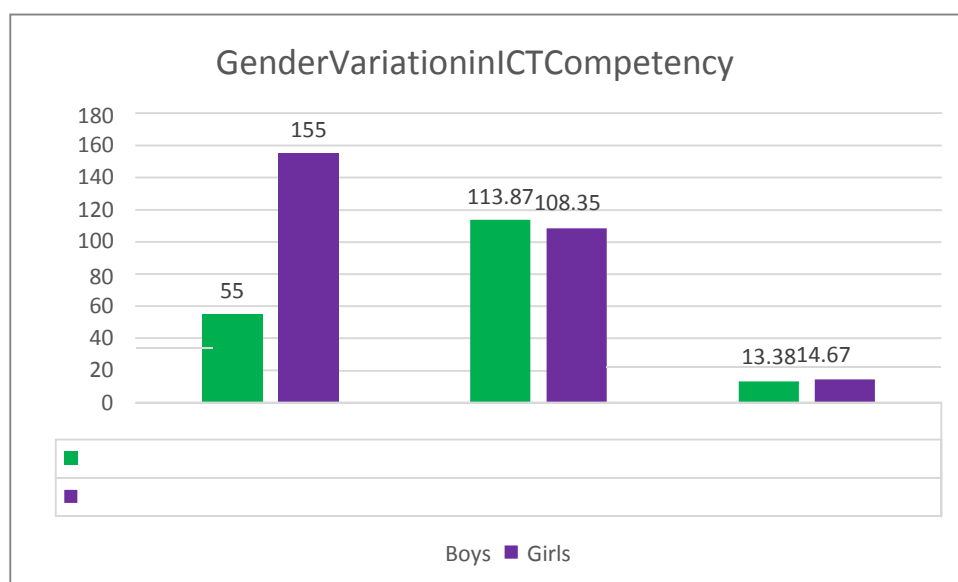
The obtained 't' value (1.723) was not significant at 0.05 & 0.01 significance level for the df 208. The table value for df 208 is 1.97 & 2.60 at 0.05 and 0.01 level of significance respectively. Though 't' value is not significant, the null hypothesis i.e. "There is no significant difference in ICT competency between science & arts Integrated B. Ed. students." is accepted.

Table 5: Gender Variation in ICT Competency

Gender	N	M	SD	't'-value	Remarks
Boys	55	113.87	13.38	2.56	Non-significant
Girls	155	108.35	14.67		

Table 4.5 presents that the mean value (113.87) of boys students is slightly higher than the girls students (108.35), but the SD value of boys students (13.38) is lower than the girls students (14.67). In order to test hypothesis, the investigator has computed 't'-value and figure 2 also supports the findings.

Figure 2: Gender Variation in ICT Competency



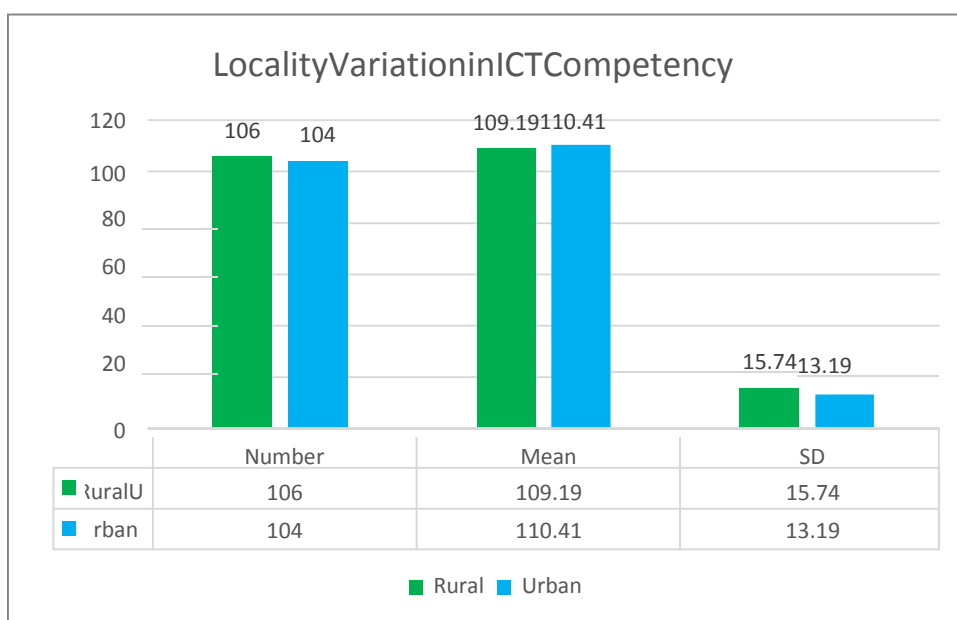
The obtained 't' value (2.56) was significant at 0.05 & non-significant at 0.01 significance level for the df 208. The table value for df 208 is 1.97 & 2.60 at 0.05 and 0.01 level of significance respectively. Though 't' value is not significant, the null hypothesis i.e. "There is no significant difference in ICT competency between boys & girls Integrated B.Ed students." is accepted.

Table 6: Variation in ICT Competency of Integrated B.Ed Students in relation to locality

Locality	N	M	SD	't'-value	Remarks
Rural	106	109.19	15.74	0.61	Non-significant
Urban	104	110.41	13.19		

Table 6 presents that the mean value (109.19) of rural students is slightly lower than the urban students (110.41), but the SD value of rural students (15.74) is higher than the urban students (13.19). In order to test hypothesis, the investigator has computed 't'-Value and figure 2 also supports the findings.

Figure 3: Variation of ICT Competency in relation to Locality



The obtained 't' value (0.61) was not significant at 0.05 & 0.01 significance level for the df 208. The table value for df 208 is 1.97 & 2.60 at 0.05 and 0.01 level of significance respectively. Though 't' value is not significant, the null hypothesis i.e. "There is no significant difference in ICT competency between rural & urban Integrated B.Ed students." is accepted.

Table No.7: Relationship between ICT competency And Academic Achievement of Integrated B. Ed Students

Variable	N	Correlation	Remarks
ICT competency	210	0.21	Positive negligible correlation
Academic achievement	210		

Table No 7 represents that the correlation of ICT competency and academic achievement of Integrated B. Ed. students. The r value of ICT competency & academic achievement is 0.21. It reveals that the positive negligible correlation between ICT Competency & academic achievement.

Table No.8: Relationship between ICT competency And Academic Achievement of Science Students

Variable	N	Correlation	Remarks
ICT competency	90	0.17	Positive negligible correlation
Academic achievement	90		

Table. No. 8 represents that the correlation of ICT competency and academic achievement of science stream students. The r value of ICT competency & academic achievement is 0.17. It reveals that the positive negligible correlation between ICT competency & academic achievement.

Table No.9: Relationship between ICT competency And Academic Achievement of Arts Students

Variable	N	Correlation	Remarks
ICT competency	120	0.21	Positive negligible correlation
Academic achievement	120		

Table. No 4.7 represents that the correlation of ICT competency and academic achievement of science stream students. The r-value of ICT competency & academic achievement is 0.21. It reveals that the positive negligible correlation between ICT competency & academic achievement.

Significance Difference between Two Correlation

Table No.10: Significance Difference between Two Correlations

Stream	N	r-value	t-value	Remarks
Science	90	0.17	0.29	Non - significant
Arts	120	0.21		

The obtained 't' value (0.29) was not significant at 0.05 & 0.01 significance level for the df 208. The table value for df 208 is 1.97 & 2.60 at 0.05 and 0.01 level of significance respectively. Though 't' value is not significant, the null hypothesis is i.e. "There is no significant difference between two correlations (ICT competency & Academic Achievement) of science stream & arts stream." is accepted.

Major findings

On the basis of the analysis and interpretation of data the investigator found some major findings for the study. The major findings are-

1. Maximum students have above average level of ICT competency.
2. Science students have more extremely high ICT competency level & a small number of low ICT competency level students.
3. There is no significant difference in ICT competency in relation to locality and stream.
4. There is a significant difference in ICT competency in relation to gender.
5. The study revealed that positive negligible correlation between ICT competency and academic achievement

of the Integrated B.Ed students.

6. The study shows that There is no significant difference between two correlation (ICT Competency & Academic Achievement) of science stream & arts stream

Suggestion for further study

The study will help the further study to conduct the study in other metro cities and semi-urban areas. It is also recommended that further studies can be conducted with large samples as well as applying higher order statistical technique like ANOVA. The study can be conducted at post-graduation level, under graduate level, higher secondary level and secondary level.

Educational implication of the study

1. The findings of the present study will be helpful for the students to know their ICT competency including hardware, software & system approach in teaching-learning process. When they use ICT in teaching-learning process, the information written in memory in permanent manner.
2. The study may be helpful to develop innovation skills including creativity, critical thinking, communication & collaboration while using ICT.
3. The present study will enhance in making the students technology oriented to use all the ICT tools competently. On the other hand, the policy makers will be benefited from this study in formulating appropriate policies for adoption and development of ICT infrastructure in educational sector and to generate ICT competent teachers.

Conclusion

ICT competency plays a vital role in increasing academic achievement of students. So, the parents & teachers have to develop the level of ICT competency of students. In the present study Integrated B. Ed students have above average level of ICT competency. Therefore, education for ICT will be given to pre-service teachers in their educational process. The necessity of informing, raising awareness and supporting pre-service teachers about the use of technology & networking can help in developing the ICT competency level.

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