DIGITAL LITERACY AND ATTITUDE OF PROSPECTIVE TEACHERS TOWARDS USING INTERACTIVE WHITEBOARD IN CLASSROOM

Dissertation submitted to Tamil Nadu Teachers Education University in partial fulfilment of the requirements for the degree of

Master of Philosophy in Education

by

LATHA SARASWATHY. N

Reg. No: MP151053

under the guidance and supervision of

PRASAD.P.S.

Assistant Professor in Education

N.V.K.S.D. COLLEGE OF EDUCATION

(AUTONOMOUS)

(RE-ACCREDITED BY NAAC WITH 'A' GRADE)

ATTOOR, KANNIYAKUMARI DISTRICT

TAMIL NADU

NOVEMBER – 2017

Latha Saraswathy. N,

M.Phil., Scholar,

N.V.K.S.D. College of Education,

Attoor, Kanniyakumari District.

DECLARATION

I declare that the dissertation entitled DIGITAL LITERACY AND ATTITUDE OF PROSPECTIVE TEACHERS TOWARDS USING INTERACTIVE WHITEBOARD IN CLASSROOM submitted to the Tamil Nadu Teachers Education University, Chennai for the fulfilment of the degree of Master of Philosophy in Education, is the record of original research work carried out by me under the guidance of Mr. Prasad P.S. Assistant professor in Education, N.V.K.S.D College of Education, Attoor and it has not been submitted by me for the award of any degree, diploma, title or recognition before.

Place :Attoor   N. Latha Saraswathy.

Date :   (M.Phil. Scholar)

Prasad. P.S. M.Sc, M.Ed., M.phil

Assistant Professor in Education,

N.V.K.S.D. College of Education,

Attoor, Kanniyakumari District.

CERTIFICATE

    This is to certify that the dissertation, entitled "DIGITAL LITERACY AND ATTITUDE OF PROSPECTIVE TEACHERS TOWARDS USING INTERACTIVE WHITEBOARD IN CLASSROOM" submitted to Tamil Nadu Teachers Education University, in partial fulfilment of the requirements for the award of the degree of Master of Philosophy in Education, is a record of bonafied research work done by Mrs. Latha Saraswathy. N during the period 2015 to 2017 under my supervision and guidance.

Place :Attoor   Prasad P.S

Date :   Guide.

ACKNOWLEDGEMENT

Place :Attoor   Latha Saraswathy. N.

Date :   (M.Phil Scholar)

CONTENTS

LIST OF TABLES

LIST OF ABBREVATIONS

OC	-	Open Category
BC	-	Backward caste
MBC	-	Most backward caste
SC	-	Scheduled Caste
ST	-	Scheduled Tribes

INTRODUCTION

- Need and significance of the study

- Statement of the problem

- Objectives of the study

- Hypotheses

- Methodology in brief

- Delimitations of the study

- Organization of the report

Digital technology has reached the extreme position which makes our daily life more easily. To enjoy this new technology in this world, each and every person should be digitally literate. The digitally literate people can easily adopt new technology more efficiently.

Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information requiring both cognitive and technical skills.

- ALA Digital Literacy Taskforce, 2011

Research around digital literacy is concerned with wider aspects associated with learning how to effectively find, use, summarize, evaluate, create and communicate information while using digital technologies not just being literate at using a computer.

Digital literacy requires certain skills sets that are interdisciplinary in nature. To achieve information, media and technology skills. One needs to achieve competency in information literacy, media literacy and ICT (Information Communication Technologies)

Digital technology hopes people to interact and communicate with family and friends even in the busy constrains of today's world. This can be useful only when the people are digitally literate.

Interactive whiteboards are large interactive displays that connect to a computer and projector. When the computer's desktop is projected on to the interactive whiteboard users can control the computer using either a special pen or their fingers. The need for a mouse is eliminated because users can interact directly with the interactive white board

screen. The term SMART board is often used interchangeability with the more generic term interactive white board.

They are used in a variety of settings, including classrooms at all levels of education, in corporate board rooms and work groups, in training rooms for professional sports coaching, in broadcasting studios, and others.

The first interactive whiteboard was released in 1991; only in the last several years have whiteboards become a must-have tool in K-12classrooms. New emphases on developing 21st century skills for students, the requirement for educator proficiency in technology, and research documenting increased learning with the use of interactive whiteboards have spurred its adoption.

Fundamentally, an interactive whiteboard combines a dry erase whiteboard with an LCD projector and is usually mounted on a wall or floor stand. Powered by easy-to-use software, the whiteboard becomes a computer screen viewable by an entire classroom. The projector projects the content from a computer onto the surface of the board while the teacher controls the content either with a pointer or a touch of the hand instead of a keyboard and mouse. The combination of software with the projector results in much more than simply a projected image.

Anything that can be done on a computer monitor can be replicated on the interactive white board. A teacher can create engaging lessons that focus on one task such as a matching activity where students use either their fingers or a pen to match items. Another teacher might integrate multiple items into a lesson plan such as websites, photos, and music that students can interact with, respond to verbally or even write comments on the

board itself. Image size and placement can change with a simple touch to the screen. This technology makes the one-computer classroom a workable instructional model. Imagine taking a class on a photo safari to Africa complete with embedded videos, animal sounds and mapping software.

NEED AND SIGNIFICANCE

Information and communication technologies (ICT's) have fundamentally changed the way people learn, teach and communicate. They can transform the nature of education where and how learning takes place and the roles of students and teachers in the learning process.

With the emerging new technologies, the teaching profession is evolving from an emphasis on teacher-centered, teacher-centered instruction to learner-centered, interactive learning environments.

Today's students are digital learners. They literally take in the world via the filter of combining devices. The students of this age also trying to adopt them for the modernized changes and so the teachers are also try to endow them with the modern technological teaching learning methods and packages, with this a teacher can communicate instantly.

Interactive whiteboard is an innovative which can enhance any lesson and entire students to learn. With the use of this teachers can develop many creative ways to capture student's attention and imagination.

The usage of smart teaching technique is now more prevalent in school as well as other colleges and institutes. It was generated back in 1980's and is growing since then.

This new technology helps the student with the benefit of learning with a different experience. The smart class makes the classroom more interactive and interesting. It has also created a greater impact on our society as well as on education system. The government has also started implementing this idea of smart class in the schools. The smart classes have their own merits and demerits but this new technology is welcomed by the society in a great manner.

Today's prospective teachers are tomorrow's school teachers. As a future teacher, prospective teachers could be aware about digital literacy and developing positive attitude towards using interactive white board.

In this way the investigator likes to study the digital literacy and attitude of prospective teachers towards using interactive white board.

STATEMENT OF THE PROBLEM

Interactive white board is an emerging technology in education. In near future, all the schools and college will be using this device instead of chalkboard and other technologies. Our country is in the process of digitalization, so each and every individual have to be acquainted with the function and operation of the digital technologies. For that the teachers must have a very clear idea about the digital technology. So it is necessary to check whether the prospective teachers have digital literacy and their attitude towards interactive White board. So the investigator entitled the study as DIGITAL LITERACY AND ATTITUDE OF PROSPECTIVE TEACHERS TOWARDS USING INTERACTIVE WHITEBOARD IN CLASSROOM.

OPERATIONAL DEFINITION OF TERMS

DIGITAL LITERACY

Digital literacy is defined as a competence using digital technologies that encompasses a variety of cognitive and emotional skills". (Eshat – Alkalai & Chajut, 2009).

By the term Digital literacy investigator means the ability to understand and use digital technology, communication tools and social networks

ATTITUDE:

Attitude is defined as a dispositional readiness to respond to certain situation, persons, objects or ideas in a consistent manner, which has been learnt and has become one's typical mode of response.

By the term Attitude investigator means the state of mind and view of prospective teachers regarding the usage of interactive whiteboard.

PROSPECTIVE TEACHERS:

Those who are undergoing two years Bachelor of Education (B.Ed.) (secondary) programme in various college of education affiliated to Tamil Nadu Teacher Education university.

INTERACTIVE WHITE BOARD

Interactive white board (IWB) is a large interactive display that connects to a computer. A projector projects the computer's desktop onto the board's surface where

users control the computer using a pen, finger, stylus, or other device. The board is typically mounted to a wall or floor stand.

A large touch-sensitive board connected to a computer and a digital projector, used for teaching in the classroom.

--Collins English Dictionary.

A CLASSROOM

A classroom is a learning space, in educational institution; where in which teaching learning process is held.

OBJECTIVES OF THE STUDY

1. To construct and validate a scale for measuring the attitude of prospective teachers towards using interactive white board.
2. To study the level of digital literacy of prospective teachers in Kanniyakumari District.
3. To compare the mean scores of digital literacy of prospective teachers on the basis of gender, locale, community, religion, optional subject, frequency of computer use, purpose of using computer, level of computer knowledge, own a smart phone; own a laptop/personal computer and internet browsing habit.
4. To find out whether there is any significant difference in the mean score of attitude of prospective teachers towards using interactive white board on the basis of background variable such us gender, locale, community, religion, optional subject, frequency of computer use, purpose of using computer, level of computer knowledge, own a smart phone, own a laptop/personal computer and internet browsing habit.

5. To study the correlation between digital literacy and attitude of prospective teachers towards using interactive white board in classroom.

HYPOTHESES :

Following hypotheses were formulated for the present study.

1. There is no significant difference in the mean scores of digital literacy of male and female prospective teachers.

2. There is no significant difference in the mean scores of digital literacy of rural and urban prospective teachers

3. There is no significant difference in the mean scores of digital literacy of OC, BC, MBC and SC/ST prospective teachers.

4. There is no significant difference in the mean scores of digital literacy of Hindu, Christian and Muslim prospective teachers.

5. There is no significant difference in the mean scores of digital literacy of prospective teachers based on optional subject.

6. There is no significant difference in the mean scores of digital literacy of prospective teachers based on the frequency of using computer.

7. There is no significant difference in the mean scores of digital literacy of prospective teachers based on the purpose of using computer.

8. There is no significant difference in the mean scores of digital literacy of prospective teachers based on the level of computer knowledge.

9. There is no significant difference in the mean scores of digital literacy of prospective teachers based on own a Smartphone.

10. There is no significant difference in the mean scores of digital literacy of prospective teachers based on internet browsing habit.

11. There is no significant difference in the mean scores of attitude towards using interactive whiteboard in the classroom of male and female prospective teachers.

12. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of rural and urban prospective teachers.

13. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of OC, BC, MBC and SC/ST prospective teachers.

14. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of Hindu, Christian and Muslim prospective teachers.

15. There is no significant difference the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on optional subject.

16. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on frequency of using computer.

17. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on the purpose of using computer.

18. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on the level of computer knowledge.

19. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on own a smart phone.

20. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on own a laptop/personal computer.

21. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on internet browsing habit.

22. There is no significant correlation between the mean scores of digital literacy and attitude of prospective teachers towards using interactive white board in the class room.

METHODOLOGY IN BRIEF

METHOD ADOPTED

Normative survey method was adopted for the study.

POPULATION

The population in the present study consisted of all prospective teachers studying in different B.Ed. colleges in Kanniyakumari district.

SAMPLE

The sample for the study consisted of 400 prospective teachers of different colleges of education in Kanniyakumari district. Simple random sampling technique is used to select the sample.

TOOLS USED

1. Digital literacy test (Evangelin M.S Beulah & Prasad P.S, 2015)

2. Attitude scale on interactive white board constructed and validated by N. Latha Saraswathy & Prasad P.S. 2017

3. Personal data sheet

STATISTICAL TECHNIQUES USED

Statistical techniques like arithmetic mean, standard deviation, t test, ANOVA and Pearson's product moment method of correlation.

DELIMITATIONS OF THE STUDY

The main de-limitations of the study are the following

- The sample size is delimited to 400 prospective teachers only.

- The sample is restricted to Hindu and Christian prospective teachers due to the low enrolment of Muslim prospective teachers in the colleges of education in Kanniyakumari district.

ORGANIZATION OF THE REPORT

CHAPTER I: This chapter consists of a general introduction, need and significance of the study, statement of the problem, operational definitions of key terms, objectives of the study, hypotheses and delimitations of the study.

CHAPTER II: A brief review of theoretical overview and related studies with more proximity to the present study is included.

CHAPTER III: It discusses about the tool development and methodology adopted for the study, tool developed sample design, sample selected, variables used, procedure adopted for data collection and the statistical procedures used.

CHAPTER IV: It deals with the analysis and interpretation of data collected during the course of the study.

CHAPTER V: This chapter presents the study in retrospect, followed by findings, conclusions and together with recommendations and suggestions for further research.

REVIEW OF RELATED LITERATURE

- Theoretical overview

- Studies in India

- Studies in abroad

- Critical review

The review of related literature enables the researcher to define the limits of his field. The knowledge of related literature, brings the researcher up-to-date on the work which others have done and thus to state the objectives clearly and concisely.It is the task that begins with a research for a suitable topic that continues throughout the duration of the research project which necessarily shows how the problem under investigation relates to previous research studies.

According to Good, Barr and Scats "A survey of related literature helps to show whether the evidence already available to solve the problem adequately without further investigation and thus avoid the risk of duplication". Review of related literature, besides allowing the researcher to acquaint himself with the current knowledge in the field or area in which an investigator is going to conduct research. The survey of related studies implies locating, studying and evaluating reports of the relevant researchers, study of the public articles, going through related portions of encyclopedia and research abstracts.

Lehman says the review of literature is a very significant aspect of the research process. It helps the researcher by giving him some information about the status of knowledge in the area he intends to study. It should provide the researcher with ideas of the type of study or the type of design that he may eventually use in conducting his research. According to Mouly, "the survey of the literature is a crucial aspect of the planning of the study and invariably is a wise investment".

THEORETICAL OVERVIEW

DIGITAL LITERACY

Digital literacy means the ability to operate digital technology like computer, i-pad, mobile phone, etc. According to Paul Glister in his book Digital Literacy (1997) explained "Digital literacy as an essential life skill and an ability to understand and to use information from a variety of digital sources. He introduced the concept that "digital literacy is about mastering ideas, not keystrokes," distinguishing digital literacy from a more limited "technical skills" view. "Not only must you acquire the skill of finding things, you must also acquire the ability to use these things in your life" (pp. 1–2).

Today present world is considered as a digital world, so the education field is also highly influenced. In the present context, most of schools have digital technology for teaching learning purposes. So the future teachers are expected to have high knowledge of digital literacy. Digital literacy is the skill for collecting more information from the digital technologies.

DEFINITION

"Digital Literacy is the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers"

- (Gilster 1997)

"The ability to find, evaluate, utilize, share, and create content using information technologies and the Internet."

- Cornell University.

DIGITAL LITERACY

The term Digital Literacy is extremely broad; therefore it is hard to come up with only one definition. Digital literacy can be described as; things digitally literate people produce, such as blogs, wikis, and podcasts, as well as activities that digitally literate people engage in, such as social networking and digital storytelling (O'Brien & Scharber, 2008). Glister (1997) describes digital literacy as 'the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers' or other forms of digital technology.

The Internet

The Internet gives users access to numerous forms of literacy. Users can search for web pages (or create their own), write blogs, send emails, create digital portfolios, read articles, and much more. The Internet is a wonderful tool for viewing and creating many different forms of literacy, and has helped literacy to change and transform to what it is today (Fellowes & Oakley, 2011).Social media websites such as Face book and Twitter allow users to send images and messages to notify their friends and followers about their views and ideas. Users can also view the current news issues and topical issues (Winch et al., 2012).

Face book and other social media outlets

Electronic Talking Books (ETAs)

Electronic Talking Books (ETBs) are also known as digital storybooks or CD storybooks. They are stories that are narrated by a computer, an electronic device, or the internet. ETBs contain roughly the same number of pages as a paper book. ETBs are accompanied by a range of media options, e.g. pictures, sound effects, music and animations and it is because of these aspects that they are so popular with children (Fellowes & Oakley, 2011).

EBooks

EBooks are currently published print books which are presented in a digital form. There are numerous Electronic book readers available such as the Kindle, Sony Reader, and Apple i-Pad. These devices allow users to download and store thousands of magazines, newspapers, and books-(Winchet-2012).

Blogs

Blogs or 'weblogs', are diary-like entries which can be written by anyone and displayed on a web page. Blogs are a place where ideas, thoughts, and images can be expressed and shared with a worldwide audience (Winch et al., 2012).

iPhones and other smart phones

iPhones and other smart phones include many functions which allow users to write and view text. The use of SMS on mobile phones has created a new form of speed writing or shorthand, making it quicker and easier for people to write and send messages (Winch et al., 2012). They also provide users access to the Internet where they can access websites, blogs, and participate in many forms of communication with the entire world

(Winch et al., 2012). CDs and DVDs can be used as platforms for Electronic Talking Books (ETBs) (Fellowes & Oakley, 2011) which have been described previously. Interactive whiteboards are becoming extremely common in classrooms (Winch et al., 2012). They are a 'whiteboard' which is connected to a computer and a projector. The whiteboard display usually emulates the computer keyboard and mouse and can be operated by the touch of a finger or special pen. Interactive whiteboards can provide many opportunities for engaging students in producing and interacting with different texts and websites (Winch et al., 2012).

Characteristics of Digital Literacy

Literacy at one point in time suggested "the ability to read and write". Lanham expands on this previous notion to include "the ability to understand information however presented" (as cited in Lankshear & Knobel,2008, p. 2). Another definition of what it now means to be literate comes from Kress - "taking meaning and making meaning from many sources of information, from many different sign-systems, will become the new common sense."

Computer-Mediated Communication

Traditionally, there have been five forms of computer-mediated communication:

1. One-to-one dialogue with an identified interlocutor (e.g., electronic mail)

2. One-to-many dialogue with identified interlocutors (e.g., listservs or bulletin boards)

3. Postings to the Internet ("finished" pieces made available for public consumption, e.g. Suite 101 articles)

4. Joint composition (texts written in collaborative spaces, e.g. Google Docs, Wikipedia)

5. Anonymous dialogue (real-time chat discussion, often within a fictional context in which interlocutors communicate under assumed identities)."

Even though text messaging and instant messaging are not explicitly considered within these forms, they are open enough to facilitate the inclusion of new manifestations of communication.

It is acknowledged that their "speed, convenience, and a synchronicity were the most appealing features of the medium" (as cited by Schaefer Meyer and Sewell, 1988, in p. 10).

"Increasing reliance on digital modes of communication and the linguistic shifts that such reliance promotes might eventually result in "print culture sans print" or even "print sans print culture" (as cited by Baron, 2005a, pp. 28,29 in p. 11).

Digital Immigrant

As opposed to digital natives, this term is used to depict people who were born before the digital age and so learned to use the related technologies like the computer and Internet at some time later in life. While many individuals in this group may have adopted such technologies on an everyday basis, there are others who find it more difficult since they had learned and are more accustomed to utilizing alternative methods.

Digital Native

This term coined by Mark Prensky refers to individuals who were born in the age of digital technology such as the computers and the Internet. As such, people who fall

into this category tend to have a greater understanding of its concepts and higher skill level in their use because they started using them at an early age and grew up learning with them. Digital natives were born into an environment saturated by technology, where the digital world interacts rather seamlessly with the 'real' world. Consequently as learners, digital natives are a generation of virtual learners who are accustomed to seeking and building knowledge in a technology-enhanced environment.

Digital Divide

Access to digital technology may vary from developed and developing countries and even within the people in the same country which may empower some people to engage in public life in comparison to others who do not have access to the same technology. Hence, "discrepancies in who had access to this technology became strikingly apparent", p. 11.

A divide also exists, though some experts claim it is narrowing or, in some instances, even reversing itself, p. 12 in terms of gender equality in the realm of technology. With males being reported to have demonstrated a more fervent initial adoption of the computer and then the internet which ultimately led "to a shaping of the medium around their interest", p. 12.

New Literacy Studies

"The 'screen' mat be becoming dominant" and the "visual mode may be coming to have priority over the written", p. 15. The importance being placed on the visual in our contemporary culture is undeniable. It has even penetrated traditional means of writing in the sense of emoticons. The page is rapidly being replaced by the screen.

Folksonomy

This term refers to people coming together to share in the categorizing and indexing of online materials in order to aid in exchanging and managing information. (i.e. social bookmarking)

Hypertext and Hypermedia

Hypertext as defined by Nelson in 1960 (as cited in Bolter, 2011, p. 34) is a system for interconnecting documents . Hypertext and hypermedia form the foundation for how we interact with the World Wide Web (WWW). At the time of the WWW's inception, text was the dominant media. However, as our technology progressed in terms of connectivity and in our web browsers, different types of media were introduced. The terminology used to describe content on the web gradually changed from Hypertext to Hypermedia (Bolter, 2011). Hypertext and hypermedia allow for the cross-referencing of a variety of different types of media (text, audio, video, and interactive).

Hypermedia

Hypermedia is "is interactive, nonlinear, multimedia, and fluid". Hypermedia does not always have a hierarchical structure. Instead, the material is organized by topic through relational links. Considered to change the distinction between the writer and the reader. It is said to change education as it changes how students interact with teachers, other students, and provides access to new materials.

Split Condition

Digital text exists in a "split condition": when considering texts generated for arts and entertainment (especially narratives). At each end, there is avant-garde forms, like hypertext fiction, and narrative game worlds. The former challenges "conventional literary structures and often place a high processing demand on readers, resulting in limited appeal for the genre beyond circles of intellectual elite with an interest in the deconstruction of conventional aesthetic forms." The latter "holds wide appeal for popular culture audiences." There is little in between that appeals to audiences who read for pleasure.

Point casting

Described as the ability to narrow the focus and customize the information based on user preference (Kalantzis, Cope, & Harvey, 2003). A valuable component for remixing; point casting gives viewers the ability to become active receivers of information.

Multiliteracies

A focus on "modes of representation much broader than language alone". The idea that "mere literacy" can no longer negotiate the diversified and globalized contexts in which we live is a fact that has opened the door to integrated modes of meaning-making that include textual, visual, audio, spatial, behavioral etc. . Another understanding of the term multiliteracies refers to the multiple Englishes, languages, and communication patterns that are part and parcel of a diverse society.

The term multiliteracies was coined by the New London Group as they wanted to highlight related aspects of the increasing complexity of texts such as the proliferation of multimodal ways of making meaning where the written word is increasingly part and

parcel of visual, audio, and spatial patterns and the increasing salience of cultural and linguistic diversity characterized by local diversity and global connectedness

The term multiliteraciesis required because the way that people communicate has changed due to the many new technologies that have been created.

Semiotic systems and orders of discourse

Digital literacy includes understanding the use of semiotic systems like those of film, photography and gesture. It also includes the "order of discourse", which is a sort of structured mix of semiotic systems. For example, the combination of language and visuals one would use to present the news on TV is an order of discourse.

Picture Writing and the ICONIC

The ongoing negotiation of the visual image and the text means the properties of the image and text tend to blur and overlap. Icons blend properties of image and text and, as Bolter (2011) describes, become "energy units that focus the operative power of the machine into visible and manipulative symbols" (p.62). Oscillation becomes "a characteristic of reading in the late age of print" (p. 63).

Word Processing

Word processing is creating a written document through the use of a word processor. A word processor is a tool used to compose, edit, format, and print ones writing. What appears on the computer screen is a direct reflection of the letters that have been pressed on the keyboard. All this is done through the use of a computer, on which the word processor functions. Although it uses a computer it is not considered electronic writing

because it does not employ hypertext. Rather, it is a transitional tool between print and true electronic writing.

Gains

Accessibility

Digital information can be stored in multiple locations, it can be accessed from home, on a mobile device, at any time of day. Information is no longer bound inside the confines of a book nor buried in the archives of a library. Digital information can also be stored in multiple formats, easily translated, reworked, edited and saved, a process that may have taken a long time before digitalization.

Collaborative knowledge

Software, such as, chat platforms, and other discussion platforms, has provided the opportunity for individuals to collaborate and share with one another their knowledge, in effect increasing knowledge throughout, and rendering the accessibility of this knowledge instantaneous. Collaboration also shows itself in the 'cognitive surplus' that Shirky (2010) talks about - mass collaboration projects like wiki pedia, wiki commons, the linux operating system, and international development projects and news tracking, etc.

Interactivity

Computer-mediated communications are interactive, promoting dialogue and collaborations. They encourage relationship with people and connections among ideas. Due to the immediacy of this medium communication becomes less formal, creates new forms of short hand and changes how individuals interact with each

other. According to Dobson and Willinsky, digital literacy also seems to increase literate participation and interactivity.

Social Networking Spaces

The New London Group (1996) suggests that we need to embed opportunities in student learning through access to new work spaces so they may develop advanced skills and modern language. Social networking is now available through computers, IPADS, smart phones and even on gaming consoles. These tools enable participants to communicate on a specific platform while evaluating responses and practicing current skills. A digitally literate person can gain much from intersecting conversations of social media tools and can narrow conversations to target audiences; communication literacy.

Increase in Speed and Quantity of Information

We are no longer bound by how much information is available at the local or university library. Users are now able to access articles and materials from anywhere in the world at the click of a mouse. Users are much more aware of what others are working on which facilitates better information gathering.

Multimodal

Digital literacy capitalizes on and combines multiple modes of meaning such as visual, audio, spatial, gestural, and linguistic. The ability to navigate multimodal objects is grounded in cultural and linguistic diversity. These can become barriers to learning if they are not addressed in the educational environment. Multimodal

communication involves not only the delivery of a message, but an understanding that audiences may interpret a different message than that which was intended.

Literacy Pedagogy Renewal

With the event of new technologies, the demands in the working life has changed and it is now important to provide all students the skills they need in order to access successfully the work life. It is the educators responsibility to consider all implications it may means and ensure to fulfill the needs by renewing literacy pedagogy. "The emphases on innovation and creativity may fit well with a pedagogy that views language and other modes of representation as dynamic and constantly being remade by meaning-makers in changing and varied contexts" , p. 67.

Digital Literacy Skills

Information Literacy

People must be able to know how to access information and then know how to use the information gathered. Navigating through the vast amounts of resources becomes a challenge and a skill worth learning. Using the new collaboratively derived methods for organizing and accessing information using tagging, feeds, and social media sites like delicious become critical skills.

Collaborative Tools

People need to learn the proper skills and etiquette for using social media (i.e weblogs, wikis, podcasting) in order to make it possible to collaborate and contribute information.

Photo-Visual Literacy

Reading, interpreting, and negotiating information to comprehend material presented in visual and/or graphic form. Visual literacy represents the need for images to be read in addition to text.

Synchronic Learning

Identified as a unique type of photo-visual learning, by which the learner receives synchronized text, audio, and video via interactive multimedia.

Reproduction Literacy

Using digital tools to remix, edit and combine information into new forms.

Branching Literacy

The ability to navigate hypertext and create spatial mental models.

Associative Linking

Dobson and Willinsky (2009) state that associative linking enables a user to demonstrate connections between documents. Documents can now contain related concepts, adding glossaries, or including instructional components through hyper textual links.

Social-Emotional Literacy

Being able to portray social and emotional presence in online communication and collaboration.

Just-in-Time Literacy

Based upon James Paul Gee's (2008) gaming theories, a way of reading and writing where the tools needed can be picked up during the activity, through concurrent Web searches and instructional videos, rather than learning an extensive set of skills beforehand.

IMPORTANCE OF DIGITAL LITERACY

Digital literacy is a life skill for today's technical world. In each and every field it plays an important role. In business the peoples are using highly advanced digital devices. In science and technology also peoples are using digital technologies.

In education field, for teaching and learning purpose many digital devices are using. Many of the schools are using digital technology in the classroom. Digital technology makes the class learner centered. Digital technology in the classroom shall be taken to mean digital processing systems that embolden active learning, knowledge construction and inquiry. It allow for remote communication as well as data sharing take place between teachers and learners in different place. This is an expanded notion of technologies that recognizes their development from mere information delivery systems and also clarifies their role in classrooms in contrast to their wider use across schools and learning centers.

Digital literacy involves using emerging technologies to communicate meaningfully across technology, language, social, cultural and intellectual barriers. Schools need to teach concepts and techniques to allow pupils to work with any digital device, and adapt to new technology quickly using the skills and concepts they have been taught. A variety of devices, platforms and web standards need to be incorporated into the educational experience to ensure pupils are fully literate in digital technology.

USES OF DIGITAL LITERACY IN THE CLASSROOM

- Easily modified for differentiating instruction

- It is an effective way to teach vocabulary through intentional scaffolding

- Provides multiple exposures to academic language

- Allow the student for learning with real world context

- Used as a assessment tool

- Makes learning easily accessible

- Encourage peer collaboration for both students and teachers

- Increases motivation and self-esteem for both students and teachers

- Promotes the effective use of technology

BENEFITS OF DIGITAL LITERACY

- Digitally literate learners develop their school work by easily accessing online resources including lecture videos, library databases.

- Through digital literacy one can know the whole world. Information can be passed quickly.

- Digital literacy allows to search, study, analyse and compare everything at anytime and anywhere

- Digital literacy improves employability because it is a gate skill, demanded by many employers when they first evaluate a job application.

- It also works as a catalyst because it enables the acquisition of other important life skills.

- Digitally literate people will save time by paying bills, applying for job and online banking.

INTERACTIVE WHITEBOARD (IWB)

An interactive whiteboard (IWB) is a large interactive display that connects to a computer. A projector projects the computer's desk top onto the board's surface where users control the computer using a pen, finger, stylus, or other device. The board is typically mounted to a wall or floor stand.

They are used in a variety of settings, including classrooms at all levels of education, in corporate board rooms and work groups, in training rooms for professional sports coaching, in broadcasting studios, and others.

Uses for interactive whiteboards may include:

- Running software that is loaded onto the connected PC, such as a web browsers or other software used in the classroom.

- Capturing and saving notes written on a whiteboard to the connected PC

- Capturing notes written on a graphics tablet connected to the whiteboard

- Controlling the PC from the white board using click and drag, markup which annotates a program or presentation

- Using OCR software to translate cursive writing on a graphics tablet into text

- Using an Audience Response System so that presenters can poll a classroom audience or conduct quizzes, capturing feedback onto the whiteboard

An interactive whiteboard (IWB) device is connected to a computer via USB or a serial port cable, or else wirelessly via Bluetooth or a 2.4 GHz wireless. In the latter case WEP and WPA/PSK security is available

A device driver is usually installed on the attached computer so that the interactive whiteboard can act as a Human Input Device (HID), like a mouse. The computer's video output is connected to a digital projector so that images may be projected on the interactive whiteboard surface.

The user then calibrates the whiteboard image by matching the position of the projected image in reference to the whiteboard using a pointer as necessary. After this, the pointer or other device may be used to activate programs, buttons and menus from the whiteboard itself, just as one would ordinarily do with a mouse. If text input is required, user can invoke an on-screen keyboard or, if the whiteboard software provides for this, utilize handwriting recognition. This makes it unnecessary to go to the computer keyboard to enter text.

Thus, an IWB emulates both a mouse and a keyboard. The user can conduct a presentation or a class almost exclusively from the whiteboard.

In addition, most IWBs are supplied with software that provides tools and features specifically designed to maximize interaction opportunities. These generally include the ability to create virtual versions of paper flipcharts, pen and highlighter options, and possibly even virtual rulers, protractors, and compasses—instruments that would be used in traditional classroom teaching.

COMMON TYPES OF OPERATION

The majority of IWBs sold globally involve one of four forms of interaction between the user and the content projected on the whiteboard. These are an infrared scan technology, a resistive, touch-based board, an electromagnetic pen and associated software, and an ultrasonic pen.

Operation of a infrared scan (IR touch) whiteboard

An infrared interactive whiteboard is a large interactive display that connects to a computer and projector. The board is typically mounted to a wall or floor stand. Movement of the user's finger, pen, or other pointer over the image projected on the whiteboard is captured by its interference with infrared light at the surface of the whiteboard. When the whiteboard surface is pressed, software triangulates the location of the marker or stylus. Infrared IWBs may be made of any material, no dry-erase markers are involved, and may be found in many settings, including various levels of classroom education, corporate boardrooms, training or activity rooms for organizations, professional sports coaching facilities, and broadcasting studios.

Operation of a resistive touch-based interactive whiteboard

A touch-based IWB also involves a simple pointing device. In this case, the material of the board is important. In the most common resistive system, a membrane stretched over the surface deforms under pressure to make contact with a conducting back plate. The touch point location can then be determined electronically and registered as a mouse event. For example, when a finger is pressed on the surface, it is registered as the equivalent of the left mouse click. Again, such a board requires no special instruments. This leads to the claim of resistive systems manufacturers that such a whiteboard is easy and natural to use. It is, however, heavily dependent on the construction of the board itself.

Operation of an electromagnetic pen-based interactive whiteboard

An electromagnetic pen-based interactive whiteboard involves an array of wires embedded behind the solid board surface that interacts with a coil in the stylus tip to determine the horizontal and vertical coordinates of the stylus. The pen itself usually is passive, i.e., it contains no batteries or other power source; it alters the electrical signals produced by the board. For instance, when close to the surface of the board, the mouse pointer can be sensed, giving the board "mouse-over" capabilities. When it is pressed in against the board in one way, the board activates a switch in the pen to signal a mouse click to the computer; pressed in another way, contact with the board signals a click of the right mouse-button. Like a scaled-up version of a graphics tablet used by professional digital artists and designers, an electromagnetic IWB can emulate mouse actions accurately, will not malfunction if a user leans on the board, and can potentially handle multiple inputs.

Operation of a portable ultrasonic, IR pen-based interactive whiteboard

This technology uses infrared light and ultrasound positioning technology. The technology works in a similar way to lightning in a thunderstorm by computing the time difference between the speed of light and the speed of sound. An infrared IWB is also available in a portable format. After moving the set-up to a new location, the system acquires connection to the computer with a simple re-calibration of the projected image — again using the electronic pen. The device or bar scans a bracketed area (usually 3m by 1.5m, giving a whiteboard that is 110" wide). Typically, multiple brackets can be added, providing for users at different sites to share the same virtual whiteboard. A portable IR pen-based whiteboard works on a variety of surfaces — an existing whiteboard, a flat wall, even a chalkboard with dry-erase paint, transforms those surfaces into an interactive whiteboard. No battery is required for USB signal receiver and the unit can be mounted to the ceiling if a permanent solution is required. Made of a tiny and lightweight material, the PIWB is easy to transport.

Operation of a Wiimote / IR-based interactive whiteboard

A Wii-based IR system was invented by Johnny Chung Lee, PhD. in 2007. Lee claimed that the system "makes a technology available to a much wider percentage of the population" (Speaking at TED, April 2008) by using an ordinary Wiiremote control as a pointer and the IR camera on the front of the remote control as tracking device sensing light from an IR light pen. Lee produced several videos on YouTube about this system to demonstrate its operability, flexibility, and ease of use, and pointing out its modest price — the most inexpensive part is the infrared LED of the pen. This is an approach with a shallow learning curve since the gaming system is already familiar to many. A

large programming support community may be available, both in open source and commercial offerings) However, the system cannot be used near direct sunlight, nor can it share the software of manufacturers of the IWB-types already mentioned. Certain considerations about the Bluetooth connection of the light pen also apply. Two lines of sight are involved (the controller and the pen) in the case of rear-projection case unlike many others.)

Operation of a virtual whiteboard via an interactive projector

An interactive projector IWB involves a **CMOS** camera built into the projector, so that the projector produces the IWB image, but also detects the position of an active IR light pen when it contacts the surface where the projected image. This solution, developed in 2007 and patented in 2010 by U.S. manufacturer Box light, like the other IR whiteboard systems, can suffer from potential problems caused by 'line of sight' between the pen and the projector/receiver and, like them also, does not provide mouse-over capability found in other solutions.

Interactive whiteboards are generally available in two forms: front projection and rear projection.

- Front-projection interactive whiteboards have a video projector in front of the whiteboard. A disadvantage of front-projection whiteboards is that the presenter, standing in front of the screen, must extend his or her arm with or without a stylus to avoid casting a shadow. This is not a disadvantage of Ultra-Short-Throw (UST) projectors, which cast an image from above and just in front of the IWB surface, removing the presenter from the beam's path.

- Rear-projection interactive whiteboards locate the projector or emissive display behind the whiteboard sensing surface so that no shadows occur. This also avoids the problem with front-projection boards that the presenter has to look into the projector light while speaking to the audience. However, rear-projection systems are generally significantly more expensive than front-projection boards, are often very large, and cannot be mounted flush on a wall, although in-wall installations are possible.

Some manufacturers also provide an option to raise and lower the display to accommodate users of different heights.

Short –throw projection systems and interactive whiteboard

Some manufacturers offer short-throw projection systems in which a projector with a special wide angle lens is mounted much closer to the interactive whiteboard surface and projects down at an angle of around 45 degrees. These vastly reduce the shadow effects of traditional front-projection systems and eliminate any chance for a user to see the projector beam. The risk of projector theft, which is problematic for some school districts, is reduced by integrating the projector with the interactive whiteboard.

Some manufacturers have provided a unified system where the whiteboards, short throw projection system and audio system are all combined into a single unit which can be set at different heights and enable young children and those in wheelchairs to access all areas of the board. Reduced installation costs make these short-throw projection systems cost effective.

Calibration

In most cases, the touch surface must be initially calibrated with the display image. This process involves displaying a sequence of dots or crosses on the touch surface and having the user select these dots either with a stylus or their finger. This process is called alignment, calibration, or orientation. Fixed installations with projectors and boards bolted to roof and wall greatly reduce or eliminate the need to calibrate.

A few interactive whiteboards can automatically detect projected images during a different type of calibration. The technology was developed by Mitsubishi Electric Research Laboratories Inc. and is disclosed in patent 7,001,023. The computer projects a Gray Code sequence of white and black bars on the touch surface and light sensitive sensors behind the touch surface detect the light passing through the touch surface. This sequence allows the computer to align the touch surface with the display; however, it has the disadvantage of having tiny fiber-sized "dead spots" in the resistive touch surface where the light sensors are present. The "dead spots" are so small that touches in that area are still presented to the computer properly.

Another system involves having a light sensor built into the projector and facing the screen. As the projector generates its calibration image (a process called "training"), it detects the change in light reflected from the black border and the white surface. In this manner it can uniquely compute all the linear matrix transform coefficients.

Yet another system includes a camera built into the handheld pen, with human imperceptible targets injected into the image stream sent to the projector or display, containing positioning information, where the camera detects that information and calculates position accordingly, requiring no calibration at all. Such a technology and system is integrated into penveu, and is further disclosed in patent 8,217,997

Associated equipment

A variety of accessories is available for interactive whiteboards:

* Mobile stand — Allows the interactive whiteboard to be moved between rooms. Many are height adjustable as well.

* Personal Response System — Allows students to answer test questions posted on the whiteboard or take part in polls and surveys.

* Printer — Allows copies of the whiteboard notes to be made.

* Remote control — Allows the presenter to control the board from different parts of the room and eliminates on-screen toolbars.

* Slate or tablet — Allows students control of the whiteboard away from the front of the room.

* Track — Allows the whiteboard to be placed over a traditional whiteboard or tack board to provide additional wall space at the front of the room. Some tracks provide power and data to the whiteboard as well.

* Video projector — Allows a computer display to be projected onto the whiteboard. 'Short Throw' projectors are available from some manufacturers that mount directly above the board minimizing shadow effects. 'Ultra -short Throw' projectors are even more effective.

* Wireless unit — Allows the interactive whiteboard to operate without wires to the computer, e.g. Bluetooth.

CLASS ROOM USES

In some classrooms, interactive whiteboards have replaced traditional whiteboards or flipcharts, or video/media systems such as a DVD player and TV combination. Even where traditional boards are used, the IWB often supplements them by connecting to a school network digital video distribution system. In other cases, IWBs interact with online shared annotation and drawing environments such as interactive vector based graphical websites.

Brief instructional blocks can be recorded for review by students — they will see the exact presentation that occurred in the classroom with the teacher's audio input. This can help transform learning and instruction.

Many companies and projects now focus on creating supplemental instructional materials specifically designed for interactive whiteboards. Electro kite out of Boston, MA, for example, will have the first complete curriculum for schools and districts.

One recent use of the IWB is in shared reading lessons. Mimic books, for instance, allow teachers to project children's books onto the interactive whiteboard with book-like interactivity.

INTEGRATION WITH A LEARNER RESPONSE SYSTEM

Some manufacturers also provide classroom response systems as an integrated part of their interactive whiteboard products. Handheld 'clickers' operating via Infrared or Radio signals, for example, offer basic multiple choice and polling options. More sophisticated clickers offer text and numeric responses and can export an analysis of student performance for subsequent review. By combining classroom response with an interactive whiteboard system, teachers can present material and receive feedback from

students in order to direct instruction more effectively or else to carry out formal assessments. For example, a student may both solve a puzzle involving math concepts on the interactive whiteboard and later demonstrate his or her knowledge on a test delivered via the classroom response system. Some classroom response software can organize and develop activities and tests aligned with State standards.

ADVANTAGES OF INTERACTIVE WHITEBOARDS:

- Clear graphics

- Interactivity for teachers and students

- Projection of computer images on a larger screen for audience viewing

- Manipulation of computer functions while standing (rather than from the computer)

- Incorporation of video and images into traditional teaching lessons

DISADVANTAGES OF INTERACTIVE WHITEBOARDS:

- Expensive

- Require specific software

- Require extra training for teachers

- Touch sensitive board has limitations; sometimes is not sensitive enough

- Speakers are not loud enough sometimes

REVIEW OF RELATED STUDIES

STUDIES RELATED TO DIGITAL LITERACY

Vishnuja (2017) conducted a study on Digital literacy and attitude towards m-learning among prospective teachers. The main objectives of the study were;1). To study the level of digital literacy and attitude towards m-learning of prospective teachers. 2). To find out whether there was any significant difference in the mean scores of digital literacy and attitude towards interactive white board of prospective teachers with respect to the background variables- sex, locality, community, religion, programme, optional subject, having smart phone, frequency of mobile phone use, purpose of using mobile phone, place of internet access and frequency of using social network.. The background variables such as sex, having smart phone, frequency of using mobile phone use, purpose of using mobile phone, place of internet access and frequency of using social media had influence on digital literacy of prospective teachers. Other background variables had no influence on digital literacy of prospective teachers.

The background variables such as programme, having smart phone, frequency of using mobile devices, purpose of using mobile and place of access had influence on attitude of m-learning of prospective teachers. Other background variables such as sex, locale, community, religion, optional subject and frequency of using social media had no influence on attitude of m-learning of prospective teachers.

There exists significant positive correlation between digital literacy and attitude towards m-learning of prospective teachers.

Gilu G, Ettaniyil R and Raman Nai (2016) conducted a study on Information literacy skills of secondary level teacher trainees. The main objectives of the study was to study the information literacy skills of secondary level teacher trainees of Kottayam District. • To find out the significant difference in information literacy skills among 103

secondary level teacher trainees of Kottayam District with respect to gender, stream of discipline, type of management. The findings revealed that 1. most of the Secondary Level Teacher Trainees of the total sample possess average information literacy skills. 2. There exists a significant difference in the means of scores on information literacy skills among secondary level teacher trainees with respect to gender, aided and university college of teacher education, aided and unaided teacher education colleges, unaided and university college of teacher education . 3. The stream of disciplines has no significant influence on information literacy skills among secondary level teacher trainees.

Atanu Kumar and Sinha (2016) made a study on Digital information literacy of post graduate students of Visva-Bharati, A survey. The main objective of this study was to determine the literacy of using digital resources of the post graduate students of Visva-Bharati, the first central University of Independent India. The target group selected for this study was postgraduate students of four department of Palli Samgathana Vibhaga of Visva-Bharathi. Questionnaire method was used for this study. Majority of the respondents were familiar with the use of digital resources but they require training for using digital resources effectively and efficiently.

Nachimuthu.K(2015) conducted a study on Attitude on digital literacy through Gyanpedia for student teachers. The main objectives of the study was to determine the attitude of Gyanpedia by the student teachers. Who are enrolled in college of Education institutes affiliated by tamilnadu teachers education university, Chennai. The findings of the study revealed that73% student teachers said they did not have faced and problem using Gyanpedia activities while 27% student teachers said they have faced problem in using Gyanpedia.

Evangelin M.S. Beulah (2015) conducted a study on Digital literacy among prospective teachers of kanniyakumari district. The purpose of the study was to study the level of digital literacy among prospective teachers. Survey method was adopted for this study. The size of the sample was 400 prospective teachers in kanniyakumari district. The statistical techniques adopted for this study was t test and ANOVA. The finding of this study revealed that prospective teachers had average level of digital literacy.

NeeraBansal (2015) conducted a study on Digital literacy among student community in Hisar district: The main objective of the study were i) To know the frequency of use of computer by the students of different stream. ii) To understand about the familiarity of students with the web based applications. Survey method was adopted for this study. The size of the sample was 280 students of F.C. college for Women, Hisar. The findings revealed that a good percentage of students commerce stream had possessed their own desktop, laptop and smart phones. 45.52% students were familiar with E-mail where as in the case of twitter, blog and skype the figure was very low. The digital competence of students was tested by framing a few questions and the students of arts faculty were not very confident in many operations.

Cihak, David F.; Wright, Rachel; Smith, Cate C.; mcmahon, Don; Kraiss, and Kelly(2015) conducted a study on Incorporating functional digital literacy skills as part of the curriculum for high school students with intellectual disability. The main objectives of the study was to examine the effects of teaching functional digital literacy skills to three high school students with intellectual disability. The findings revealed that the all students acquired and maintained these functional digital literacy skills. Findings are

discussed in the context of teaching essential digital literacy skills to increase greater participation in a digital society.

Asadullah B (2014) conducted a study on Digital information literacy a survey among research scholars of Vellore district. The main objective of the study was to study the level of digital information literacy among research scholars of Vellore district. Survey method was adopted for this study. The sample consisted of 137 scholars in Vellore district. The study revealed that every research scholars of arts and science faculties of Vellore district have computer competencies and digital information literacy at least at minimal level.

Shabana Tabusum S Z (2014) studied on Digital literacy awareness among arts and science college students in Tiruvallur district. The main objective of the study was to know the digital competence of arts and science college students. The method adopted for this study was survey method. The size of sample was 300 arts and science students in Tiruvallur district. The results revealed that majority of the students have average computer literacy level. And majority of male students spend daily on computers and majority of female students used computer weekly.

Kazu and Erten (2013) conducted a study on A study on Prospective teacher's perception levels of their digital literacy. The purpose of the study was to find the self–efficiency perception levels of digital literacy of prospective teachers. The findings of the study revealed that there was no significant correlation between the self-efficiency perceptions of prospective teachers related to computer, information, media literacy and digital literacy in terms of gender. There is significant difference on technology literacy.

Lakshmi Shanmugam P.N. (2013) made A study on Digital smart classroom teaching experience of high school teachers in Madurai district. The main objective of the study was to find out the high school teachers experience on digital smart classroom teaching. Survey method was adopted for this study. The sample of the study consists of 80 teachers. The statistical techniques used for treatment of data were t test and correlation. The findings revealed that there is no significant difference between experience of UG and PG teachers in teaching digital smart class room.

NathSarabi (2013) made a study on Computer literacy among M.Ed. students of Calicut university. An exploration. The purpose of this study was to examine whether exists significant difference among M.Ed. students in their computer literacy on the basis of subject of specialization, type of management of institution. Normative survey method was used. The sample consisted of 150 M.Ed. students from Calicut University. The computer literacy assessment test was used as tool. The statistical techniques used were mean, median, mode, standard deviation, t test. The findings revealed that type of management of institution has significant effect on computer literacy among M.Ed. students. M.Ed. students in aided institutions are better than that of students in government and unaided institutions.

Gracious, F.L.Antony.; Shyla.F. Jasmine. L and Anne(2012) conducted a study on Multiple intelligence and digital learning awareness of prospective B.Ed. Teachers. The main objectives of the study was to find the relationship between multiple intelligence and digital learning awareness of prospective B.Ed. Teachers. The findings revealed that there was no significant relationship between multiple intelligence and digital learning awareness of prospective B.Ed. teachers.

Rona Lynette Tyger (2011) conducted a study on Teacher candidates' digital literacy and their technology integration efficacy. The main objective of the study was to investigate perceived digital literacy levels and technology integration efficacy of pre-service teaching (PST) candidates. The sample was comprised of PST candidates from two universities and one college in the southeastern United States that differ in size and culture. The study used a quantitative approach. PST candidates self-rated their digital literacy levels and technology integration efficacy using an online digital literacy survey. The relationship between PST candidates' perceptions of their digital literacy level and their level of technology integration efficacy was investigated. The existence of a digital divide has recently been of concern to educational stakeholders. Because of this concern, several other relationships with digital literacy were analyzed: age, race, financial aid status; laptop/personal computer/Internet accessible device ownership, time of laptop/personal computer/Internet accessible device ownership and Internet access level.

Amutha.S and Kumaravel Karpaga.R (2008) conducted a study on An investigation into the ICT knowledge among the prospective teacher educators. The objective of the study was to develop and design a tool to assess the ICT knowledge prospective teacher educators. To ascertain the level of ICT knowledge of prospective teacher educators. Survey method was conducted for this study. The study has revealed that a majority of the teachers have low level of computer knowledge.

Bulu Maharana and Champeswar Mishra(2007) conducted a study on A survey of digital information literacy of faculty at sambalpur university. The main objective of the study was to find the digital information literacy among faculty at sampalpur University. Survey method was adopted for this study. The size of sample was 105 teachers of

different postgraduate departments of sambalpur University. The major findings were 98.57% of faculty members who responded to the survey expressed their need for electronic information in addition to traditional print resources. A majority of the university faculty members have internet knowledge. 82.86% respondents indicated that they use e-journals. All respondents expressed the wish that the Library would take initiative in promoting information literacy at the university level.

Hatlevik, OveEdvard.; Guomundsdottir, GretaBjork.; Loi and Massimo(2015) conducted a study on Examining factors predicting students' digital competence. The main objectives of the study was to examine factors predicting lower secondary school students' digital competence and to explore differences between students when it comes to digital competence. Results from a digital competence test and survey in lower secondary school will be presented. It is important to learn more about and investigate what characterizes students' digital competence. The results indicate variation in digital competence among the ninth-graders. Further, analyses showed that students' conditions at home, i.e., language integration and cultural capital, together with mastery orientation and academic achievements predict students digital competence. This study indicates that there is evidence of digital diversity between lower secondary students. It does not seem like the development of digital competence among the students happens automatically. Students' family background and school performance are the most important factors.

Nowell, Shanedra D. (2014) conducted a study on using disruptive technologies to make digital connections: stories of media use and digital literacy in secondary classrooms. The main objectives of the study was focused on ways teachers and students in an urban high school used technologies often labeled as disruptive (i.e. social media

and mobile phones) as learning and relationship building tools, inside and outside the classroom. In this teacher research study, secondary teachers discussed digital illiteracies, the digital divide, and digital teacher-student relationships with their urban high school students. Findings showed that students had difficulties connecting their personal media use (social media and mobile phones) with its usefulness as an educational tool. In response, teachers leveraged teacher-student relationships, the social-emotional bond developed through classroom communication that links the two groups, by connecting with students via social media and other technologies in order to extend learning beyond the classroom.

STUDIES RELATED TO INTERACTIVE WHITEBOARD

Shanmugam and Lakshmi, P.N(2014) conducted a study on A study of digital smart classroom teaching experiences of high school teachers in Madurai district. The main objectives of the study was i) To find out the high school teachers experiences on digital smart classroom teaching. ii) To find out the relationship of their teaching competency with their experience on digital smart classroom teaching. The findings revealed that There is no significance difference between the experience of UG and Pg teachers in teaching Digital smart classroom. 2.Teaching competency has low positive relationship with empower faculty. 3. Teaching competency has high positive relationship with digital smart classroom teaching.

Ozdamar-Keskin and Nilgun; (2015) conducted study on examining Digital literacy competences and learning habits of open and distance learners**.** The purpose of the study is to examine digital literacy competences and learning habits of learners enrolled in the open and distance education system of Anadolu university in turkey. Data were gathered

from 20.172 open and distance learners through a survey which included four parts: demographic information, abilities to use digital technologies, learning habits, preferences in using digital technologies for learning purposes. Principal Component Factor Analysis was applied in order to group and classify the attitudes and statements of the learners in their personal learning preferences, problem solving skills, project work skills, and abilities to use digital tools for learning purposes. Their personal learning preferences produced five factors: visual, auditory, dependent, collaborative, and reading-writing learning styles. According to the results of the study, learners believe that they have problem-solving and project-working skills to deal with educational difficulties. However, they seem to have only basic competences of digital literacy and the skills to use information and communication technologies at a basic level. They need training on how to use digital tools more efficiently for learning purposes. Further research is needed to explore how to increase the use of digital tools for the purpose of effective learning and also how to design learning environments to improve digital literacy

Yapici, I. Umit; Karakoyunand Ferit (2016) conducted a study on High school students' attitudes towards smart board use in biology classes. The main objectives of the study was to determining high school students' attitudes towards smart board use in biology classes. The results of data analyses revealed that the students demonstrated positive attitudes in general. Consequently, it could be stated that smart board use in biology classes allows understanding of subjects more easily and rapidly, avoiding time consumption and increasing students' motivation and interest via visual elements. The students' attitude scores did not differ statistically with respect to the variables of "gender" and "smart board use time."

Hakansarac and Murat ozarslan (2016) conducted a study on relation between the attitude of students towards interactive board in education process and technological, pedagogical and content knowledge of teachers. The main objectives of the study was indicated the relationship between teachers' technologic pedagogical content knowledge level and students' attitudes towards the usage of interactive whiteboards. As a result of the research, it was determined that students' attitudes towards interactive whiteboards are high; female students' attitudes are meaningfully higher than male ones' statistically; students' attitudes towards interactive white boards do not alter in accordance with class grades and also teachers' technologic pedagogical content knowledge level is high. It is also indicated that there is not any encountered meaningful relationship statistically between points of students' attitudes towards interactive white board and teachers' technologic pedagogical content knowledge of open and distance learners.

Balta, Nuri; Duran and Muharrem (2015) conducted a study on Attitudes of students and teachers towards the use of interactive whiteboards in elementary and secondary school classrooms. The main objectives of the study wasto understand teachers' and students' attitudes toward interactive whiteboard technology along with differences in attitudes resulting from some demographic factors. The findings was revealed that interactive whiteboards are highly rated by both teachers and students. Students mostly prefer the usage of interactive whiteboards in math courses, and their attitudes differ across their genders and school levels. As students get elder, their positive attitudes toward interactive whiteboard technology decrease, and it has been found out that there is no difference between teachers' and students' attitudes. This study includes some implications for policy makers, educator and researchers.

Jay R. Wilson(2015) conducted a study on rural high school students' digital literacy. The main objectives of the study was to examined the literacy habits and activities of grade 10 and 12 students from 16 composite and high schools within a rural canadian school division. 424 students (Mage=16 years) completed a survey regarding the frequency of their literacy activities with a focus on their digital literacy habits. The findings revealed that potential for increased use of digital technologies and literacy texts in and out of classrooms.

Nasrin Shams and Iran SaeedKetabi (2015) conducted a study on Iranian teachers' attitudes towards the use of interactive whiteboards in english language teaching classrooms. The main objectives of the study was to evaluate teachers' beliefs about IWB use and frequency of IWB usage in Iranian schools. To achieve this aim, 174 EFL teachers who used IWB for instruction from different educational levels (grade 6 to 11) participated in this study. The findings of this study indicated that Iranian EFL teachers hold positive attitudes towards the effects of IWB use in their classrooms in general. It was also found that the more teachers frequently use IWBs, the more they improve their IWB competencies.

Stonier and Francis W.(2015) conducted a study on, The Impact of an intensive experience on prospective teachers' perception of the uses of digital, interactive text among K-12 students. The main objectives of the study wasto measure pre-service teacher perception, awareness, and potential use of digital illiteracies, media, and digital interactive text in their future classrooms. Findings indicated that pre-service teachers generally maintained or strengthened their perceptions and understandings of digital

interactive text, digital illiteracies, and digital literacy tools. There were several demographic categories that yielded significant results.

Gila Kurtz and Etty Kochavi and Keren David (2014) conducted a study on Teachers' perceptions of the use of the interactive whiteboard and its impact on their self-perceptions as ICT literate. The main objectives of the study was to examine the attitudes of teachers towards using an interactive whiteboard (IWB) in classroom teaching, and its impact on their self-image as ICT literate teachers. The findings indicated advantages of the IWB in diversifying the means available to the classroom teacher to generate curiosity and interests, demonstrate the subject matter, and document the class lesson. The weaknesses of the IWB were associated with the extensive training required its use, the long preparation time for lessons using the IWB, and technical problems. The findings also suggested that the use of the IWB contributed to the respondents' self-esteem as ICT-literate teachers, including a sense of empowerment and confidence in their ICT skills, which contributed to their increased use of the IWB in classroom instruction.

SonmezPAMUKa, MustafaERGUNC.;RecepCAKIRb.H and BayramYILMAZd (2013) conducted the use of tablet PC and interactive board from the perspectives of teachers and students: evaluation of the FATİH project. The main objectives of the study was to evaluate the early implementation results of the movement of enhancing opportunities and improving technology, abbreviated as FATIH project from the perspectives of participating teachers and students. The results revealed that although there is a promising use of IB, there is limited, in some cases no, use of Tablet computers. Both teachers and students were in favor of IBs, but were also skeptical about Tablet

computers. In addition to technical problems, some pedagogical and professional development issues were found to be important results.

Lopez, Omar.;Krockover and Cheri(2014) conducted a study on Contextual factors relevant to elementary teachers using interactive whiteboards in mathematics classroom discourse. The main objectives of the study was to contributes to the literature by examining in more detail the correlations among contextual factors defined by the teachers' technical confidence, lesson planning skills, and the extent of IWB usage in mathematics classroom discourse. The findings suggest that teachers' technical confidence in using the IWB does matter with regard to planning IWB-based lessons and to engaging students in the classroom. The findings also suggest that the teachers' skills in planning IWB-based lessons matters to students' engagement and behavior in mathematics classroom discourse. Lastly, the findings recommend concurrent high use of the IWB among teacher and students in classroom discourse if the goal is to maximize IWB student effects.

Ibrahim Mohamed Al-Fakiand Abdelmoneim Hassan Adam Khamis(2014) conducted a study on Difficulties facing teachers in using interactive whiteboards in their classes. The main objective was to identify the challenges which face teachers when using Smart Board in teaching English language. The findings of this study revealed that teachers face when using interactive whiteboard. Those challenges are categorized into four categories. The teacher factor showed that 1. There is a big gap between teachers' practice and pedagogical framework of the Smart Board. They use teacher-centered approach and Presentation Practice Production (PPP) format of lesson with Smart board.2. Teachers use Smart board as a presentational tool for teaching English language

classes.3. Teachers adhere to conventional approach (teacher-centered approach).4. Nearly half of the English language sample teachers face difficulties to manage Smart Board.5. Teachers lack knowledge about troubleshooting of Smart Board.6. More than forty-two percent of teachers complain about their busy schedules.7. More than 35% of teachers do not use web-learning resources in English language classes.8. More than 15% of teachers lack computer competency. The Schools' Administration Factor showed that 1. Schools' administration does not have a clear vision concerning Smart Board, periodical pedagogical support concerning interactive whiteboard. 3. Schools' administration provides insufficient interactive learning materials (software) - schools suffer from shortage of supporting materials, professional programs to raise teachers' skills of using computer and smart board. Sufficient technicians did the training programs, an insufficient initial training regarding smart board, once per school year is insufficient, particularly because the IWB is a new technology to both teachers and learners. The technical support factor. The majority of teachers emphasize that technicians are not available when smart board's problems occur, not helpful in training teachers to diagnose and eliminate problems of the smart board. The number of technicians is a small to deal with all classrooms demands. IT departments limit the use of the Internet in classrooms. IT departments do not train students on how to utilize the Smart Board. Nearly all English language teachers complain about computer programs and anti-virus protection, which are not updated regularly, in the classroom. It is considered the biggest challenge, which impedes and affects teachers' performance inside classrooms. The student factor showed that teachers emphasize that learners' motivation is low. This factor affects learning english language. 2. Learners choose not to

participate in interactive whiteboard's activities. 3. Teachers emphasize that more than thirty percentages of learners do not utilize smart board in their english language learning. 4. The majority of students do not access educational websites. 5. Sixty percentages of learners know better than teachers do about technology. They are competent users of technology. They can change smart board setting to disrupt the english language classes. They do not help teachers in troubleshooting too. Perhaps no one of those factors by itself is a determining factor, the interaction of them; however, has a very profound effect on teachers' performance. Those factors are considered key challenges by the researcher.

Muhanna, Wafa; Nejem and KhamisMousa(2013) conducted a study on Attitudes of mathematics teachers toward using smart board in teaching mathematics. The main objectives of the study was to investigated the attitudes of mathematics teachers toward using a smart board in teaching mathematics a to determine the effect of gender, experience, and qualification of teachers on their attitudes. The results of the study revealed that the mathematics teachers have positive attitudes toward using a smart board in teaching mathematics. Results showed that there is no statistically significant difference due to gender variable; however, there were statistically significant differences due to experience variable and due to qualification variable.

Wong, Kung-Teck.; Russo, Sharon.; McDowall and Janet (2013) conducted a study on Understanding early childhood student teachers' acceptance and use of interactive whiteboard. The main objectives of the study was to understand early childhood student teachers' self-reported acceptance and use of interactive whiteboard (IWB), by employing the unified theory of acceptance and use of technology (UTAUT)

as the research framework. Design/methodology/approach. The findings have uncovered the important distinction of performance expectancy and effort expectancy in IWB acceptance and use. Hence, it provides several prominent implications for the research and practice.

Muhanna, Wafa; Nejem and KhamisMousa (2013) conducted a study on Attitudes of mathematics teachers toward using smart board in teaching mathematics. The main objectives of the study was to investigated the attitudes of mathematics teachers toward using a smart board in teaching mathematics and also to determine the effect of gender, experience, and qualification of teachers on their attitudes. The results of the study revealed that the mathematics teachers have positive attitudes toward using a smart board in teaching mathematics. Results showed that there is no statistically significant difference due to gender variable; however, there were statistically significant differences due to experience variable and due to qualification variable.

Isman, Aytekin and Abanmy (2012) conducted a study on Saudi secondary school teachers attitudes' towards using interactive whiteboard in classrooms. The main objectives of the study was to investigating the saudi secondary school teachers' attitudes towards using interactive whiteboard in the classrooms. The findings of the study was indicated that there were appositive attitude towards using interactive whiteboard. But a few number of teachers used effectively the interactive whiteboard effectively in the classrooms. These results indicated that the teachers need a professional development program for effective using of interactive whiteboard effectively to help them in improving their teaching skills and the students learning.

Turel, Y. K., and Johnson. T. E. (2012) conducted a study on teachers' belief and use of interactive whiteboards for teaching and learning. The main objective was to evaluate both teachers' perceptions and their use of IWBs. The results showed that teachers believe that IWBs can be used for different subject domains. Also, teachers believe that IWBs can be used to facilitate learning and instruction under the following conditions, 1) collaboration with colleagues, 2) training about effective instructional strategies using IWB, and 3) more frequent teacher use of IWBs to improve IWB competency.

Mathews-Aydinli, Julie and Elaziz, Fatih(2010) conducted a study on Turkish students' and teachers' attitudes toward the use of interactive whiteboards in EFL classrooms . The main objectives of the study was to explored the attitudes of students and teachers toward the use of interactive whiteboards (IWBs) in a foreign language teaching and learning context. The study also investigated possible factors affecting teachers' and students' attitudes toward IWB technology. The statistical analysis revealed that the more teachers use IWBs, the more they like this technology. It was also found that as the number of hours of IWB exposure increases, students' awareness of the distinctiveness of IWB technology increases. Suggestions are made for further research and for administrators considering whether or not to invest in IWBs.

Smith.F, Hardman.Fand Higgins.S. (2006)conducted a study on The impact of interactive whiteboards on teacher-pupil interaction in the national literacy and numeracy strategies. The main objectives of the study was to examine the impact of interactive whiteboards on teacher-pupil interaction. Findings of the study was revealed that the whiteboard lessons contained 5 additional minutes of whole class teaching and 5 fewer

minutes of group work. Additionally, the authors found significantly more open questions, repeat questions, probes, evaluation, answers from students, and general talk during whiteboard lessons than in lessons without whiteboards. Furthermore, the authors found the whiteboard lessons to be faster in pace than non-whiteboard lessons. Finally, the authors found that answers took up more time in whiteboard lessons, the pauses were briefer, and uptake questions and explaining took up less time. Overall, however, the authors concluded that the interactive whiteboards did not fundamentally change teachers' pedagogy.

Smith, H. J., Higgins,; S., Wall, K., and Miller, J(2005) conducted a study on Interactive whiteboards: boon or bandwagon"? The main objectives of the study was conducted a review of the literature on interactive whiteboards. According to the authors, studies have found that teachers find interactive whiteboards a flexible and versatile teaching tool and allow for multimodal presentations that can include real-time movement (such as angle rotation in mathematics). Additionally, teachers find interactive whiteboards efficient, allowing them to control the computer at the touch of the screen and easy access to material from a variety of sources. Furthermore, lessons can be prepared, stored, and then reused for later classes. Students benefit from the presence of interactive whiteboards through the development of technology skills, increased motivation, increased interaction through greater verbal and physical participation, and through greater multi-sensory presentation of material. However, some difficulties of using interactive whiteboards include lack of adequate or continuous training, especially regarding technical problems that require quick troubleshooting, glare from sunlight, boards placed at inappropriate heights, especially when permanently fixed, and frequent

recalibration or realignment when boards not permanently fixed are bumped or moved in some manner.

Kennewell, S and Morgan, A. (2003) conducted a study on Student teachers' experiences and attitudes towards using interactive whiteboards in the teaching and learning of young children. The main objectives of the study to examined the attitudes of student teachers concerning the use of interactive whiteboards. The findings was revealed that few student teachers indicated that the presence or absence of an interactive whiteboard would be an issue when they decided whether or not to accept their first teaching position. Additionally, the authors found that student teachers felt that the characteristic most enjoyed by young students was their ability to physically interact with the board itself.

Miller, D., Glover, D., and Averis, D.(2003) conducted a study on exposure – the introduction of interactive whiteboard technology to secondary school mathematics teachers in training. The main objectives of the study was to examine the experience of using interactive whiteboards in relation to presentation, motivation, and teaching and learning. The Findings was revealed that 169 responses out of a cohort of 220 teachers, and found that only 52 had made use of interactive whiteboards in their instruction. Additionally, the authors found that greater use of the technology was associated with moving away from the motivational and presentational abilities of the whiteboard to greater awareness of the use of the interactivity of the whiteboard to assist in developing effect lessons.

CRITICAL REVIEW

The investigator reviewed 40 studies, of which 18 were related to digital literacy and 22 were related to interactive white board. These helped the researcher to give adequate insight into the nature of the problem under the study. The investigator critically reviewed the studies, the design and methods, sampling techniques, tools used and their recommendations for further research. The present study differs from the above studies in terms of area, population and sample. To the best knowledge of the investigator, no studies have been conducted regarding the selected variables.

METHODOLOGY

- Method adopted for the study

- Sample of the study

- Tools Used

- Data collection procedure

- Statistical techniques used

Research is an essential and powerful tool in leading man towards progress. Research is an endless quest for knowledge or unending search for truth. It brings to light new knowledge or corrects previous error and misconceptions in an orderly way to existing knowledge; the knowledge obtained by research is scientific and objective and is matter of rational understanding, common and experience.

Research methodology is a way to systematically solve the research problem. It may be understood as science, studying how research is done scientifically. We study the various steps that are generally adopted by a researcher in studying his research problem along with logic behind them.

Research methodology refers to the method which the investigator used in his research work. It paves the way to solve the research problem systematically. Research methodology involves various activities. They are identifying problems, review of literature, formulation of hypothesis, data collection, analysis of data, interpreting results and finally conclusion. It is a way to solve the research problem systematically. Methodology occupies a very important place in any type of research as the validity and reliability of the findings.

Different methods are used for research, George. J. Mouly has classified research methods into three basic types, they are

1. Historical method

2. Experimental method and

3. Normative survey method

In the present study, the investigator has selected Normative Survey method.

NORMATIVE SURVEY METHOD

In a normative survey, investigator concerned with conditions or relationship that exist, practices that prevail, beliefs, points of view or attitudes that are held, process that are going on, influences that are being felt and trends that are developing.

SECTION A: TOOL DEVELOPMENT

DEVELOPMENT OF ATTITUDE SCALE ON INTERACTIVE WHITEBOARD

For measuring the attitude of prospective teachers towards Interactive whiteboard, the investigator constructed and standardized a Likert type scale.

ATTITUDE SCALE

Attitude scales are carefully constructed sets of rating scales designed to measure one or more aspects of an individuals and groups attitude towards some object. The individuals' responses to the various scales may be aggregated or summed to provide a single scale for the individual. Or, more commonly, the responses to each item or subgroup of scale items may be examined independently of the other scale items. Generally the following two types of scales are popular. They are

    i.   **Thurstone's Attitude Scale**

    ii.   **Likert Attitude Scale**

I) THURSTONE'S ATTITUDE SCALE

This scale is also known as equal appearing interval scales. In constructing such scales a large number of statements representing a variety of opinions on a subject are collected. These statements are then given to a number of judges who are asked to sort the statement in two categories say from "very favourable" to "very unfavourable".

Whenever the judges disagree significantly over an item it is rejected. The finalized scale then consists of remaining statements that represent clearly defined opinions on the subject. Each of these final statements is then assigned a scale value based on the median scale position given by the judges.

II) LIKERT'S ATTITUDE SCALE

Likert scaling developed in 1932 is used to determine the relative intensity of different items. In this type, the subjects are asked to respond to a certain number of statements. Reply to each statement is given in terms of five degree of agreement or disagreement, for example strongly agree, agree, undecided, disagree, strongly disagree. Each statement thus becomes a scale in itself having 5 points on it. At one end of this scale is strong approval and at the other end is strong disapproval between lie intermediate points.

Of the total number of statements included in the scale nearly half are favourable and other half are unfavourable. For the favourable statements the values give to strongly agree, agree, undecided, disagree, strongly disagree are 5, 4, 3, 2 and 1respectively. For unfavourable statements the values are 1, 2, 3, 4 and 5 respectively. Thus agreements with favourable statements are disagreements with unfavourable statements are treated as equivalent.

DEVELOPMENT OF ATTITUDE SCALE ON INTERACTIVE WHITE BOARD

To measure the attitude towards interactive whiteboard of prospective teachers the investigator developed a Likert type attitude scale. For the development of Attitude Scale on interactive whiteboard, the researcher is expected to understand the construction in

addition to the knowledge on the various steps for the development of the scale. Investigator used the method of Likert item analysis for standardization. Thus the development and standardization of Attitude Scale on interactive whiteboard includes the following steps

      a. Collection of Statements

      b. Screening of the Statements

      c. Sample for tryout

      d. The draft scale and its administration

      e. Instructions for scoring

      f. Item analysis

      g. Selecting the final list of statements.

A) COLLECTION OF STATEMENTS

The first step in the construction of the tool is the collection of a number of statements about the topic. So here, statements related to interactive white board were prepared. For this, discussions were held with the concerned guide. Besides this the statements prepared by investigators in related areas of research are also studied. Again the investigator collected ideas from magazine, journals, educational reports, text books, e-books, e-journals, e-resources etc. By making use of these 55 statements were prepared to include in the draft form of Attitude Scale on Interactive white board.

B) SCREENING OF THE STATEMENTS

The scale was then submitted to the guide; with the suggestions given by the guide few statements which seemed to overlap with one another were rejected.

The vague items were revised and finally 55 statements were selected for the attitude scale of these 55 statements 9 statements show unfavourable attitude (negative statements) towards interactive whiteboard and 46 statements show favourable attitude (positive statements) towards interactive whiteboard. All the items selected were arranged in a random order. The draft form of Attitude scale on interactive whiteboard was then printed (Appendix-C).

C) SAMPLE FOR TRYOUT

The draft attitude scale was subjected to a pilot study. The attitude scale was administrated to a sample of 100 prospective teachers in Kanniyakumari district.

D) THE DRAFT SCALE AND ITS ADMINISTRATION

The subjects were met in their classes after obtaining permission from the head of the institutions. Investigator distributed the draft scale to the subjects. Each statement has five choices viz: strongly agree, agree, undecided, disagree and strongly disagree representing SA, A, U, D and SD. Students were instructed to read each of the statements carefully and answer them by making a tick (✓) mark against the answer which they think as appropriate for themselves.

E) INSTRUCTION FOR SCORING:

The scoring was done as follows score of 5, 4, 3, 2, 1 was given to the category SA, A, U, D, SD for a positive statement. The score is reversed for negative statement. The score for attitude scale of interactive whiteboard is the total of the scores obtained for all the items.

F) ITEM ANALYSIS

For the standardization of attitude scale, the investigator used Likert item analysis method.

LIKERT ITEM ANALYSIS METHOD

The procedure for Likert item analysis is as follows:

1. First of all total scores for each subject for all the items was found out.

2. The subjects were divided into two arbitrary defined groups. For example, those subjects with the top 25% of all total scores may be considered to have most favourable attitude and those with the lowest 25% of all total scores be considered to have the least favourable attitudes.

3. The mean score for each statement is calculated separately in two groups. The following table illustrates this method.

    Calculation of Mean for one statement for the two groups with the most favourable and the least favourable attitudes.

    Table 3.1

Response Category	Scale value x	High Group		Low Group	
		f	fx	f	fx
Strongly Agree	5	32	160	22	110
Agree	4	18	72	21	84
Undecided	3	0	0	6	18
Disagree	2	0	0	1	2
Strongly disagree	1	0	0	0	0
		50	**232**	**50**	**214**

$$\overline{X_H} = \frac{\sum fx}{\sum f} = \frac{232}{50} = 4.64$$

$$\overline{X_L} = \frac{\sum fx}{\sum f} = \frac{214}{50} = 4.28$$

$$\overline{X_H} - \overline{X_L} = 4.64 - 4.28$$

d= 4.64 - 4.28

d=0.36

4.   Next the difference of the two mean scores is calculated in respect of each statement. For example it is 0.36.

5.   Finally all the statements are ranked according to their difference in mean scores. These with mean difference near zero are considered poor and therefore eliminated.

G) SELECTION OF FINAL LIST STATEMENTS

Using Likert item analysis method, items having mean difference 0.6 and above were selected. Items with mean difference below 0.5 are considered poor and therefore eliminated. Thus the final attitude scale consists of 24 items. These items were then arranged in random order. The items which are selected are shown with *.

Details of item selection for Attitude Scale on Interactive whiteboard

Table: 3.2

SL. NO.	STATEMENTS	VALUE
1.	Interactive Whiteboard leads to a good working environment for teachers.	0.36
2.	Teachers do not have the knowledge of how to use the interactive whiteboard.	1.35*
3.	Prospective teachers lack practical knowledge for using interactive whiteboard.	-1.82
4.	Interactive white board allows sharing learning resources with other teachers.	0.77*
5.	Interactive whiteboard reduces the mental efforts taken by the teachers.	-0.04
6.	Teachers can utilize many multimedia resources available in interactive white board.	0.7*
7.	While using interactive white board teachers cannot make eye contact with the students.	1.27*
8.	Interactive whiteboard considerably reduce the workload of teachers.	0.3
9.	Teachers enjoy using interactive whiteboard.	0.21
10.	Teaching efficiency may decline due to the interactive white board usage.	0.97*
11.	Interactive white board is difficult to handle.	0.59
12.	Interactive white board enable for a teacher to review, re-plan and summarize the subject.	0.06
13.	Frequent training is required for the teacher to use interactive whiteboard.	-1.1
14.	Interactive Whiteboard makes the teacher's drawings and diagrams more clearly.	0.34
15.	Teachers face difficulties while using the interactive white boards.	0.32

SL. NO.	STATEMENTS	VALUE
17.	Teachers need continual pedagogical support and technical support.	0.22
18.	Interactive Whiteboard captures learner's attention.	-0.43
19.	Interactive Whiteboard encourages the involvement of learners in the subject.	0.37
20.	Interactive whiteboard motivates student' learning.	0.43
21.	Interactive whiteboard allows learners to accommodate different learning styles.	0.18
22.	Interactive white board promotes discussion among students and improves their participation.	0.14
23.	Interactive whiteboard class rooms are only good for urban students.	0.75*
24.	Interactive whiteboard gives opportunities to teach new things to the students.	0.34
25.	Memory retentions of student's can be increased with the use of interactive white board.	-2.1
26.	Students prefer interactive whiteboard classroom than traditional classroom.	-3.04
27.	Using interactive white board helps students to learn concepts easily.	0.24
28.	Vision problems may result due to the continuous use of interactive white board for teachers as well as students.	0.9*
29.	Interactive white board increases the feasibility of learning.	0.38
30.	Students feel more comfortable while teachers use the interactive white board.	0.53
31.	Interactive white board helps to develop a creative thinking among students.	0.61*
32.	Interactive white board gives students the opportunity to observe information in multiple formats.	0.18
33.	Interactive white board is more cost effective than providing laptop to every student in the classroom.	0.38

SL. NO.	STATEMENTS	VALUE
34.	Interactive white board replaces dusty chalkboard.	0.49
35.	Interactive white board provides possibilities to make course content more visual.	0.55
36.	Interactive white board provides more opportunities for interaction in the class room.	0.13
37.	Class room discipline may be affected due to the use of interactive white board.	0.81*
38.	Interactive white board facilitates discussion in the class room.	0.69*
39.	Interactive white board provides a co-operative learning environment in the class room.	0.71*
40.	Schools are not technologically updated to use interactive white board.	0.92*
41.	Technical and software problem may leads to data loss.	0.71*
42.	The technicians will not be always available whenever the problem occurs on the interactive white board.	0.67*
43.	While using interactive white board teachers may face technical problems.	0.63*
44.	Due to the non-availability of electronic pen technical difficulties arise inside the class room.	0.67*
45.	There will be practical difficulty when there is no power.	0.71*
46.	Interactive white boards will replace traditional chalk board and white board.	0.8*
47.	Interactive white board makes teaching easy.	0.51
48.	Interactive white board creates interest to learning process.	0.59
49.	Using interactive white board saves time.	0.83
50.	Interactive white board is very expensive.	0.65*
51.	Interactive white board helps to access online content.	4.27
52.	Interactive white board software can convert hand written text into computer edible text.	0.82*

SL. NO.	STATEMENTS	VALUE
53.	Interactive white board helps to projection of computer images on a larger screen for audience viewing.	0.77*
54.	Interactive white board is not a user friendly device.	0.45
55.	Interactive white board images can be saved and printed.	0.32

Note: '*' denotes selected items.

SECTION B: PLAN AND PROCEDURE

A) METHOD ADOPTED

The present study attempts to find out the relationship between the digital literacy and attitude towards interactive white board of prospective teachers. The problem selected is concerned with the existing condition of education. The investigator selected the normative survey method for conducting this study.

NORMATIVE SURVEY METHOD

The normative survey method of educational research describes and interprets what exists at present. In this method, we concerned with conditions or relationships that exists, practices that prevail, attitude that are held, processes that going on influence that are being felt and trend that are developing.

B) TOOLS USED FOR THE PRESENT STUDY

Collection of relevant data is one of the most important steps in any research especially in the field of education. An appropriate instrument or tool is very essential to serve this purpose. In certain research, the investigator carries out of the study using readymade tools. But in some other cases such tools may not work suitably with the

variable selected for the study. In such cases the investigator has to prepare suitable scale and test which will work adequately with the subject selected for the study. This study necessitated the following test and scale namely,

1   Personal data sheet

2.   Attitude scale on Interactive whiteboard (prepared and validated by Latha Saraswathy. N & Prasad, P.S. 2017)

3.   Digital literacy test (Evangelin M.S Beulah & Prasad P.S., 2015)

PERSONAL DATA SHEET:

Personal data sheet is prepared to collect data regarding variable such as name, gender, locale, community, religion, optional subject, frequency of computer use , purpose of using computer, level of computer knowledge, own a smart phone, own a laptop/personal computer, internet browsing habit. A copy of personal datasheet is given in appendix A.

DIGITAL LITERACY TEST:

In the present study, in order to find out the "digital literacy of prospective teachers", Digital literacy test" constructed by Evangelin M.S Beulah & Prasad P.S. A copy of digital literacy test is given in appendix B

The key domains of digital literacy tests are the following:

a) Computer awareness
b) Digital lifestyle
c) Security awareness
d) Internet awareness
e) ICT awareness
   Reliability and validity 0.94

ATTITUDE SCALE ON INTERACTIVE WHITEBOARD

In the present study, in order to find out the attitude towards interactive whiteboard among prospective teachers, attitude scale on interactive whiteboard was constructed by N. Latha Saraswathy and Prasad P.S. copy of final tool is given in appendix D.

RELIABILITY AND VALIDITY

Reliability and validity are essential to the effectiveness of any data gathering procedure.

RELIABILITY

Reliability is the accuracy or precision of measuring instrument. The reliability of a test can be measured in different ways, such as test-retest method and split half method.

In the present study, the reliability coefficient of attitude scale on interactive whiteboard was found out by test retest method. In this method the same test is given to the same group of students after an interval of time. The interval may not be too long or too short then correlate the scores of test and retest. For calculation of test retest, the scores obtained from the 74 prospective teachers are used. The co-efficient of correlation indicates the reliability of the test. The correlation co-efficient of the whole test is then estimated by using Spearman-Brown Prophecy Formula. The reliability of co-efficient was found to be, 0.76**.** Hence the tool is highly reliable for measuring Attitude on interactive whiteboard of prospective teachers.

VALIDITY OF THE TEST

The validity of a test means the degree to which the test actually measures what it intends to measure. The validity provides a direct check on how well the test fulfills its function.

FACE VALIDITY

Face validity means that the given tool appears or seems to measure what it measure. The tool was submitted to a panel of experts and in their opinion it appeared to measure the relevant objective of the tool. A close look on the items of the test reveals that each and every item is capable of measuring the reading skill ability of prospective teachers. This provided the face validity of the tool.

C) SAMPLE FOR THE STUDY

The population of the present study included all the prospective teachers in colleges of education of Kanniyakumari district.

The sample for the present investigation was selected by using the method of simple random sampling technique designed to ensure representativeness and to avoid bias.

The sample for the study comprised of 400 prospective teachers from 9 colleges of Kanniyakumari districts. Data was collected initially from 404 students. Scoring of this response sheets indicated that few of them are incomplete and they were rejected and a final of 400 was used for the study. Details of sample selected are given below in the table 3.3.

The details of colleges and the number of samples from each college are given in table 3.3

Table 3.3

College wise distribution of sample

SL. No.	Name of B.Ed. College	No.of prospective Teachers
1	N.V.K.S.D College of Education, Attoor.	52
2	St. Hindu College of Education, Nagercoil.	49
3	Sun College of Education, Nagercoil.	38
4	R.P.A. College of Education, Mamoodukkadai.	45
5	White Memorial College of Education, Attoor.	48
6	Christian college of Education, Marthandam.	50
7	Grace College of Education. Padanthalumoodu.	40
8.	St. Stephen College of Education, Kollancode	32
9	Immanuel Arasar College of Education, Nattalam.	46
	Total	**400**

Table 3.4

Percentage distribution of the sample according to background characteristics

Background characteristics		Count	Percent
Sex	Male	34	8.50
	Female	366	91.50
Locale	Rural	277	69.25
	Urban	123	30.75
Community	OC	52	13.00
	BC	286	71.50
	MBC	31	7.75
	SC/ST	31	7.75
Religion	Hindu	172	43.00
	Christian	228	57.00
	Muslim	06	0.15
Optional subject	Humanities	172	43.00
	Science	228	57.00
Frequency of computer use	Daily	128	32.00
	Weekly	126	31.50
	Monthly	104	26.00
	Never	42	10.50
Purpose of computer use	Studies	124	31.00
	Personal use	77	19.25
	Both	199	49.75
Computer knowledge level	Basic	155	38.75
	Average	149	37.25
	Good	65	16.25
	Expert	31	7.75
Own a smart phone	Yes	243	60.75
	No	157	39.25
Own a laptop/personal computer	Yes	237	59.25
	No	163	40.75
Internet browsing habit	Never	100	25.00
	Rarely	183	45.75
	Frequently	117	29.25

D) ADMINISTRATION OF THE TOOLS

For administration of the tool, the investigator visited 9 colleges of education in Kanniyakumari district. After getting permission from the principal, with the help of the class-in-charge, investigator met the subjects.

Then the tools were distributed to the subjects. General directions in the tool were explained. The subjects were made familiar with the more of making responses.

The investigator supervised the groups by taking round in the classroom and cleared the doubts raised by the subjects. Thirty minutes was allotted for digital literacy test and interactive whiteboard attitude scale.

E) SCORING AND TABULATION

The data collected were scored systematically. For attitude towards in interactive white board for positive items, a score of '5' for strongly agree, '4' for agree, '3' for undecided, '2' for disagree and '1' for strongly disagree was given for negative items the score was reversed. Maximum score of the scale was 120 and minimum was 1. In digital literacy test a score of 1 was given to 'yes' and 0 for 'no'. Maximum score was 38 and minimum was 0.

STATISTICAL TECHNIQUES ADOPTED

For the analysis of data collected, following statistical techniques were adopted.

- Arithmetic mean

- Standard Deviation

- t test

- ANOVA

- Persons product moment coefficient of correlation

1. *ARITHMETIC MEAN*

Arithmetic mean $= \mathbf{A} + \frac{\Sigma fd}{N} \mathbf{X} \ \mathbf{C}$

Where

A – assumed mean of the scores obtained

f – frequency of each class interval

d – deviation of the scores from the assumed mean.

N – total frequency

C – class interval

2. STANDARD DEVIATION

$$\textbf{Standard deviation, } \sigma = CX \sqrt{\frac{\Sigma fd^2}{N} - \frac{(\Sigma fd)^2}{N}}$$

Where

C – class interval

d – deviation of the scores from the assumed mean

f – frequency

N – total frequency

3. t test

$$\textbf{t} - \textbf{ratio} = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$

where

$\overline{X_1}$ - arithmetic mean of the first group

$\overline{X_2}$ - arithmetic mean of the second group

σ_1 - standard deviation of the first group

σ_2 - standard deviation of the second group

N_1 - total number in the first group

N_2 - total number in the second group

4. ANOVA (F-test)

The composite procedure for testing simultaneously the difference between several samples mean is known as analysis of variance or ANOVA

$$F = \frac{V_b}{V_w}$$

Here, $V_b = V_t - V_w$

V_b −means square variance between groups

V_w − means square variance within groups

V_t − means square variance of total groups

PEARSON'S PRODUCT MOMENT METHOD OF CORRELATION COEFFICIENT

Correlation is used to find out the relationship between the two variables. The most widely used to measure of correlation is the Pearson's Product moment of correlation. The formula for correlation coefficient in terms of raw scores is

Pearson Product moment correlation, $\gamma = \dfrac{N\sum x^1 y^1 - \sum fx^1 . \sum y^1}{\sqrt{Nfx^2 - (\sum fx^1)^2 . [\sum fy^2 - (\sum fy^1)^2]}}$

Where

γ — the person's product moment correlation co-efficient

N – total number of pairs of X and Y

X – raw score on the X - variable

Y – raw on the Y – variable

Garrett (1969) presents the following classification for interpreting the various values of 'r'.

r	=	Zero denotes no relationship
r	=	0.00 to ± 0.20 denotes negligible correlation
r	=	± 0.20 to ± 0.40 denotes low correlation
r	=	± 0.40 to ± 0.70 denotes substantial correlation
r	=	±0.70 to ± 0.99 denotes high correlation
r	=	One denotes perfect correlation

The above classification has been accepted for the present investigation. The details of analysis are presented in the next chapter.

SCHEFFE'S TEST:

A significant obtained as the result of ANOVA does not point out which of the three groups differ among themselves. In such cases the comparison at the difference set means for any two groups is done using Scheffe's procedure (Scheffe's 1957). Scheffe's test is one of the well-known multiple groups comparison test.

ANALYSIS AND INTERPRETATION

- Interpretation of data

- Tenability of hypothesis

The data after collection has to be processed and analyzed in accordance with the research plan/design. Processing implies editing, coding, classifying and tabulating the collected data so that they are amenable to analysis. The term analysis refers to the contemplated comparison and to interpret or draw. It is opined that analysis of data in a general way involves a number of closely related operations, which are performed with the purpose of summarizing the collected data organizing in such a way that they answer the research questions set forth. Data, the raw material or data analysis comes in a variety of forms. The variable under investigation must be measured before any hypothesis can be tested. The careful data analysis starts with an examination of the key feature of each variable.

Analysis may be categorized as:

a) Descriptive Analysis

b) Inferential Analysis

Descriptive Analysis is largely the study of distribution of one variable. This is described as uni-dimensional or univariate Analysis. If it involves two variables it is brivariate analysis and if more than two variables it is called multivariate analysis. Such simple and basic statistical tools which reveal the points of central tendency, variation, dispersion, correction measures of association are referred to as descriptive analysis. Data of this kind of analysis is generally qualitative in nature.

Inferential Analysis: Certain data are essentially quantitative in nature, which warrant appropriate and systematic application of statistical tools. The quantitative data are measurable. Measurement is expressed by means of various scales. This type of statistical tools referred to as inferential statistics.

DIGITAL LITERACY OF PROSPECTIVE TEACHERS

PERCENTAGE ANALYSIS

Table 4.1

Mean and Standard deviation of Digital literacy of Prospective Teachers
(TOTAL SAMPLE)

NUMBER	MEAN	STANDARD DEVIATION
400	28.79	7.16

From the above table 4.1 it is evident that the mean was found to be 28.79 out of 38. This indicates that the prospective teachers have average digital literacy. The obtained standard deviation is 7.16.

DIGITAL LITERACY OF PROSPECTIVE TEACHERS

Table 4.2

Percentage wise distribution of different levels of digital literacy.

Digital Literacy	Count	Percent
Low	62	15.50
Medium	257	64.25
High	81	20.25
Total	400	100.00

From the table 4.2 it is evident that about 15.50 percentage of the total sample have low digital literacy, about 64.25 percentage have average digital literacy and about 20.25 percentage of the sample shows high digital literacy.

COMPARISON OF DIGITAL LITERACY OF PROSPECTIVE TEACHERS

Comparison of digital literacy of prospective teachers based on the selected background variables.

SEX WISE COMPARISON OF DIGITAL LITERACY OF PROSPECTIVE TEACHERS

Two groups of prospective teachers namely male and female have been subjected for study as per the analysis given in the table 4.3.

Table 4.3

Comparison of digital literacy based on sex

Sex	Mean	SD	N	t	p	Significant at 5% level
Male	28.03	7.60	34			
Female	28.86	7.13	366	0.612	0.541	NS

The calculated 't' value (t-0.612;p >0.05) is not significant at 5% level. It means that there is no significant difference in the mean scores of digital literacy of male and female prospective teachers. Therefore the null hypothesis "There is no significant difference in the mean scores of digital literacy of male and female prospective teachers" is accepted.

LOCALE WISE COMPARISON OF DIGITAL LITERACY OF PROSPECTIVE TEACHERS

Two groups of prospective teachers namely rural and urban have been subjected for the study as per the analysis given in the table 4.4

Comparison of digital literacy based on locale

Table 4.4

Locale	Mean	SD	N	t	p	Significant at 5% level
Rural	27.94	7.47	277			
Urban	30.71	6.03S	123	3.929	0.000	S

The calculated 't' value (t-3.929; p>0.01) is significant at 5% level. So, the null hypothesis "There is significant difference in the mean scores of digital literacy of rural and urban prospective teachers" is rejected.

From the mean scores, it is clear that urban prospective teachers have high digital literacy than that of rural prospective teachers.

COMMUNITY WISE COMPARISON OF DIGITAL LITERACY OF

PROSPECTIVE TEACHERS

Four groups of prospective teachers OC, BC, MBC and SC/ST have been subjected for the study as per the analysis given in the table 4.5

Table 4.5

Comparison of digital literacy based on community

Community	Mean	SD	Source	Sum of Squares	Df	Mean Square	F	p	Sig. at 5% level
OC	30.79	6.45	Between Gp	2545.97	3	848.66			
BC	28.52	6.3	Within Gp	17926.97	396	45.27			
MBC	34.42	5.65	Total	20472.94	399		18.746	0.000	S
SC/ST	22.23	10.83							

The calculated 'F' value (F-18.746; p>0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of digital literacy of OC, BC, MBC and SC/ST prospective teachers" is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence Scheffe's multiple comparison is used for further analysis

RESULT OF SCHEFFE'S PROCEDURE FOR THE COMMUNITY
OF PROSPECTIVE TEACHERS

Table: 4.6

Result of scheffe's procedure for the community of prospective teachers

Community	N	Pair	p (Scheffe)	Significant at 5% level
OC (A)	52	AVs B	0.173	*NS*
BC (B)	286	BVs C	0.000	*S*
MBC (C)	31	AVs C	0.132	*NS*
SC/ST (D)	31	AVs D	0.000	*S*
		BVs D	0.000	*S*
		CVs D	0.000	*S*

The result showed that the mean scores of digital literacy of BC and MBC, OC and SC/ST, BC and SC/ST. The other pairs do not differ in the digital literacy. Mean value showed that MBC prospective teachers have high digital literacy than the other groups.

RELIGION WISE COMPARISON OF DIGITAL LITERACY OF PROSPECTIVE TEACHERS

Two groups of prospective teachers Hindu and Christian have been subjected for the study as per the analysis given in the table 4.7

Table 4.7

Comparison of digital literacy based on religion

Religion	Mean	SD	N	t	p	Significant at 5% level
Hindu	28.6	7.68	178	0.285	*0.776*	*NS*
Christian	28.81	6.76	216			

The calculated 't' value (t-0.285; p<0.05) is not significant at 5% level. It means that there is no significant difference in the mean scores of digital literacy of Hindu and Christian prospective teachers, therefore the null hypothesis. "There is no significant difference in the mean scores of digital literacy of Hindu and Christian prospective teachers" is accepted.

OPTIONAL SUBJECT WISE COMPARISON OF DIGITAL LITERACY OF PROSPECTIVE TEACHERS

Two groups of prospective teacher's humanities and science have been subjected for the study as per the analysis given in the table 4.8

Table 4.8

Comparison of digital literacy based on optional subject

Optional Subject	Mean	SD	N	t	p	Significant at 5% level
Humanities	28.12	7.88	172	1.580	0.115	*NS*
Science	29.29	6.54	228			

The calculated 't' value (t-1.580; p>0.05) is not significant at 5% level. So the null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on optional subject" is accepted.

COMPARISON OF DIGITAL LITERACY BASED ON FREQUENCY OF COMPUTER USE OF PROSPECTIVE TEACHERS

Four groups of prospective teachers on the basis of frequency of computer usage, daily, weekly, monthly and never have been subjected for the study as per the analysis given in the table 4.9

Table : 4.9

Comparison of digital literacy based on frequency of computer use

Frequency of computer use	Mean	SD	Source	Sum of Squares	df	Mean Square	F	p	Sig. at 5% level
Daily	30.89	6.78	Between Gp	1829.43	3	609.81			
Weekly	28.77	6.31	Within Gp	18643.5	396	47.08	12.953	0.00	S
Monthly	28.42	7.17	Total	20472.9	399				
Never	23.33	7.87							

The calculated 'F' value (F-12.953; P≤0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of digital literacy of prospective teachers based on frequency of using computer" is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence, Scheffe's multiple comparison is used for further analysis.

RESULT OF SCHEFFE'S PROCEDURE FOR DIGITAL LITERACY BASED ON FREQUENCY OF USING COMPUTER

Table 4.10

Result of scheffe's procedure for digital literacy based on frequency of using computer

Frequency of computer use	N	Pair	p (Scheffe)	Significant at 5% level
Daily (A)	128	AVs B	0.110	NS
Weekly (B)	126	BVs C	0.985	NS
Monthly (C)	104	AVs C	0.061	NS
Never (D)	42	AVs D	0.000	S
		BVs D	0.000	S
		CVs D	0.001	S

There exist significant difference in the mean scores of digital literacy of prospective teachers using computers daily and never.

There exist significant difference in the mean scores of digital literacy of prospective teachers using computers weekly and never.

The other pairs do not differ in the digital literacy. Mean value showed that prospective teachers using computer daily have high digital literacy than the other groups.

COMPARISON OF DIGITAL LITERACY BASED ON PURPOSE OF COMPUTER USE OF PROSPECTIVE TEACHERS

Three groups of prospective teachers namely studies, personal use, both have been subjected for the study as per the analysis given in the table 4.11

Table 4.11

Comparison of digital literacy based on purpose of computer use of prospective teachers

Purpose of computer use	Mean	SD	Source	Sum of Squares	df	Mean Square	F	p	Sig. at 5% level
Studies	27.54	8.11	Between Gp	397.07	2	198.54			
Personal use	28.3	6.76	Within Gp	20075.9	397	50.57	3.926	*0.02*	*S*
Both	29.75	6.56	Total	20472.9	399				

The calculated 'F' value (F-3.926; P≤0.05) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of digital literacy of prospective teachers based on purpose of using computer" is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly.

Hence, Scheffe's multiple comparison is used for further analysis.

RESULT OF SCHEFFE'S PROCEDURE FOR DIGITAL LITERACY BASED ON PURPOSE OF USING COMPUTER

Table 4.12

Result of scheffe's procedure for digital literacy based on purpose of using computer

Purpose of computer use	N	Pair	p (Scheffe)	Significant at 5% level
Studies (A)	124	A Vs B	0.763	NS
Personal use (B)	77	B Vs C	0.316	NS
Both (C)	199	A Vs C	0.026	S

There exist significant difference in the mean scores of digital literacy of prospective teachers using computer for studies and both (studies and personal usage) purpose of computers use studies and both.

The other pairs do not differ in the digital literacy. Mean value showed that prospective teachers using computer for both (studies and personal usage) have high digital literacy than the other groups.

COMPARISON OF DIGITAL LITERACY BASED ON COMPUTER KNOWLEDGE LEVEL OF PROSPECTIVE TEACHERS

Four groups of prospective teachers namely basic, average, good, expert have been subjected for the study as per the analysis given in the table 4.13

Table 4.13

Comparison of digital literacy based on computer knowledge level of prospective teachers

Computer knowledge level	Mean	SD	Source	Sum of Squares	df	Mean Square	F	p	Sig. at 5% level
Basic	26.88	6.82	Between Gp	1389.12	3	463.04			
Average	28.88	6.97	Within Gp	19083.81	396	48.19	9.608	*0.00*	*S*
Good	31.8	6.63	Total	20472.9	399				
Expert	31.55	7.97							

The calculated 'F' value (F-9.608; p≤0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of digital literacy of prospective teachers based on computer knowledge level " is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence, Scheffe's multiple comparison is used for further analysis.

RESULT OF SCHEFFE'S PROCEDURE FOR DIGITAL LITERACY BASED ON

COMPUTER KNOWLEDGE LEVEL

Table : 4.14

Result of scheffe's procedure for digital literacy based on computer knowledge level

Computer knowledge level	N	Pair	p (Scheffe)	Significant at 5% level
Basic (A)	155	AVs B	0.099	*NS*
Average (B)	149	BVs C	0.047	*S*
Good (C)	65	AVs C	0.000	*S*
Expert (D)	31	AVs D	0.009	*S*
		BVs D	0.286	*NS*
		CVs D	0.999	*NS*

There exists significant difference in the mean scores of digital literacy of prospective teachers having average computer knowledge and good computer knowledge.

There exists significant difference in the mean scores of digital literacy of prospective teachers having average computer knowledge and good computer knowledge.

There exists significant difference in the mean scores of digital literacy of prospective teachers having average computer knowledge and expert.

The other pairs do not differ in the digital literacy. Mean value showed that prospective teachers having expert computer knowledge have high digital literacy than the other groups.

COMPARISON OF DIGITAL LITERACY OF PROSPECTIVE TEACHERS OWN A SMART PHONE

Two groups of prospective teachers namely, having and not having own a smart phone have been subjected for the study as per the analysis given in the table 4.15

Table: 4.15

Comparison of digital literacy of prospective teachers own a smart phone

Own a smart phone	Mean	SD	N	t	*p*	Significant at 5% level
Yes	30.81	5.93	243			
No	25.66	7.77	157	7.079	*0.00*	*S*

The calculated 't' value (t-7.079; p≤0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of digital literacy of prospective teachers based on own a smart phone:" is rejected. From the mean scores, it is clear that prospective teachers own a smart phone have high digital literacy than that of not own a smart phone.

COMPARISON OF DIGITAL LITERACY OF PROSPECTIVE TEACHERS HAVING

AND NOT HAVING OWN A LAPTOP/PERSONAL COMPUTER

Two groups of prospective teachers having and not having own a laptop/personal computer have been subjected for the study as per the analysis given in the table 4.16.

Table : 4. 16

Comparison of digital literacy of prospective teachers having and not having own a laptop/personal computer

Own a laptop/personal computer	Mean	SD	N	t	*p*	Significant at 5% level
Yes	29.97	6.63	237	3.971	*0.00*	*S*
No	27.06	7.57	163			

The calculated 't' value (t-3.971; p≤0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of digital literacy of prospective teachers based on own a laptop/personal" is rejected. From the mean scores, it is clear that prospective teachers having own a laptop/personal have high digital literacy than that of not having own a laptop/personal.

COMPARISON OF DIGITAL LITERACY BASED ON INTERNET BROWSING HABIT OF PROSPECTIVE TEACHERS

Three groups of prospective teachers namely never, rarely, frequently have been subjected for the study as per the analysis given in the table 4.17.

Table 4.17

Comparison of digital literacy based on internet browsing habit of prospective teachers

Internet browsing habit	Mean	SD	Source	Sum of Squares	df	Mean Square	F	*p*	Sig. at 5% level
Never	24.81	7.95	Between Gp	2386.9	2	1193.47			
Rarely	29.34	6.23	Within Gp	18086	397	45.56	26.197	*0.00*	S
Frequently	31.32	6.4	Total	20472.9	399				

The calculated 'F' value (F-26.197; p≤0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of digital literacy of prospective teachers based on purpose of using computer" is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence, Scheffe's multiple comparison is used for further analysis.

RESULT OF SCHEFFE'S PROCEDURE FOR DIGITAL LITERACY BASED ON

INTERNET BROWSING HABIT

Table 4.18

Result of scheffe's procedure for digital literacy based on internet browsing habit

Internet browsing habit	N	Pair	p (Scheffe)	Significant at 5% level
Never (A)	100	A Vs B	0.000	S
Rarely (B)	183	B Vs C	0.047	S
Frequently (C)	117	A Vs C	0.000	S

There exists significant difference in the mean scores of digital literacy of prospective teachers having the habit of browsing internet rarely and never.

There exists significant difference in the mean scores of digital literacy of prospective teachers having the habit of browsing internet frequently and rarely.

There exists significant difference in the mean scores of digital literacy of prospective teachers having the habit of browsing internet frequently and never.

Mean value showed that prospective teachers having the habit of internet browsing frequently have high digital literacy than the other groups.

ATTITUDE TOWARDS INTERACTIVE WHITEBOARD OF PROSPECTIVE

TEACHERS PERCENTAGE ANALYSIS

DESCRIPTIVE STATISTICS FOR ATTITUDE OF INTERACTIVE WHITE

BOARD

Table 4.19

Mean and Standard deviation attitude towards Interactive whiteboard of Prospective Teachers

(TOTAL SAMPLE)		
NUMBER	**MEAN**	**STANDARD DEVIATION**
400	91.97	11.75

From the above table 4.19 it is evident that the mean was found to be 91.97 out of 120. This indicates that the prospective teachers have favourable attitude towards interactive whiteboard. The obtained standard deviation was 11.75

PERCENTAGE WISE DISTRIBUTION OF DIFFERENT LEVELS OF ATTITUDE TOWARDS INTERACTIVE WHITEBOARD OF PROSPECTIVE TEACHERS

Table 4.20

Percentage wise distribution of different levels of attitude towards interactive whiteboard of Prospective Teachers

ATTITUDE	COUNT	PERCENT
Un favourable	58	14.50
favourable	278	69.50
Highly favourable	64	16.00
Total	400	100.00

From the table 4.20 it is evident that about 14.50 percentage of the total sample have unfavourable attitude towards interactive whiteboard, about 69.50 percentages have favourable attitude towards interactive whiteboard and about 16.00 percentage of the sample shows high favourable attitude towards interactive whiteboard.

COMPARISON OF ATTITUDE TOWARDS INTERACTIVE WHITEBOARD OF PROSPECTIVE TEACHERS

Comparison of attitude towards interactive whiteboard of prospective teachers based on the selected background variables.

SEX WISE COMPARISON OF ATTITUDE TOWARDS INTERACTIVE WHITEBOARD OF PROSPECTIVE TEACHERS

Two groups of prospective teachers namely male and female have been subjected for study as per the analysis given in the table 4.21.

Table 4.21

Comparison of attitude towards interactive whiteboard based on sex

Sex	Mean	SD	N	t	p	Significant at 5% level
Male	80.56	17.17	34			
				4.163	*0.000*	S
Female	93.03	10.54	366			

The calculated 't' value (t-4.163;p<0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of attitude towards interactive whiteboard of male and female prospective teachers" is rejected.

From the mean scores, it is clear that female prospective teachers have favourable attitude towards using interactive whiteboard in class room than that of male prospective teachers.

LOCALE WISE COMPARISON OF ATTITUDE TOWARDS INTERACTIVE WHITEBOARD OF PROSPECTIVE TEACHERS

Two groups of prospective teachers namely rural and urban have been subjected for the study as per the analysis given in the table 4.22

Table 4.22

Comparison of attitude towards interactive white board based on locale

Locale	Mean	SD	N	t	p	Significant at 5% level
Rural	91.10	11.96	277			
				2.300	*0.022*	*S*
Urban	93.93	11.08	123			

The calculated 't' value (t-2.300; p<0.05) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of attitude towards interactive whiteboard of rural and urban prospective teachers" is rejected.

From the mean scores, it is clear that urban prospective teachers have favorable attitude towards using interactive whiteboard in class room than that of rural prospective teachers

COMMUNITY WISE COMPARISON OF ATTITUDE TOWARDS INTERACTIVE WHITEBOARD OF PROSPECTIVE TEACHERS

Four groups of prospective teachers belongs to open category, backward caste, most backward caste, schedule caste and scheduled tribes have been subjected for the study as per the analysis given in the table 4.23

Table 4.23

Comparison of attitude towards interactive white board based on community

Community	Mean	SD	Source	Sum of Squares	Df	Mean Square	F	p	Sig. at 5% level
OC	90.79	7.88	Between Gp	4448.18	3	1482.73			
BC	91.57	11.54	Within Gp	50660.52	396	127.93	11.590	0.000	S
MBC	102.68	12.14	Total	55108.70	399				
SC/ST	86.97	13.05							

The calculated 'F' value (F-11.590; p<0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of attitude towards interactive white board of prospective teachers belongs to OC, BC, MBC, SC/ ST" is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence Scheffe's multiple comparison is used for further analysis.

RESULT OF SCHEFFE'S PROCEDURE FOR THE COMMUNITY OF PROSPECTIVE TEACHERS

Table : 4.24

Result of scheffe's procedure for the community of prospective teachers

Community	N	Pair	p (Scheffe)	*Significant at 5% level*
OC(A)	52	AVs B	0.976	NS
BC (B)	286	BVs C	0.000	S
MBC (C)	31	AVs C	0.000	S
SC/ST(D)	31	AVs D	0.530	NS
		BVs D	0.203	NS
		CVs D	0.000	S

From the above table 4.24 it is clear that there is significant difference in the mean scores of attitude towards interactive white board of prospective teachers belongs to OC, BC, MBC, SC/ ST.

From the above table 4.24 it is clear that there is no significant difference in the mean scores of attitude towards interactive whiteboard of prospective teachers based on community.

From the mean scores, it is clear that prospective teachers belongs to MBC have favorable attitude towards using interactive whiteboard in class room than that of OC, BC, MBC, SC/ ST.

RELIGION WISE COMPARISON OF ATTITUDE TOWARDS INTERACTIVEWHITE BOARD OF PROSPECTIVE TEACHERS

Two groups of prospective teachers Hindu, Christian and Muslim have been subjected for the study as per the analysis given in the table 4.25

Table 4.25

Comparison of attitude towards interactive white board based on religion

Religion	Mean	SD	N	t	*p*	*Significant at 5%. Level*
Hindu	90.71	11.54	178			
Christian	92.90	11.87	216	1.851	*0.065*	NS

The calculated 't' value (t-1.851; p<0.05) is not significant at 5% level. So, the null hypothesis "There is no significant difference in the mean scores of attitude towards interactive white board of Hindu and Christian prospective teachers" is accepted.

OPTIONAL SUBJECT WISE COMPARISON OF ATTITUDE TOWARDS INTERACTIVE WHITE BOARD OF PROSPECTIVE TEACHERS

Two groups of prospective teacher's humanities and science have been subjected for the study as per the analysis given in the table 4.26

Table 4.26

Comparison of attitude towards interactive white board based on optional subject

Optional Subject	Mean	SD	N	t	p	Significant at 5% level
Humanities	92.23	11.33	172			
Science	91.78	12.08	228	0.382	0.703	NS

The calculated 't' value (t-0.382; p>0.05) is not significant at 5% level. So the null hypothesis "There is no significant difference in the mean scores of attitude towards interactive whiteboard of prospective teachers based on optional subject" is accepted.

FREQUENCY OF USING COMPUTER WISE COMPARISON OF ATTITUDE TOWARDS INTERACTIVE WHITE BOARD OF PROSPECTIVE TEACHERS

Four groups of prospective teachers on the basis of frequency of using computer, daily, weekly, monthly and never have been subjected for the study as per the analysis given in the table 4.27

Table 4.27

Comparison of attitude towards interactive whiteboard based on frequency of using computer

Frequency of computer use	Mean	SD	Source	Sum of Squares	df	Mean Square	F	p	Sig. at 5% level.
Daily	97.03	12.7	Between Gp	5950.5	3	1983.497			
Weekly	91.20	10.15	Within Gp	49158.207	396	124.14	15.978	*0.00*	*S*
Monthly	89.41	10.7	Total	55108.698	399				
Never	85.21	9.88							

The calculated 'F' value (F-15.978; p≤0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of attitude towards interactive whiteboard of prospective teachers based on frequency of using computer" is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence, Scheffe's multiple comparison is used for further analysis.

Table 4.28

Result of Scheffe's procedure for attitude towards interactive whiteboard based on frequency of computer use.

Frequency of computer use	N	Pair	p (Scheffe)	Significant at 5% level
Daily (A)	128	AVs B	0.001	*S*
Weekly (B)	126	BVs C	0.689	*NS*
Monthly (C)	104	AVs C	0.000	*S*
Never (D)	42	AVs D	0.000	*S*
		B Vs D	0.029	*S*
		C Vs D	0.237	*NS*

From the above table 4.28 it is clear that there is significant difference in the mean scores of attitude towards interactive whiteboard of prospective teachers based on frequency of using computer daily and weekly, daily and monthly, daily and never, weekly and never.

From the above table 4.28 it is clear that there is no significant difference in the mean scores of attitude towards interactive whiteboard of prospective teachers frequency of using computer weekly and monthly, monthly and never.

From the mean scores, it is clear that prospective teachers who use computer daily have favorable attitude towards interactive whiteboard of than that of those who use weekly, monthly and never .

PURPOSE OF COMPUTER USEWISE COMPARISON OF ATTITUDE

TOWARDS INTERACTIVE WHITE BOARD OF PROSPECTIVE TEACHERS

Three groups of prospective teachers namely studies, personal use, both have

been subjected for the study as per the analysis given in the table 4.29

Table 4.29

Comparison of attitude towards interactive white board based on purpose of computer use

Purpose of computer use	Mean	SD	Source	Sum of Squares	Df	Mean Square	F	p	Significant at 5% level
Studies	94.19	13.01	Between Gp	1066.8113	2	533.41			
Personal use	89.68	13.44	Within Gp	54041.886	397	136.13	3.918	0.02	S
Both	91.48	9.92	Total	55108.698	399				

The calculated 'F' value (F-3.918; p≤0.01) is significant at 5% level. So the null

hypothesis "There is significant difference in the mean scores of attitude towards

interactive whiteboard of prospective teachers based on purpose of using computer " is

rejected.

The result does not help to identify exactly the pairs of groups which differ

significantly. Hence, Scheffe's multiple comparison is used for further analysis.

Table 4.30

Result of Scheffe's procedure for attitude towards using interactive whiteboard in class room based on purpose of computer use

Purpose of computer use	N	Pair	p (Scheffe)	Significant at 5% level
Studies (A)	124	AVs B	0.030	*S*
Personal use (B)	77	BVs C	0.517	*NS*
Both (C)	199	AVs C	0.129	*NS*

From the above table 4.30 it is clear that there is significant difference in the mean scores of attitude towards interactive white board of prospective teachers based on purpose of using computer for studies and personal use.

From the above table 4.30 it is clear that there is no significant difference in the mean scores of attitude towards interactive white board of prospective teachers based on the purpose of using computer for personal use and both, studies and both.

From the mean scores, it is clear that prospective teachers who use computer for studies have favourable attitude than that of those who use computer for personal and both.

COMPARISON OF INTERACTIVE WHITE BOARD BASED ON COMPUTER KNOWLEDGE LEVEL OF PROSPECTIVE TEACHERS

Four groups of prospective teachers having and not having smart phone have been subjected for the study as per the analysis given in the table 4.31

Table 4.31

Comparison of interactive white board based on computer knowledge level of prospective teachers.

Computer knowledge level	Mean	SD	Source	Sum of Squares	df	Mean Square	F	p	Significant at 5% level
Basic	90.87	10.71	Between Gp	2109.3	3	703.08			
Average	90.66	11.9	Within Gp	52999.445	396	133.84	5.253	*0.001*	*S*
Good	94.62	11.98	Total	55108.698	399				
Expert	98.23	13.19							

The calculated 'F' value (F-5.253; p≤0.01) is significant at 5% level. So the null hypothesis "There is significant difference in the mean scores of interactive white board of prospective teachers based on computer knowledge level" is rejected.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence, Scheffe's multiple comparison is used for further analysis.

Table : 4.32

RESULT OF SCHEFFE'S PROCEDURE FOR INTERACTIVE WHITEBOARD BASED ON COMPUTER KNOWLEDGE LEVEL

Computer knowledge level	N	Pair	p (Scheffe)	Significant at 5% level
Basic (A)	155	AVs B	0.999	*NS*
Average (B)	149	BVs C	0.153	*NS*
Good (C)	65	AVs C	0.188	*NS*
Expert (D)	31	AVs D	0.016	*S*
		BVs D	0.013	*S*
		CVs D	0.564	*NS*

From the above table 4.32 it is clear that there is significant difference in the mean scores of interactive white board of prospective teachers based on using computer knowledge level basic and expert, average and expert, .

From the above table 4.32 it is clear that there is no significant difference in the mean scores of interactive white board of prospective teachers based on computer knowledge level basic and average, average and good, basic and good, good and expert.

From the mean scores, it is clear that the prospective teachers who are expert in computer knowledge have favorable attitude than that of those have basic, average, good level in computer knowledge.

OWN A SMARTPHONE WISE COMPARISON OF ATTITUDE TOWARDS INTERACTIVE WHITE BOARD OF PROSPECTIVE TEACHERS

Two groups of prospective teachers having and not having own a smart phone have been subjected for the study as per the analysis given in the table 4.33

Table 4.33

Comparison of attitude towards interactive white board based on own smart phone

Own Smartphone	Mean	SD	N	t	p	Significant at 5% level
Yes	91.61	11.79	243			
No	92.53	11.71	157	0.765	*0.45*	*NS*

The calculated 't' value (t-0.765; p>0.01) is not significant at 5% level. So the null hypothesis "There is no significant difference in the mean scores of attitude towards interactive white board of prospective teachers based on own a smart phone" is accepted.

OWN A LAPTOP/PERSONAL WISE COMPARISON OF ATTITUDE

TOWARDS INTERACTIVE WHITE BOARD OF PROSPECTIVE TEACHERS

Two groups of prospective teachers own a laptop/personal computer have been subjected for the study as per the analysis given in the table 4.34

Table 4.34

Comparison of attitude towards interactive white board based on own a laptop/personal computer.

Own a laptop/personal computer	Mean	SD	N	t	p	Significant at 5% level
Yes	92.64	11.97	237			
No	91.01	11.40	163	1.377	*0.17*	*NS*

The calculated 't' value (t-1.377; p>0.01) is not significant at 5% level. So the null hypothesis "There is no significant difference in the mean scores of attitude towards interactive white board of prospective teachers based on own a laptop/personal computer" is accepted.

INTERNET BROWSING WISE COMPARISON OF ATTITUDE TOWARDS

INTERACTIVE WHITE BOARD OF PROSPECTIVE TEACHERS

Three groups of prospective teachers namely never, rarely, frequently have been subjected for the study as per the analysis given in the table 4.35

Table 4.35

Comparison of attitude towards using interactive white board in class room based on internet browsing.

Internet browsing habit	Mean	SD	Source	Sum of Squares	Df	Mean Square	F	p	Sig at 5% level
Never	92.33	12.38	Between Gp	146.60151	2	73.30076			
Rarely	91.33	11.53	Within Gp	54962.096	397	138.4436	0.529	*0.589*	*NS*
Frequently	92.68	11.59	Total	55108.698	399				

The calculated 'F' value (F-0.529; p ≥0.05) is not significant at 5% level. So the null hypothesis "There is no significant difference in the mean scores of attitude towards interactive white board of prospective teachers based on internet browsing" accepted.

CO-EFFICIENT OF CORRELATION

The Pearson's product moment co-efficient of correlation is used to find out the extent of relationship between two sets of variables. When the co-efficient of correlation 'r' is positive we can say that there is positive relationship between the variables. If the co-efficient of correlation 'r' is negative , than we can say that the relationship between the two variables is negative. If 'r' is zero, than there is no relationship between the variables.

CO-EFFICIENT OF CORRELATION BETWEEN DIGITAL LITERACY AND ATTITUDE TOWARDS INTERACTIVE WHITE BOARD OF PROSPECTIVE TEACHERS

Table 4.36

Correlation between digital literacy and attitude towards interactive white board of prospective teachers

Background characteristics	Pearson Correlation	*p*	*Significant at 5% level*
Total sample	0.155	*0.002*	*S*

From the above table following interpretation are derived

1. The correlation between digital literacy and attitude of prospective teachers towards using interactive whiteboard in class room is 0.155 which is significant at 0.05 level and verbally interpreted as positive negligible correlation. There exists significant positive negligible correlation between digital literacy and attitude of prospective teachers towards using interactive whiteboard in class room.

TENABILITY OF HYPOTHESES

1. The first null hypothesis "There is no significant difference in the mean scores of digital literacy of male and female prospective teachers" is accepted.

2. The second null hypothesis "There is no significant difference in the mean scores of digital literacy of rural and urban prospective teachers" is rejected.

3. The third null hypothesis "There is no significant difference in the mean scores of digital literacy of OC, BC, MBC and SC/ST prospective teachers" is rejected.

4. The fourth null hypothesis "There is no significant difference in the mean scores of digital literacy of Hindu and Christian prospective teachers" is accepted.

5. The fifth null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on optional subject" is accepted.

6. The sixth null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on frequency of using computer" is rejected.

7. The seventh null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on purpose of using computer" is rejected.

8. The eighth null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on computer knowledge level" is rejected.

9. The ninth null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on own and not own a smart phone" is rejected.

10. The tenth null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on own and not own a laptop/personal computer" is rejected.

11. The eleventh null hypothesis "There is no significant difference in the mean scores of digital literacy of prospective teachers based on internet browsing habit" is rejected.

12. The twelth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of male and female prospective teachers" is rejected.

13. The thirteenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of rural and urban prospective teachers" is rejected.

14. The fourteenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers belongs to OC, BC, MBC, SC/ST " is rejected.

15. The fifteenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of Hindu and Christian prospective teachers" is accepted.

16. The sixteenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers based on optional subject" is accepted.

17. The seventeenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers based on frequency of using computer" is rejected.

18. The eighteenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers based on purpose of computer use" is rejected.

19. The nineteenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers based on computer knowledge level" is rejected.

20. The twenteenth null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers based on own and not own a smart phone" is accepted.

21. The twenty first null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers based on own and not own a laptop/personal computer" is accepted.

22. The twenty second null hypothesis "There is no significant difference in the mean scores of attitude towards using interactive whiteboard in class room of prospective teachers based on internet browsing habit" is accepted.

FINDINGS, CONCLUSION, EDUCATIONAL IMPLICATION AND SUGGESTIONS

- Major findings

- Conclusions

- Educational implication

- Suggestions for further Research

THE STUDY IN RETROSPECT

The present investigation is entitled as Digital literacy and Attitude towards using interactive whiteboard in classroom of prospective teachers in Kanniyakumari District. This chapter attempts to summarize all the findings and conclusions drawn from the present investigation. The educational implication of the study and suggestions for further research are also given.

OBJECTIVES OF THE STUDY

1.   To construct and validate a scale for measuring the attitude scale on interactive white board of prospective teachers.

2.   To study the level of digital literacy of prospective teachers in Kanniyakumari District.

3   To compare the mean score of digital literacy of prospective teachers in kanniyakumari District with respect on the basis of background variable such us gender, locale, community, religion, optional subject, frequency of computer use , purpose of using computer, level of computer knowledge, own a smart phone, own a laptop/personal computer, internet browsing habit.

4.   To find out whether there is any significant difference in the mean score of attitude of prospective teachers towards using interactive white board in classroom on the basis of background variable such us gender, locale, community, religion, optional subject, frequency of computer use, purpose of using computer, level of computer knowledge, own a smart phone, own a laptop/personal computer, internet browsing habit.

5. To study the correlation between digital literacy and attitude of prospective teachers using interactive white board in classroom.

HYPOTHESES FORMULATED

1. There is no significant difference in the mean scores of digital literacy of male and female prospective teachers.

2. There is no significant difference in the mean scores of digital literacy of rural and urban prospective teachers

3. There is no significant difference in the mean scores of digital literacy of OC, BC, MBC, SC/ ST prospective teachers.

4. There is no significant difference in the mean scores of digital literacy of Hindu, Christian and Muslim prospective teachers.

5. There is no significant difference the mean scores of digital literacy of prospective teachers based on optional subject.

6. There is no significant difference in the mean scores of digital literacy of prospective teachers based on frequency of using computer.

7. There is no significant difference in the mean scores of digital literacy of prospective teachers based on purpose of using computer.

8. There is no significant difference in the mean scores of digital literacy of prospective teachers based on the level of computer knowledge.

9. There is no significant difference in the mean scores of digital literacy of prospective teachers based on own a Smartphone.

10. There is no significant difference in the mean scores of digital literacy of prospective teachers based on internet browsing habit.

11. There is no significant difference in the mean scores of attitude towards using interactive whiteboard in the classroom of male and female prospective teachers.

12. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of rural and urban prospective teachers.

13. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of OC, BC, MBC and SC/ST prospective teachers.

14. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of Hindu, Christian and Muslim prospective teachers.

15. There is no significant difference the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on optional subject.

16. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on frequency of using computer.

17. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on purpose of using computer.

18. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on the level of computer knowledge.

19. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on own a smart phone.

20. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on own a laptop/personal computer.

21. There is no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on internet browsing habit.

22. There is no significant correlation between the mean scores of digital literacy and attitude of prospective teachers using interactive white board in the class room.

METHOD ADOPTED

Normative survey method was adopted for the study.

POPULATION

The population in the present study consisted of prospective teachers studying in different Colleges of Education in Kanniyakumari district.

SAMPLE

The sample for the study consisted of 400 prospective teachers in different colleges of education in Kanniyakumari district. Simple random sampling technique was used to select the sample.

TOOLS

The tools used for the collection of data were

1. Digital literacy test(Evangelin M.S Beulah & Prasad P.S, 2015)
2. Attitude scale on interactive white board constructed and validated by N. Latha Saraswathy & Prasad P.S. 2017
3. Personal data sheet.

STATISTICAL TECHNIQUES USED

For analysis of data, the following statistical techniques were used

1. Arithmetic mean
2. Standard deviation
3. t test
4. ANOVA
5. Pearson Product Moment Correlation Coefficient

MAJOR FINDINGS

The findings emerged from the analysis of data collected were summarized below:

1. From this study it is found that, the total sample of prospective teachers have average digital literacy. The result is supported by the following findings

(Arithmetic mean for the total score of 28.79 out of 38 and standard deviation is 7.16).

2. From this study it is found that, the total sample of prospective teachers have favorable attitude towards using interactive white board in class room. The result is supported by the following findings (Arithmetic mean for the total score of 91.97 is out of 120 and standard deviation is 11.75).

3. There existed no significant difference in the mean scores of digital literacy of male and female prospective teachers. The result is supported by the following value (t-0.612; $p > 0.05$).

4. There existed significant difference in the mean scores of digital literacy of rural and urban prospective teachers. Urban prospective teachers have high digital literacy than that of rural prospective teachers. The result is supported by the following value (t-3.929; $p > 0.01$).

5. There existed significant difference in the mean scores of digital literacy of OC, BC, MBC, SC/ST prospective teachers. Prospective teachers of MBC category have high digital literacy than OC, BC, SC/ ST prospective teachers. The result is supported by the following value (F-18.746; $p > 0.01$).

6. There existed no significant difference in the mean scores of digital literacy of Hindu and Christian prospective teachers. The result is supported by the following value (t-0.285; $p < 0.01$).

7. There existed no significant difference the mean scores of digital literacy of prospective teachers based on optional subject. The result is supported by the following value (t-1.580; $p > 0.05$).

8. There existed significant difference in the mean scores of digital literacy of prospective teachers based on frequency of computer use. Prospective teachers using computer use daily have high digital literacy than the prospective teachers using computer weekly, monthly and never. The result is supported by the following value (F-12.953; p≤0.01).

9. There existed significant difference in the mean scores of digital literacy of prospective teachers based on purpose of using computer. The prospective teachers using computer for both (studies and personal) have high digital literacy than their counter parts. The result is supported by the following value (F-15.978; p≤0.01).

10. There existed significant difference in the mean scores of digital literacy of prospective teachers based on the level of computer knowledge. The prospective teachers who are expert have high digital literacy than that of average, good and basic. following findings (F-9.608; p≤0.01).

11. There existed significant difference in the mean scores of digital literacy of prospective teachers based on own a smart phone. Prospective teachers own a smart phone have high digital literacy than that of not own a smart phone prospective teachers. The result is supported by the following value (t-7.079; p≤0.01).

12. There existed significant difference in the mean scores of digital literacy of prospective teachers based on own a laptop/personal computer. Prospective teachers have own a laptop/personal computer than that of not own a

laptop/personal computer. The result is supported by the following value(t-3.971; $p \leq 0.01$).

13. There existed significant difference in the mean scores of digital literacy of prospective teachers based on internet browsing habit. Prospective teachers having the habit of browsing internet have high digital literacy the other groups. The result is supported by the following value (F-26.197; $p \leq 0.01$).

14. There existed significant difference in the mean scores of attitude towards using interactive whiteboard in the classroom of male and female prospective teachers. Female prospective teachers have favourable attitude towards interactive white board than male prospective teachers. The result is supported by the following value (t-4.163; $p < 0.01$).

15. There existed significant difference in the mean scores of attitude towards using interactive white board in the classroom of rural and urban prospective teachers. The urban prospective teachers have favourable attitude towards interactive white board than rural prospective teachers. The result is supported by the following value(t-2.300; $p < 0.05$).

16. There existed significant difference in the mean scores of attitude towards interactive white board using in the classroom of prospective teachers belongs to OC, BC, MBC, SC/ST. The MBC prospective teachers have favourable attitude towards interactive white board than that of OC,BC,SC/ST prospective teachers. The result is supported by the following value (F-11.590; $p < 0.01$).

17. There existed no significant difference in the mean scores of attitude towards using interactive white board in the classroom of Hindu and Christian prospective teachers. The result is supported by the following value (t-1.851; p<0.01).

18. There existed no significant difference the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on optional subject. The result is supported by the following findings (t-0.382; p>0.05)

19. There existed significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on frequency of using computer. Prospective teachers using computer daily have favourable attitude than the other group. The result is supported by the following value(F-15.978; p≤0.01).

20. There existed significant difference in the mean scores of attitude towards interactive white board using in the classroom of prospective teachers based on purpose of using computer. The prospective teachers who use computer for studies have favourable attitude towards interactive white board than prospective teachers using computer for personal and both. The result is supported by the following value (F-3.918; p≤0.01).

21. There existed significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on the level of computer knowledge. The prospective teachers who are in expert in computer knowledge have favourable attitude than that of basic, average and good. The result is supported by the following value (F-5.253; p≤0.01).

22. There existed no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on own a smart phone The result is supported by the following findings(t-0.765; p>0.01).

23. There existed no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on own a laptop/personal computer. The result is supported by the following findings(t-1.377; p>0.01)

24. There existed no significant difference in the mean scores of attitude towards using interactive white board in the classroom of prospective teachers based on own a internet browsing habit. The result is supported by the following findings (F-0.529; p≥0.05).

25 There existed significant negligible positive correlation between digital literacy and attitude towards using interactive white board of prospective teachers. The finding was supported by the following result (Pearson correlation0.155; p≤ 0.01 which was significant at 0.01 level). If the prospective teachers have digital literacy means naturally they have favourable attitude towards using interactive white board in class room.

CONCLUSIONS

The above findings have helped the investigator to arrive at certain conclusion regarding the study.

The background variables such as locale, community, frequency of using computer, purpose of using computer, computer knowledge level, own a smart phone, own a lap top, internet browsing habit had influence on digital literacy of prospective teachers. Other background variables such as sex, religion, optional subject had no influence on digital literacy of prospective teachers.

The background variables such as, sex, locale, community, frequency of using computer, purpose of computer, computer knowledge level had influence on attitude towards using interactive white board in class room of prospective teachers. Other background variables such as religion, optional subject, own a smart phone, own a laptop/personal computer, internet browsing habit had no influence on attitude towards using interactive white board in class room of prospective teachers.

There exists significant positive correlation between digital literacy and attitude towards using interactive white board in class room of prospective teachers. If the prospective teachers have digital literacy skill means automatically the attitude on interactive white board using classroom could in favourable attitude. Today in the contemporary period technology play an important part. So the teacher education institution could give training to the prospective teachers to uplift the use of technology in teaching learning process.

EDUCATIONAL IMPLICATIONS OF THE STUDY

The present investigation aimed at studying the digital literacy and attitude towards using interactive white board in class room of prospective teachers. The findings of the study gave certain implication they are as follows:

1. The college should provide hands on training for prospective teachers for using computer, interactive white board effectively for teaching learning process.

2. Prospective teachers need to develop the knowledge of digital literacy and improve their habit of using interactive whiteboard. So it may reach the students also.

3. More organized training programs on digital literacy could be given for prospective teachers.

4. In the college plenty of time could be allotted for the prospective teachers to use digital technology and network resources.

5. Government schools wants to take steps to introduce digitalized teaching and learning in the classroom.

6. School curriculum and teacher education curriculum must deal with modern technology and their uses in teaching and learning process.

7. Government must provide high speed internet facilities and infrastructure facilities in the Colleges of Education.

8. Prospective teachers must be trained well enough to utilize the technology for new pedagogical purpose.

9. All schools are adopt interactive whiteboard. So the prospective teachers should aware of digital literacy and using interactive white board in class room.

10. More research and development should be conducted in the digital literacy and using interactive white board in class room.

11. Sufficient training should be provided to the teacher educator in handling ICT classes.

12. The interactive whiteboard classroom technical device can be modified and prepared for physically challenged children.

13. An innovative assessment methodology can be installed in smart class room for continuous and comprehensive evaluation.

14. The government should provide training programs of student teachers to handle smart class room devices and prepare modules.

15. The interactive whiteboard technology can be used in higher education and distance education.

16. Integration of smart class with other kind of learning.

17. The laptop provided by Tamil Nadu government can be installed with text authoring tools and students can be equipped with a hand held remote answering device for instant and innovative assessment.

18. An in service programmes for teacher may be conducted by the NCERT to prepare instructional modules for various subjects at various levels like national, state, district, block and school cluster level.

19. Interactive white board should be equipped flexibly depending on the type of the training to be given in the field of education.

20. Interactive whiteboard class room environment should be integrated with appropriate teaching design models and goals of education.

21. Smart class room should show parallelism with artificial intelligence application.

22. Other teaching strategies should be used effectively with the equipment used in the smart class room.

23. In order to increasing the effectiveness in learning, interactive whiteboard classroom environment should be used flexibly.

All schools could be launch digital literacy in the classroom. This will create interest among students and it develops technical and network skills among them.

SUGGESTIONS FOR FURTHER RESEARCH

Based on the findings of the present investigation, the investigator suggests the following areas for further research.

1. The present study was conducted only on prospective teachers. It can be conducted on pupils at different age levels and academic levels.

2. Study may be conduct under the topic Digital literacy and attitude towards interactive white board among school students, prospective teachers, teachers and teacher educators, arts and science college lectures etc.

3. Study can be conduct under the area Impact of digital literacy on attitude towards interactive white board using class room for learning among higher secondary students, college students, and prospective teachers.

4. Digital literacy and usage of ICT for class room transaction can be conduct for college level students, prospective teachers, teachers and teacher educators.

5. Research needed to understand the interactive whiteboard technology and pedagogy.

6.   The present study has done only in Kanniyakumari district of Tamil Nadu. A similar study can be extended to other districts in Tamil Nadu.

7.   The present study can be repeated for a large sample representing the whole state.

8.   Experimental studies to be conducts on the digital literacy and using interactive white board in classroom.

9.   Prospective teachers have to remove the bias that they have in their mind about digital literacy and using interactive white board in class room.

10.   An investigation may be undertaken to find out all the factors that influence the attitude towards using interactive whiteboard of prospective teachers.

1. Mangal, S. K. (2002). *Educational technology.* Ludiana: Tandon Publications.

2. Sharma, R. A. (2006). *Fundamentals of educational Technology,* Meerut: Surya Publication,

3. Sharma, Indrajit and Koli, Shiv kumar. (2014). *Educational Technology for Teachers.* New Delhi: Arpan publications.

4. Neogi, U.K. (2011). *Research Methodology Tools and Techniques.* Delhi: Variety books publishers.

5. Sagar, Krishna. (2006). *Digital Technology in Education.* New Delhi: Authors press publication.

6. Beulah M.S. Evangelin (2015). Digital literacy among prospective teachers of kanniyakumari district. Unpublished M.Ed. Thesis, Tamil Nadu Teacher Education University, Chennai.

7. Vishnuja, M (2017). Digital literacy and attitude towards m-learning among prospective teachers in kanniyakumari district. Unpublished M.Ed. Thesis, Tamil Nadu Teacher Education University, Chennai.

8. Amutha, S &Kumaravel, Karpaga. (2008). An investigation into the ICT knowledge among the prospective teacher educators. *Research and Reflections on Education,* 6(4), 13-16.

9. Asadullah, B. (2014). Digital information literacy a survey among research scholars of vellore district". *An International Peer Reviewed Bilingual E-Journal of Library and information Science,* 1(1), 21-29.

10. Shanmugam, Lakshmi. (2013). A study of digital smart classroom teaching experience of high   school teachers in Madurai district. *Shanlax International Journal of Education,* 1(2), 31- 36.

11. Nath, K., &Sarabi, M.K. (2013). Computer literacy among M.Ed. students of Calicut university. An exploration. *Journal of Educational Research and Extension,* 50(3), 4-9.

12. Nachimuthu. K(2015), Attitude on Digital Literacy through Gyanpedia for student teachers. *.An International Journal of Education and Humanities.*Vol.4(1), No.1, 63-67.

13. Dhanalekshmi K.(2016), *A study on the awareness of smart class room among B.Ed students:* Encyclopedia of ICT in Education. V1, 245-253.

14. Shanmugam, Lakshmi, P.N(2014). A study of Digital smart classroom teach ing experiences of high school teachers in Madurai District. *Journal of Educational Research and Extension, 51(1), 27-30*

15. Dr. Ibrahim Mohamed Al-Faki, AbdelmoneimHassa, & AdamKhamis(2014). *Difficulties Facing Teachers in Using Interactive Whiteboards in Their Classes*. .*American International Journal of Social Science V3 (2)*

16. Türel, Y. K., & Johnson, T. E. (2012). *Teachers' Belief and Use of Interactive Whiteboards for Teaching and Learning.* Educational Technology & Society, 15 (1), 381–394.

17. Smith, F., Hardman, F., and Higgins, S. (2006). The impact of interactive whiteboards on teacher-pupil interaction in the National Literacy and Numeracy Strategies ,*British Educational Research Journal, 32*(3), 443-457.

18. Dhindsa, H. S., and Emran, S. H. (2006). Use of the interactive whiteboard in constructivist teaching for higher student achievement. *Proceedings of the Second Annual Conference for the Middle East Teachers of Science, Mathematics, and Computing,* (p. 175-188).

19. Kennewell, S., & Morgan, A. (2003). *Student teachers' experiences and attitudes towards using interactive whiteboards in the teaching and learning of young children* cited in J. Wright, A. McDougall, J. Murnane, & J. Lowe (Eds.), <u>Young children and learning technologies.</u> Sydney: Australian Computer Society.

20. ShabanaTabusum. S.Z(2014). *Digital Literacy Awareness among Arts and Science College Students in Tiruvallur District*. International Journal of Managerial Studies and Research (IJMSR) Volume 2, Issue 4, April 2014, PP 61-67 ISSN 2349-0330 (Print)& ISSN 2349-0349 (Online) www.arcjournals.org ©ARC Page.

21. Tabusum, Shabana S N. (2014). Digital *Awareness among arts and science college students in Thiruvallur district:* A study. *International Journal of Managerial Studies and Research,* 2(4).

22. Miller,D.,Glover,D.,& Averis, D. (2003, March). *Exposure–The introduction of interactive whiteboard technology to secondary school mathematics teachers in training*. Paper presented at CERME3: Third Conference of the European Society for Research in Mathematics Education, Bellaria, Italy.

23. Miller, D., Glover, D., & Averis, D. (2005). *Presentation and pedagogy: The effective use of interactive whiteboards in mathematics lessons* In D. Hewitt & A.

Noyes (Eds.). *Proceedings of the Sixth British Congress of Mathematics Education* (105-112). University of Warwick.

24. Bansal, Neera (2015). *Digital literacy among student community in hisar district*: A study, *Journal of Information Management 2(2)* 11-19. Issn: 2348-1773. Retrieved from http://splpjim.org/wp-content/uploads/2016/04/Journal-2.pdf

25. Digital Literacy Characteristics. Retrieved from

    https://literacyandschoollibraries.wikispaces.com

26. Digital Literacy. Retrieved from https://Digital Literacy _ SpeedMatters.htm

27. Gillen, J & Barton, David. (2010). *Digital literacies*. Retrieved from:

    http://eprints.lancs.ac.uk/33471/1/DigitalLiteracies.pdf

28. Types of Digital Literacy. Retrieved from https://prezi.com/ta5epp1pfewk/types-of-digital-literacy /on 4/11/.2017 22.

29. Good, C. V. (1959). *Good's dictionary of education.* New York: Mc Graw Hill Book Co. Goodwill, seattle. (2014). *Digital literacy theortical framework.* Retrieved from:

    http://www.seattlegoodwill.org/system/assets/general/JTE/DigitalLiteracy/DLThe oreticalFramework-1014.pdf

30. Kazu, Y., & Erten, P. (2013). A study on prospective teacher's perception levels of their digital literacy. *International Journal of Multidisciplinary Thought,* 3(1), 51-68. Retrieved from http://www.researchgate.net/publication/311861579.

31. Maharana, Bulu.,& Mishra, Champeswar. (2007). *A Survey of Digital Information Literacy of Faculty at Sambalpur University*. Retrieved from http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1145&context=libphilprac.

32. Need of digital-age literacy in teacher education. Retrieved from http://files.eric.ed.gov/fulltext/EJ1102767.pdf.

33. Sinha, Atanu Kumar (2016),"Digital *information literacy of past graduate students of visva-   bharati: a survey. Inflibnet 10th convention planner*-2016 145-153 retrieved from http://ir.inflibnet.ac.in/bitstream/1944/2022/1/18.pdf.

34. Tabusum, Shabana S N. (2014). *Digital Awareness among arts and science college students in   Tiruvallur district*: A study. *International Journal of Managerial Studies and Research,*   2(4), 61-67. Issn: 2349-0349. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc

35. The Definition of Digital Literacy**. Retrieved from http://www.teachthought.com/pedagogy/literacy/the-definition-of-digital-literacy/

36. Tyger, Rona Lynette. (2011). Teacher Candidates' Digital Literacy and Their Technology Integration Efficacy. Retrieved from http://digitalcommons.georgiasouthern.edu/cgi/viewcontent.cgi

37. Multiple Intelligence and Digital Learning Awareness of Prospective B.Ed Teachers, retrieved from
    https://eric.ed.gov/?q=digital+literacy+in+b.Ed+students&id=EJ983644   on 5/12/2016

38. *Characteristics of digital literacy* retrieved from
    http://wiki.ubc.ca/Course:ETEC540/2012WT1/Orality_and_Literacy/Characteristics_of_Digital_Literacy on 4/11/2017.

39. Cihak, David F.; Wright, Rachel; Smith, Cate C.; mcmahon, Don; Kraiss, Kelly,(2015),"*Incorporating Functional Digital Literacy Skills as Part of the Curriculum for High School Students with Intellectual Disability* REF: **Incorporating Functional Digital Literacy Skills as Part of the Curriculum for High School Students with Intellectual Disability,** Retrieved from
    https://eric.ed.gov/?q=digital+literacy+in+b.Ed+students&pg=5&id=EJ1060661 on 5/12/2016

40. Beeland, W. D. (2002). *Student engagement, visual learning, and technology: Can   interactive Whiteboards help?.* Retrieved from
    http://chiron.valdosta.edu/are/Artmanscrpt/vol1no1/beeland_am.pdfon October 8, 2007.

41. Ozdamar-Keskin, Nilgun; Ozata, FatmaZeynep; Banar, Kerim; Royle, Karl,(2015),"*Examining Digital Literacy Competences and Learning Habits of Open and Distance Learners***,** Retrieved December5, 2016 from
    https://eric.ed.gov/?q=digital+literacy+in+b.Ed+students&pg=8&id=EJ1105611

42. Hatlevik, OveEdvard; Guomundsdottir, GretaBjork; Loi, Massimo(2015), *Examining Factors Predicting Students' Digital Competence r*etrieved from
    https://eric.ed.gov/?q=digital+literacy+in+b.Ed+students&pg=11&id=EJ1060150 on 7/12/2016

43. Nowell, Shanedra D. (2014), *Using Disruptive Technologies to Make Digital Connections: Stories of Media Use and Digital Literacy in Secondary Classrooms.* Retrieved from
https://eric.ed.gov/?q=digital+literacy+in+b.Ed+students&pg=10&id=EJ1032446
on 7/12/2016

44. Balta, Nuri; Duran, Muharrem (2015). *Attitudes of Students and Teachers towards the Use of Interactive Whiteboards in Elementary and Secondary School Classrooms.* retrieved from
https://eric.ed.gov/?q=attitude+towards+interactive+white+board+of+prospective+teachers&id=EJ1057345 on 7/12/2016

45. Isman, Aytekin,;Abanmy, FahadAbdulAziz,; Hussein, HishamBarakat,; Al Saadany, Mohammed Abdelrahman(2012). *Saudi Secondary School Teachers Attitudes' towards Using Interactive Whiteboard in Classrooms*, retrieved from
https://eric.ed.gov/?q=attitude+towards+interactive+white+board+of+prospective+teachers&id=EJ989220on 7/12/2016.

46. Yapici, I. &Umit; Karakoyun, Ferit(2016). *High School Students' Attitudes towards Smart Board Use in Biology Classes* retrieved from
https://eric.ed.gov/?q=attitude+towards+interactive+white+board+of+prospective+teachers&pg=2&id=EJ1099956on 7/12/2016

47. Muhanna, Wafa; Nejem, Khamis Mousa(2013). *Attitudes of Mathematics Teachers toward Using Smart Board in Teaching Mathematics.* retrieved from
https://eric.ed.gov/?q=attitude+towards+interactive+white+board+of+prospective+teachers&pg=2&id=EJ1073218on 7/12/2016

48. Lopez, Omar; Krockover, Cheri(2014). *Contextual Factors Relevant to Elementary Teachers Using Interactive Whiteboards in Mathematics Classroom Discourse.* Retrieved from

https://eric.ed.gov/?q=attititude+towards+interactive+whiteboard+using+classroom+in+B.ed+students&pg=4&id=EJ1040442 on 9/12/2016

49. Mathews-Aydinli, Julie; Elaziz, Fatih(2010). *Turkish Students' and Teachers' Attitudes toward the Use of Interactive Whiteboards in EFL Classrooms* retrieved from
https://eric.ed.gov/?q=attititude+towards+interactive+whiteboard+using+classroom+in+B.ed+students&pg=7&id=EJ886086on 9/12/2016

50. Wong, Kung-Teck; Russo, Sharon; McDowall, Janet (2013) "*Understanding Early Childhood Student Teachers' Acceptance and Use of Interactive Whiteboard*", retrieved from
https://eric.ed.gov/?q=attititude+towards+interactive+whiteboard+using+classroom+in+B.ed+students&pg=12&id=EJ1004417 on 9/12/2016.

51. *Campus-Wide Information Systems*, v30 n1 p4-16 2013Muhanna, Wafa; Nejem, KhamisMousa(2013). *Attitudes of Mathematics Teachers toward Using Smart Board in Teaching Mathematics* retrieved from https://eric.ed.gov/?q=attitude+of+prospective+teachers+towards+using+interactive+whiteboard&pg=15&id=EJ1073218 on 10/12/2016

52. Jay R. Wilson(2015), Rural High School Students' Digital Literacy retrieved from
http://www.literacyandtechnology.org/uploads/1/3/6/8/136889/jlt_v16_2_wilson_nahacewsky_briere.pdf on 23/12/2016

53. Hakan SARAÇ & Murat OZARSLAN (2016). *The Investigation of Relation Between The Attitude of Students Towards Interactive Board in Education Process and Technological, Pedagogical and Content Knowledge of Teachers* retrieved from file:///C:/Users/Welcome/Downloads/5000209764-5000439386-1-SM.pdf on 26/12/2016

54. Nasrin Shams, Iran SaeedKetabi(2015).conducted a study on " *Iranian Teachers' Attitudes towards the Use of Interactive Whiteboards in English Language Teaching Classrooms"* retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.848.5447&rep=rep1&type=pdf on 26/12/2016

55. Stonier, Francis W.(2015) conducted a study on *The Impact of an Intensive Experience on Prospective Teachers' Perception of the Uses of Digital, Interactive Text among K-12 Students* retrieved from https://eric.ed.gov/?q=awareness+and+attitude+towards+digital+literacy+in+B.Ed+students&id=ED549230 on 25/12/2016

56. Gila Kurtz1,2, Etty Kochavi3 , Keren David3 ,(2014) conducted a study on *Teachers' Perceptions of the Use of the Interactive Whiteboard and Its Impact on Their Self-Perceptions as ICT Literate*, Retrieved from http://www.academicstar.us/UploadFile/Picture/2014-3/2014319215749325.pdf on 26/12/2016

57. Gilu G. Ettaniyil* R. Raman Nai (2016). *INFORMATION LITERACY SKILLS OF SECONDARY LEVEL TEACHER TRAINEES,* retrieved from http://eprints.rclis.org/28795/1/2016%20Gilu-1.pdfon 26/12/2016

REFERENCES

APPENDICES

N.V.K.S.D COLLEGE OF EDUCATION, ATTOOR
2017
PERSONAL DATA SHEET

Instructions:

For my M.Phil. dissertation titled "Digital Literacy and attitude of prospective teachers towards using Interactive Whiteboard in classroom" particulars regarding you

are required. The information given by you will be kept confidential and will be used for research purpose only

Thanking you,

Yours faithfully

N.Lathasaraswathy

M.Phil. Shcolar

Name of the Prospective Teacher	:	
2. Name of the Institution	:	
3. Gender	:	M/F
4. Locale	:	Rural/Urban
5. Community	:	OC/BC/MBC/SC/ST
6. Religion	:	Hindu/Christian/Muslim
7. Optional subject	:	a) Humanities
		b) Science
8. Frequency of computer use	:	
Daily/Weekly/Monthly/Never		
9. Purpose of using computer	:	Studies / Personal use / both
10. Computer knowledge level	:	Basic/Average/Good/Expert
11. Do u own a Smartphone?	:	Yes/No
12. Do you own a laptop/personal computer?	:	Yes/No
13. Internet browsing habit	:	Never/Rarely/Frequently

APPENDIX – B

N.V.K.S.D COLLEGE OF EDUCATION, ATTOOR
DIGITAL LITERACY TEST (2015)

(Prepared by Evangelin M.S. Beulah & Prasad. P.S)

SL.NO.	STATEMENTS	YES	NO
1	I know about Smart phones and I can operate it easily.		
2	I know how to collect relevant information from the internet.		
3	I know about virus and its effects on computer.		
4	I know to send e-mail.		
5	I get more confidence while using new technology.		
6	I know that computer is necessary for both education and in work settings.		
7	I know what happens when I share my personal information in online.		
8	I know Google, Yahoo are the world's most popular search engine.		
9	I know that new technologies are essential for teaching.		
10	I know to send image or videos through Bluetooth.		
11	I know that online banking is necessary in this busy world.		
12	I know how to create secure passwords for all my accounts.		
13	I know how to download files, music from internet.		
14	I know that through smart board technology the children can be more attentive in class.		
15	I am confident that I can keep up with the advancement in the computer field.		
16	I don't misuse the photo's that are posted in social media.		
17	I am uncomfortable to use the computer if it is not installed with anti-virus software.		

SL.NO.	STATEMENTS	YES	NO
18	I know that I can get more data that is useful for my career through internet.		
19	I know about PEN DRIVE, CD-ROM which is used to store information.		
20	I know to create e-mail ID.		
21	I feel enthusiastic while using new technology.		
22	I keep a back up for all my important files.		
23	I know to add or remove profile picture from the social media.		
24	I know to lock computer screen.		
25	I know that the first part of the e-mail address contains user's account name.		
26	I know that digital library would be useful for my studies.		
27	I know that windows XP, windows 7, windows 8 are operating system.		
28	Before creating my account in various sites I read the agreement completely.		
29	I know that I can get more information through internet than books.		
30	I can use a technology more appropriately to communicate a message.		
31	Whenever I use pen drive first I scan for virus.		
32	I know to use a computer for general study, without accessing a web.		
33	I know websites through which I can read the latest news or old news.		
34	I know to keep my important files safely.		
35	I know that digital technology can change our life style.		
36	I know to block a message if I get from an unknown person.		
37	I know to create documents in Ms-World.		
38	I know to work effectively and safely in online		

RESPONSE SHEET

SL.NO	YES	NO
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		

APPENDIX – C

N.V.K.S.D COLLEGE OF EDUCATION, ATTOOR

ATTITUDE SCALE ON INTERACTIVE WHITE BOARD (2017)

Prepared by

MRS. LATHA SARASWATHY. N & PRASAD. P.S
(DRAFT)

Certain statements related to your E-Learning are given below: Each statement has five choices viz. Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree. Read the following statements and provide the required information. Please indicate your answer to each statement by keeping a tick mark (√) in the appropriate column. All information given by you will be kept confidential.

SA-Strongly Agree; A-Agree; U-Undecided; D-Disagree, SD-Strongly Disagree

Name of the Student Teacher :

Name of the Institution :

SL. NO.	STATEMENTS	SA	A	U	D	SD
1.	Interactive Whiteboard leads to a good working environment for teachers.					
2.	Teachers do not have the knowledge of how to use the interactive whiteboard.					
3.	Prospective teachers lack practical knowledge for using interactive whiteboard.					
4.	Interactive white board allows sharing learning resources with other teachers.					
5.	Interactive white board reduces the mental efforts taken by the teachers					

SL. NO.	STATEMENTS	SA	A	U	D	SD
6.	Teachers can utilize many multimedia resources available in interactive white board.					
7.	While using interactive white board teachers cannot make eye contact with the students.					
8.	Interactive whiteboard considerably reduce the workload of teachers.					
9.	Teachers enjoy using interactive whiteboard.					
10.	Teaching efficiency may decline due to the interactive white board usage.					
11.	Interactive white board is difficult to handle.					
12.	Interactive white board enable for a teacher to review, re-plan and summarize the subject.					
13.	Frequent training is required for the teacher to use interactive whiteboard.					
14.	Interactive Whiteboard makes the teacher's drawings and diagrams moreclearly.					
15.	Teachers face difficulties while using the interactive white boards.					
16.	Teachers can use interactive whiteboard to design new lessons.					
17.	Teachers need continual pedagogical support and technical support.					
18.	Interactive white board captures learner's attention.					
19.	Interactive white board encourages the involvement of learners in the subject.					
20.	Interactive whiteboard motivates student' learning.					
21.	Interactive whiteboard allows learners to accommodate different learning styles.					

SL. NO.	STATEMENTS	SA	A	U	D	SD
22.	Interactive whiteboard promotes discussion among students and improve their participation.					
23.	Interactive whiteboard class rooms are only good for urban students.					
24.	Interactive whiteboard gives opportunities to teach new things to the students.					
25.	Memory retentions of student's can be increased with the use of interactive white board.					
26.	Students prefer interactive whiteboard classroom than traditional classroom.					
27.	Using interactive white board helps students to learn concept easily.					
28.	Vision problems may results due to the continuous use of interactive white board for teachers as well as students.					
29.	Interactive white board increases the feasibility of learning.					
30.	Students feel more comfortable while teachers use the interactive white board.					
31.	Interactive white board helps to develop a creative thinking among students.					
32.	Interactive white board gives students the opportunity to observe information in multiple format.					
33.	Interactive white board is more cost effective than providing laptop to every student in the classroom.					
34.	Interactive white board replace dusty chalkboard.					
35.	Interactive white board provides possibilities to make course content more visual.					
36.	Interactive white board provides more opportunities for interaction in the class room.					

SL. NO.	STATEMENTS	SA	A	U	D	SD
37.	Class room discipline may be affected due to the use of interactive white board.					
38.	Interactive white board facilitates discussion in the class room.					
39.	Interactive white board provides a co-operative learning environment in the class room.					
40.	Schools are not technologically updated to use interactive white board.					
41.	Technical and software problem may leads to data loss.					
42.	The technicians will not be always available whenever the problems occur on the interactive white board.					
43.	While using interactive white board teachers may face technical problems.					
44.	Due to the non-availability of electronic pen technical difficulties arise inside the class room.					
45.	There will be practical difficulty when there is no power.					
46.	Interactive white boards will replace traditional chalk board and white board.					
47.	Interactive white board makes teaching easy.					
48.	Interactive white board creates interest to learning process.					
49.	Using interactive white board saves time.					
50.	Interactive white board is very expensive.					
51.	Interactive white board helps to access online content.					
52.	Interactive white board software can convert hand written text into computer edible text.					
53.	Interactive white board helps to projection of computer images on a larger screen for audience viewing.					
54.	Interactive white board is not a user friendly device.					
55.	Interactive white board images can be saved and printed.					

APENDIX-D

ATTITUDE SCALE ON INTERACTIVE WHITE BOARD (2017)
Prepared by
MRS. LATHA SARASWATHY. N & PRASAD. P.S (FINAL)

Certain statements related to your E-Learning are given below: Each statement has five choices viz. Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree. Read the following statements and provide the required information. Please indicate your answer to each statement by keeping a tick mark (√) in the appropriate column. All information given by you will be kept confidential.

SA-Strongly Agree; A-Agree; U-Undecided; D-Disagree, SD-Strongly Disagree

Name of the Prospective Teacher   :

Name of the Institution   :

SL.NO.	STATEMENTS	SA	A	U	D	SD
1.	Teachers do not have the knowledge of how to use the interactive whiteboard.					
2.	Interactive white board allows sharing learning resources with other teachers.					
3.	Teachers can utilize many multimedia resources available in interactive white board.					
4.	While using interactive white board teachers cannot make eye contact with the students.					
5.	Teaching efficiency may decline due to the interactive white board usage.					
6.	Interactive whiteboard class rooms are only good for urban students.					
7.	Teachers can use interactive whiteboard to design new lessons .					

SL.NO.	STATEMENTS	SA	A	U	D	SD
8.	Vision problems may result due to the continuous use of interactive white board for teachers as well as students.					
9.	Interactive white board helps to develop a creative thinking among students.					
10.	Class room discipline may be affected due to the use of interactive white board.					
11.	Interactive white board facilitates discussion in the class room.					
12.	Interactive white board provides a co-operative learning environment in the class room.					
13.	Schools are not technologically updated to use interactive white board.					
14.	Technical and software problem may leads to data loss.					
15.	The technicians will not be always available whenever the problem occurs on the interactive white board.					
16.	While using interactive white board teachers may face technical problems.					
17.	Due to the non-availability of electronic pen technical difficulties arise inside the class room.					
18.	There will be practical difficulty when there is no power.					
19.	Interactive white boards will replace traditional chalk board and white board.					
20.	Interactive white board creates interest to learning process.					
21.	Using interactive white board saves time.					
22.	Interactive white board is very expensive.					
23.	Interactive white board software can convert hand written text into computer edible text.					
24.	Interactive white board helps to projection of computer images on a larger screen for audience viewing.					

APENDIX-E

ATTITUDE SCALE ON INTERACTIVE WHITE BOARD (2017)

Prepared by

LATHA SARASWATHY. N & PRASAD. P.S

TEST – RETEST FOR 74 PROSPECTIVE TEACHERS

SL.NO	TEST SCORE	RETEST SCORE
1	80	93
2	88	80
3	97	93
4	92	87
5	91	84
6	85	91
7	86	80
8	73	78
9	68	85
10	99	94
11	99	105
12	97	80
13	97	103
14	101	91
15	85	85
16	91	78
17	99	104
18	99	105
19	99	101
20	97	98
21	94	100
22	102	105
23	92	98
24	96	99
25	82	94
26	93	98
27	112	98
28	84	79
29	92	101
30	101	105
31	83	85
32	92	93
33	109	100
34	93	98

SL.NO	TEST SCORE	RETEST SCORE
36	90	88
37	85	82
38	90	85
39	96	100
40	91	92
41	92	85
42	93	98
43	95	88
44	93	81
45	97	94
46	89	90
47	101	87
48	96	103
49	95	107
50	68	84
51	101	99
52	68	82
53	68	102
54	89	101
55	78	92
56	92	93
57	101	91
58	90	91
59	88	84
60	77	86
61	102	105
62	99	100
63	101	100
64	104	93
65	100	104
66	90	90
67	95	102
68	91	85
69	107	103
70	85	88
71	89	109
72	100	82
73	84	86
74	89	105