

# Techno Pedagogical Attitude Of Secondary School Teachers Of Kerala In Relation To Their Digital Literacy: A Research Report

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**Abstract:** The study was conducted to find out the level of Techno Pedagogical Attitude and Digital Literacy of secondary school teachers in Kerala. Stratified Random sampling technique was adopted by selecting 360 secondary school teachers as the sample of the study. Survey method was used for the study. Techno Pedagogical Attitude Scale and Digital Literacy Test (Sareef & Baby, 2017) were used to find out level of Techno Pedagogical Attitude and Digital Literacy among secondary school teachers of Kerala. Descriptive statistics, t-test and Pearson's product moment co efficient of correlation(r) are the statistical techniques used to analyse data. The study was found that secondary school teachers possess high, average and low level of Techno Pedagogical Attitude and Digital literacy. Techno Pedagogical Attitude of secondary school teachers are not differ on subsamples of gender, locale of the schools and type of management of schools. But Digital Literacy among Secondary school teachers based on gender and locale of the schools are differ and not differ on the subsample of type of management of schools. The study also reveals that there exist moderate positive correlation between variables of Techno Pedagogical Attitude and Digital Literacy.

**Index Terms:** Attitude, Techno Pedagogical Attitude, Secondary school Teachers, Digital Literacy

## I. INTRODUCTION

Today, technology serves as a major role in shaping new global economy and producing fast changes in the society. There is a widespread acknowledgement that technology can be used to enhance both learning and teaching. India has the capacity to become the hub of technology enabled teaching and learning with its IT valour and strong education system. It has great potential, to transform the ways in which the teachers teach and the students learn. Technology provides strong powerful tools that can help in transforming the present isolated, teacher-centred and text-bound classrooms into technology enriched, student-focused and interactive knowledge environments.

The revolutionary development in Educational technology has redefined the teaching and learning process to a greater extent. The teachers to get acquaintance with the application of recent technological principles and materials in their teaching and hence there is an urgent need to examine the techno-pedagogical competencies possessed by the teachers. Currently, teacher's lack of technical expertise in technology appears to significantly constrain possibilities of developing new and innovative computer-supported pedagogical practices. For effective technology integration happen in the classrooms, teachers should have the necessary pedagogical, content and technological competencies.

The technological revolution has led to a fundamental shift in our understanding of pedagogy and its related practices. "Technological content knowledge refers to knowledge about how technology may be used to provide new ways of teaching content." (Niess,2005). But today the techno-pedagogical competency is very much needed for teachers in teaching and learning process, as it facilitates effective teaching and learning. The techno pedagogical competency is nothing but the ability of the teachers to make use of technology effectively in teaching. Technological pedagogical content knowledge (TPCK) was introduced to the educational research field as a theoretical framework for understanding teacher knowledge required for effective technology integration (Mishra & Koehler, 2006). Techno pedagogical content knowledge (TPACK) is a frame work to understand and describe the kinds of knowledge needed by a teacher for effective pedagogical practice in a technology enhanced learning environment."The TPACK frame work highlights complex relationship that exist between content, pedagogy and technology knowledge areas and may be useful organizational structure for defining what it is that teachers need to know to integrate technology effectively" (Archambault & Crippen,2009)

To integrate technology, teachers must possess requisite technology-based skills, knowledge, abilities, and attitudes (Teclhaimanot, Mentzer, & Hickman 2011). Now, techno pedagogical attitude of teachers has been going on smaller. The main reason is they are not digitally literate. " Digital Literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilitates to identify, access, manage, integrate, evaluate, analyze and synthesize digital resources, construct new knowledge and create media"(Casey & Bruce ,2010).The illiterate of the 21st century will not be those who cannot read and write but those who cannot learn, unlearn and relearn. These may aid in understanding issue of digital divide in terms of digital natives and digital immigrants. So Kerala initiated in bold attempts to support schools with IT infrastructure, IT based learning resources and also provides training to teachers. In 2016 onwards IT @ school initiated training to total teachers in Kerala for enhancing IT

enabled education. This has resulted in enhancing techno pedagogical attitude of teachers in varying school systems, curricular contexts and classroom practices in Kerala.

## II. NEED AND SIGNIFICANCE OF THE STUDY

Transition, transformation and revolution are the prime scenario of present educational system. This tendency requires a change in knowledge competencies and skills to deal with technological advancement. Technology is the means to enhance teaching- learning quality. Education systems in Kerala move to technology dynamic society. Kerala school curriculum 2013 focused on IT enabled education. Presently most of the schools have IT @ of school, smart class, and digital class. But teachers do not try to utilize such resources for effective teaching learning process because of the stable attitude of teachers towards IT enabled teaching. In this aspect teachers need to be trained on how to adapt on new technology and how to successfully integrate technology into his/her subject areas to make learning more meaningful.

The challenge for preparing 21st century teachers to use technologies effectively in their courses has led to many different approaches to using technology in teacher education programs. Most teacher education programs have redesigned their curricula to make the pre-service teachers competent in using technologies in their future teaching profession (Yildirim, 2007). While research exists to illustrate how often or the kinds of technology employed in classrooms (Pitler, 2011), there is not enough research for best practices in training teachers during pre-service programs to demonstrate how to effectively integrate 21<sup>st</sup> Century technologies into instruction. Most of the researchers found that teachers are facing lot of techno pedagogical difficulties due to their lack of digital literacy. The present study focused on examining teachers 'attitude towards technology, their level of digital skills as well as their experiences with technology and how they used technology in their current day to day educational practices. So through this study the investigator tries to find out Techno Pedagogical Attitude of Secondary school teachers in relation to their Digital Literacy and provide some suggestions for better practices.

## III. OBJECTIVES OF THE STUDY

The objectives set forth for the study are the following:

- i) To find out the level of Techno Pedagogical Attitude of secondary school teachers in Kerala.
- ii) To find out the level of Digital Literacy of secondary school teachers in Kerala.
- iii) To test whether there exist any significant difference in the level of Techno Pedagogical Attitude of secondary school teachers based on:
  - a. Gender
  - b. Locale of the schools
  - c. Type of management of schools
- iv) To test whether there exist any significant difference in the level of Digital Literacy of secondary school teachers based on:
  - a. Gender
  - b. Locale of the schools
  - c. Type of management of schools
- v) To test whether there exist any significant relationship between Techno Pedagogical Attitude of secondary school teachers and their Digital Literacy.

## IV. HYPOTHESES OF THE STUDY

The hypotheses formulated for the study is following.

- i) There will be significant difference in the mean scores of Techno Pedagogical Attitude among secondary school teachers on the basis of:
  - a. Gender
  - b. Locale of the schools
  - c. Type of management of schools
- ii) There will be significant difference in the mean scores of Digital Literacy among Secondary school teachers on the basis of:
  - a. Gender
  - b. Locale of the schools
  - c. Type of management of schools
- iii) There will be significant relationship between Techno Pedagogical Attitude of Secondary school teachers and their Digital Literacy.

## V. METHODOLOGY OF THE STUDY

### Methods of the study:

Survey method was adopted for the study

### Population and sample:

The population of the study is the secondary teachers working in schools recognised by Kerala government. The present study was conducted on sample of 360 secondary school teachers from 14 schools in three districts of Kerala (Kozhikode, Kannur, and Malappuram) selected by stratified sampling technique giving due to the representation of characteristics like gender, locale of the schools and type of Management of Schools..

#### Tool used:

To measure the variable, investigator developed Techno Pedagogical Attitude scale and Digital Literacy test with the help of supervising teacher( Sareef & Baby, 2017). For measuring reliability of the scale investigator followed Cronbach's Alpha which value found to be 0.72 and the value of Cronbach's Alpha for the test found to be 0.78. The validity of the scale and test is ensured using face and content validity.

#### Mode of Data collection and Data Analysis

After conducting standardised test on scale and deciding the sample size , the investigator prepared a list of schools from where the data to be collected. Then investigator contacted heads of high schools with a letter of recommendation to obtain permission for collecting data from that institution. The investigator met secondary school teachers and necessary arrangements were made to collect data. While administering the tools, the method of responding was explained clearly. Necessary clarifications of doubts were given whenever required. No time limit was enforced to respond the items. Then the response sheet along with tools were collected and sorted for analysis.

Soon after the collection of data, the investigator valued the data sheets of Techno Pedagogical Attitude and Digital Literacy. All the response sheets were scored as per the scoring scheme of the tools prepared. Total score of each item was calculated in the scale of Techno Pedagogical Attitude and test of Digital Literacy. Techno Pedagogical Attitude scale consists of 42 items. A respondent has to respond to 42 items by choosing any one of the three alternatives given i.e., Agree, Undecided and Disagree. The respondents have to mark their responses to each item in the appropriate columns corresponding to the three alternatives. For positive items the respective scores to the three responses are 3, 2, and 1. For negative items scoring was done in the reverse order. The total score was calculated for each item and further analysis was done after consolidation. The Digital Literacy Test consists of 40 objective type questions arranged in easy, average and difficulty level. The response sheets were scored according to the scoring scheme prepared. The teachers were instructed to respond each item by putting ( $\surd$ ) mark under the response final suitable for them against the option is A, B, C and D. For the correct answers gave '1' marks and wrong answers gave '0' marks. Finally, for finding out and assess the Digital Literacy the investigator added the scores. The analysis of the data was carried out with the help of appropriate statistical techniques – descriptive statistics, t- test and Pearson's product moment co efficient of correlation(r)

## VI. ANALYSIS AND INTERPRETATION OF DATA

### Level of Techno Pedagogical Attitude among secondary school teachers.

The different levels of Techno Pedagogical Attitude among secondary school teachers was determined by classifying the whole sample into three groups- low ,average and high in the conventional procedure of finding  $\sigma$  distance from mean  $\bar{x}$ . The standard deviation and means of the score of Techno Pedagogical Attitude for total sample are found to be 8.31 and 102.67 respectively. Secondary school teachers who obtained scores above or equal to the value of  $\bar{x} + \sigma$  were considered as high group and secondary school teachers who obtained scores below or equal to the value of  $\bar{x} - \sigma$  were considered as low group. The secondary school teachers who score lie between the values of  $\bar{x} + \sigma$  and  $\bar{x} - \sigma$  were considered as average group. The percentage of total sample falling into three groups (low, average and high) is given in Table no 1.

Table 1. Number and percentage of secondary school teachers falling into three groups of Techno Pedagogical Attitude (High, Average and Low)

| Variable                    | Group   | Score     | n   | %     |
|-----------------------------|---------|-----------|-----|-------|
| Techno Pedagogical Attitude | High    | >/110.98  | 82  | 22.78 |
|                             | Average | 110.98-94 | 224 | 62.22 |
|                             | Low     | </94.36   | 54  | 15    |

Table 1 shows that the level of Techno Pedagogical Attitude of secondary school teachers for the total sample. It is evident that 22.78 percentage of the total sample has high level of Techno Pedagogical Attitude, 62.22 percentage has average level of Techno Pedagogical Attitude and 15 percentage has low level of techno pedagogical attitude. The graphical representation of the distribution of total sample in different levels of Techno Pedagogical Attitude is given in figure 1



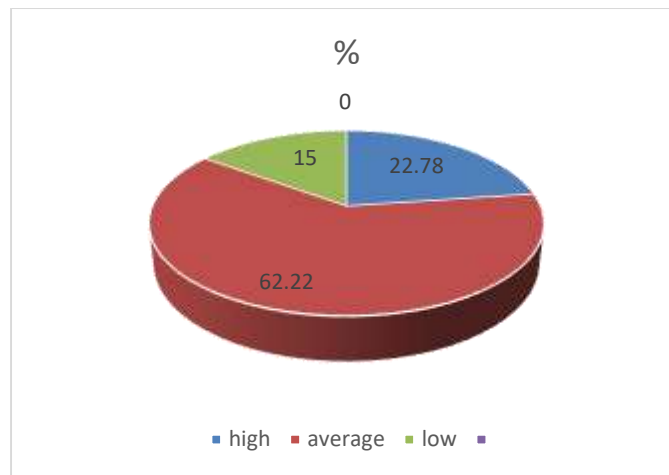


Figure 1: Distribution of total sample in different levels of Techno pedagogical Attitude

**Level of Digital Literacy among secondary school teachers.**

The different levels of Digital Literacy among secondary school teachers was determined by classifying the whole sample into three groups-low ,average and high in the conventional procedure of finding  $\sigma$  distance from mean  $\bar{x}$ . The standard deviation and means of the scores of Digital Literacy of secondary school teachers for the total sample are found to be 4.07and 30.86 respectively. Secondary school Teachers who obtained scores above or equal the value of  $\bar{x} + \sigma$  were considered as high group and secondary school teachers who obtained scores below or equal the value of  $\bar{x} - \sigma$  were considered as low group. The secondary school teachers who scores lie between the values of  $\bar{x} + \sigma$  and  $\bar{x} - \sigma$  were considered as average group. The percentage of total sample falling into three groups (low, average and high) is given in Table no 2.

Table 2. Number and percentage of secondary school teachers falling into three groups of Digital Literacy (High, Average and Low)

| Variable         | Group   | Score         | n   | %  |
|------------------|---------|---------------|-----|----|
| Digital Literacy | High    | $>/34.93$     | 78  | 22 |
|                  | Average | $34.93-26.79$ | 235 | 65 |
|                  | Low     | $</26.79$     | 47  | 13 |

Table 2 shows that the level of Digital Literacy of secondary school teachers for the total sample. It is evident that 22 percentage of the total sample has high level of Digital Literacy, 65 percentages has average level of Digital Literacy and 13 percentage has low level of Digital Literacy. The graphical representation of the distribution of total sample in different levels of Digital Literacy is given in Figure 2.

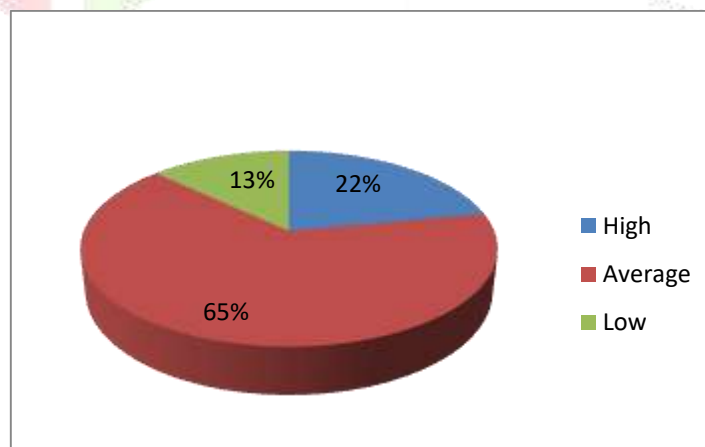


Figure 2: Distribution of total sample in different levels of Digital Literacy

### Comparison of mean scores of Techno Pedagogical Attitude between male and female secondary school teachers

Table 3. Data and results of the test of mean scores of Techno Pedagogical Attitude between male and female secondary school teachers

| Gender | N   | Mean   | SD   | t-value | Level of significance |
|--------|-----|--------|------|---------|-----------------------|
| Female | 220 | 103    | 7.98 | 0.52    | NS                    |
| Male   | 140 | 102.52 | 8.82 |         |                       |

Table 3 indicates that the mean scores obtained for the male secondary school teachers on Techno Pedagogical Attitude is 102.52 and mean scores of obtained for the female secondary school teachers on Techno Pedagogical Attitude is 103 . Standard deviation obtained for male secondary school teachers is 8.82 and female secondary school teachers is 7.98. The 't' value obtained is 0.52, which is less than the table value at 0.05 level (1.96). Since the obtained value of 't' is less than table value, it can be concluded that there exists no significant difference in the level of Techno Pedagogical Attitude of male and female secondary school teachers.

### Comparison of mean scores of Techno Pedagogical Attitude between urban and rural secondary school teachers

Table 4. Data and results of the test of mean scores of Techno Pedagogical Attitude between urban and rural secondary school teachers

| Locale of the School | N   | Mean   | SD   | t-value | Level of significance |
|----------------------|-----|--------|------|---------|-----------------------|
| Urban                | 180 | 103.05 | 8.27 | 0.88    | NS                    |
| Rural                | 180 | 102.29 | 8.35 |         |                       |

Table 4 indicates that the mean scores obtained for the urban secondary school teachers on Techno Pedagogical Attitude is 103.05 and mean scores of obtained for the rural secondary school teachers on Techno Pedagogical Attitude is 102.29 . Standard deviation obtained for urban secondary school teachers is 8.27 and rural secondary school teachers is 8.35. The 't' value obtained is 0.88, which is less than the table value at 0.05 level (1.96). Since the obtained value of 't' is less than table value, it can be concluded that there exists no significant difference in the level of Techno Pedagogical Attitude of urban and rural secondary school teachers.

### Comparison of mean scores of Techno Pedagogical Attitude between aided and government secondary school teachers

Table 5. Data and results of the test of mean scores of Techno Pedagogical Attitude between Aided and Government secondary school teachers

| Type of Management | N   | Mean   | SD   | t-value | Level of significance |
|--------------------|-----|--------|------|---------|-----------------------|
| Aided              | 180 | 103.05 | 8.01 | 1.93    | NS                    |
| Government         | 180 | 101.84 | 8.52 |         |                       |

Table 5 indicates that the mean scores obtained for the aided secondary school teachers on Techno Pedagogical Attitude is 103.05 and mean scores of obtained for the government secondary school teachers on Techno Pedagogical Attitude is 101.84 . Standard deviation obtained for aided secondary school teachers is 8.01 and government secondary school teachers is 8.54. The 't' value obtained is 1.93, which is less than the table value at 0.05 level (1.96). Since the obtained value of 't' is less than table value, it can be concluded that there exists no significant difference in the level of Techno Pedagogical Attitude of aided and government secondary school teachers.

### Comparison of mean scores of Digital Literacy between male and female secondary school teachers

Table 6. Data and results of the test of mean scores of Digital Literacy between male and female secondary school teachers

| Gender | N   | Mean  | SD   | t-value | Level of significance |
|--------|-----|-------|------|---------|-----------------------|
| Female | 218 | 30.71 | 3.73 | 2.28*   | 0.05                  |
| Male   | 142 | 31.05 | 4.55 |         |                       |

\* Significant at 0.05 level

Table 6 indicates that the mean scores obtained for the male secondary school teachers on Digital Literacy is 31.05 and mean scores of obtained for the female secondary school teachers on Digital Literacy is 30.71 . Standard deviation obtained for male secondary school teachers is 4.55 and female secondary school teachers is 3.73. The 't' value obtained is 2.28, which is greater than the table value at 0.05 level (1.96). Since the obtained value of 't' is greater than table value, it can be concluded that there exists significant difference in the level of Digital Literacy of male and female secondary school teachers.

## Discussion

The analysis of the mean scores of Digital Literacy of male and female secondary school teachers revealed that there exist significant difference in the level of Digital Literacy of male and female teachers. The mean score of Digital Literacy of male secondary school teachers is 31.05 which is higher than mean score of female secondary school teachers (30.73). This indicate that male secondary school teachers are having higher Digital Literacy than female. So it can be inferred that Digital Literacy of male and female secondary school teachers are not equal.

### Comparison of mean scores of Digital Literacy between urban and rural secondary school teachers

Table 7. Data and results of the test of mean scores of Digital Literacy between urban and rural secondary school teachers

| Locale of the school | N   | Mean  | SD   | t-value | Level of significance |
|----------------------|-----|-------|------|---------|-----------------------|
| Urban                | 180 | 31.31 | 3.73 | 2.19*   | 0.05                  |
| Rural                | 180 | 30.41 | 4.34 |         |                       |

\*Significant at 0.05 level

Table 7 indicates that the mean scores obtained for the urban secondary school teachers on Digital Literacy is 31.31 and mean scores of obtained for the rural secondary school teachers on Digital Literacy is 30.41. Standard deviation obtained for urban secondary school teachers is 3.73 and rural secondary school teachers is 4.34. The 't' value obtained is 2.19, which is greater than the table value at 0.05 level (1.96). Since the obtained value of 't' is greater than table value, it can be concluded that there exists significant difference in the level of Digital Literacy of urban and rural secondary school teachers.

## Discussion

The analysis of the mean scores of Digital Literacy of urban and rural secondary school teachers revealed that there exist significant difference in the level of Digital Literacy of urban and rural teachers. The mean score of Digital Literacy of urban secondary school teachers is 31.31 which is higher than mean score of rural secondary school teachers (30.41). This indicate that urban secondary school teachers are having higher digital literacy than rural. So it can be inferred that Digital Literacy of urban and rural secondary school teachers are not equal.

### Comparison of mean scores of Digital Literacy between aided and government secondary school teachers

Table 8. Data and results of the test of mean scores of Digital Literacy between Government and Aided secondary school teachers.

| Type of management | N   | Mean  | SD   | t-value | Level of significance |
|--------------------|-----|-------|------|---------|-----------------------|
| Aided              | 180 | 30.82 | 4.20 | 0.17    | NS                    |
| Government         | 180 | 30.89 | 3.94 |         |                       |

Table 8 indicates that the mean scores obtained for the aided secondary school teachers on Digital Literacy is 30.82 and mean scores of obtained for the government secondary school teachers on Digital Literacy is 30.89. Standard deviation obtained for aided secondary school teachers is 4.20 and government secondary school teachers is 3.94. The 't' value obtained is 0.17, which is less than the table value at 0.05 level (1.96). Since the obtained value of 't' is less than table value, it can be concluded that there exists no significant difference in the level of Digital Literacy of aided and government secondary school teachers.

### Test of significant relationship between Techno pedagogical Attitude of secondary school teachers and their Digital Literacy

Table 8. Pearson's 'r' for the variables Techno Pedagogical Attitude and Digital Literacy for the total sample

| Sl.no | Variables                   | Coefficient of correlation |
|-------|-----------------------------|----------------------------|
| 1     | Techno pedagogical attitude | 0.487                      |
| 2     | Digital Literacy            |                            |

## Discussion of Results

From table 8 shows that, the coefficient of correlation for the variable Digital literacy with the variable techno pedagogical attitude in the case of total sample is 0.487. The magnitude and direction of 'r' indicates moderate positive correlation between the variables techno pedagogical attitude and digital literacy. It means that there is a moderate increase in Techno Pedagogical Attitude results into moderate increase in Digital Literacy and moderate decrease in Techno Pedagogical Attitude results into moderate decrease in Digital Literacy.

## VII. MAJOR FINDINGS OF THE STUDY

1. The study evident that secondary school teachers possess high, average and low level of Techno Pedagogical Attitude and Digital Literacy
2. The study can inferred that Techno Pedagogical Attitude of secondary school teachers are not differ on the subsamples of gender, locale of the schools and type of management of schools
3. The study revealed that there exist significant difference in the level of Digital Literacy of male and female teachers. The mean score of Digital Literacy of male secondary school teachers is 31.05 which is higher than mean score of female secondary school teachers (30.73) .This indicate that male secondary school teachers are having higher Digital Literacy than female.
4. The study found that there exist significant difference in the level of Digital Literacy of urban and rural teachers. The mean score of Digital Literacy of urban secondary school teachers is 31.31 which is higher than mean score of rural secondary school teachers (30.41) .This indicate that urban secondary school teachers are having higher digital literacy than rural.
5. The study indicate that there exists no significant difference in the level of Digital Literacy of aided and government secondary school teachers.
6. The study inferred that the coefficient of correlation for the variable Digital literacy with the variable techno pedagogical attitude in the case of total sample is 0.487. The magnitude and direction of 'r' indicates moderate positive correlation between the variables techno pedagogical attitude and digital literacy.

## VIII. EDUCATIONAL IMPLICATIONS:

1. Proper in-service IT training programme should be organized for teachers which may provide sufficient knowledge and skill in IT. Teacher training should be equipped with latest TPACK strategy and opportunities must be provided for hands in experience
2. Schools must strongly implement IT @ school functions by providing IT labs .It create better understanding of Quality Assurance among teachers.
3. We must consider the impact of technology and changing face of curriculum. So introduce need based and advanced concepts in teaching for enabling teachers to develop and use ICT skills in attainment of curriculum learning objectives. Policy makers must give strong attention for making IT Enabled curriculum in the educational system.
4. Instructors must implement blogging technology in their class room to help students articulate and share their learning with peers and experts.
5. Some teachers do not have personal computers to develop their competency in IT. Authorities are to make provisions for teachers who do not have personal computers for developing their techno pedagogical attitude in teaching.
6. Teachers should be encourage to use online and internet facilities for getting access of various knowledge resources and for enhancing professionally which will develop their skills to work on with confidence.

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