USE OF ICT IN MATHEMATICS AT SECONDARY SCHOOL OF KATHMANDU DISTRICT

A

THESIS

BY

MOHAN RAWAL

FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION

SUBMITTED

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2019

USE OF ICT IN MATHEMATICS AT SECONDARY SCHOOL OF KATHMANDU DISTRICT

MOHAN RAWAL 2019

त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय संकाय
गणित शिक्षा विभाग
TRIBHUVAN UNIVERSITY
CENTRAL DEPT. OF EDUCATION
DEPARTMENT OF MATHEMATICS EDUCATION

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौँ, नेपाल
फोन नं.: ४३३१३३७
UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal
Tel. No.: 4331337

पत्र संख्या:-
Ref.

मिति:.....
Date:

Recommendation for Acceptance

This is to certify that **Mr. Mohan Rawal** has completed his thesis entitled **"Use of ICT in Mathematics at Secondary School of Kathmandu District"** under my supervision during the period prescribed by the rules and regulation of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I Recommend and forward his thesis to the Department of Mathematics Education to organize final viva- voce.

.....

Dr. Dirgha Raj Joshi

(Supervisor)

Date: August, 2019

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UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal
Tel. No.: 4331337

पत्र संख्याः-
Ref.

मितिः.....
Date:

Letter of Certificate

This is to certify that **Mr. Mohan Rawal,** a student of academic year 2072/2073 with Exam Roll No 7228332, T.U. Regd. No. 9-2-29-648-2012 and Thesis No. 1502 has been completed his under my supervision during the period prescribed by the rules regulation of Tribhuvan University, Nepal. The thesis entitled **"Use of ICT in Mathematics at Secondary School of Kathmandu District"** embodied the result of his investigation conducting the period 2019 at the Department of Mathematics Education, Central Department of Education, University Campus, Kirtipur Kathmandu. I hereby, recommended and forward that his thesis be submitted for the evaluation as the partial requirement to as ward the Degree of Masters of Education.

Date: August, 2019 ……..……

Assoc. Prof. Laxmi Narayan Yadav

Head of Department of Mathematics Education

त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय संकाय
गणित शिक्षा विभाग
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UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal
Tel. No.: 4331337

पत्र संख्याः-
Ref.

मितिः.....
Date:

Letter of Approval

This thesis submitted by **Mr. Mohan Rawal** entitled on "**Use of ICT in Mathematics at Secondary School of Kathmandu District"** has been approved as for the partial fulfillment for the requirement of Master Degree in Mathematics education.

Viva Voce Committee	**Signature**
1. Assoc. Prof. Laxmi Narayan Yadav (Chairman)	……..
2. Professor. Uma Nath Pandey (External)	……..
3. Dr. Dirgha Raj Joshi (Supervisor)	……..

Date: August, 2019

Defense Date ……

Declaration

This thesis contains no material which has accepted for the award of other degree in any institutions. To the best of knowledge and belief this thesis contains no material previously published by any other except due acknowledgement has been made.

…….

Mohan Rawal

Date: August, 2019

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…….

Date: August, 2019 Mohan Rawal

Abstract

This study focused on the use of ICT in teaching mathematics at secondary school of Kathmandu district. The objectives of this study were to measure the status of using ICT tools in teaching mathematics and to explore the confident level of mathematics teachers in using ICT while teaching mathematics. This study adopted the survey design using the instruments like questionnaire, u-test and t-test was applied to analyze the data. 50 secondary schools and 149 mathematics teachers of Kathmandu district were the sample of the study which were selected using the purposive sampling technique.

The finding of the study shows that online resources, mathematical software, mobile apps are used less whereas the tools of ICT are frequently used while teaching mathematics at secondary school of Kathmandu district. The use of online resources, mathematical software and mobile apps is poor results. The null hypothesis is accepted through the u-test and t-test and compared with tabulated value therefore there was no significant difference in school type, age, gender, teaching experiences, appointment type and ICT training on teaching mathematics. This study has made recommendation, that the use of ICT in teaching mathematics should be used as an important ICT in mathematics.

Table of Contents

List of Tables

ACRONYMS

APA= American Psychological Association

ICT= Information Commutation and Technology

M. Ed= Master of Education

NCTM= National Council of Teachers of Mathematics

TU= Tribhuvan University

UNESCO= United Nation Educational, Science and Cultural Organization

Chapter I

INTRODUCTION

Background of the Study

Information and Communication Technology (ICT) has changed our daily activities in many ways which include radio and television as well as newer digital technologies such as computers and the internet have been touted as potentially powerful enabling tools for educational change and reform. Since these changes are evident amongst younger members of our society, they are evident in primary and secondary school students. Considering that ICT plays an increasingly important role in society, especially if we take into account social, economic and cultural role of computers and the Internet, it is clear that the time has come for the actual entry of ICT in the field of education. The combination of ICT and the Internet certainly opens many opportunities for creativity and innovation, but also for the current generation of students to make an approach for availing required teaching materials. The end of the 20^{th} century witnessed very exciting changes one of them being in the field of information and communication technology. All concerned with education must realize that in the fast changing world today. (Vandana Mehra &Dilli Raj Newa, 2009).

Amarasinghe and Lambdin (2000) described three different varieties of technology usage as using technology as a data analysis tool, using technology as a problem-solving/ mathematical modeling tool, and using technology to integrate mathematics with a context. Meanwhile researchers (Balacheff & Kaput, 1996; Kilpatrick & Davis, 1993) have discussed the impact of technological forces on learning and teaching mathematics.

Researchers argued that with the introduction of technology, it is possible to de-emphasize algorithmic skills; the resulting void may be filled by an increased emphasis on the development of mathematical concepts. Technology saves time and gives students access to powerful new ways to explore concepts at a depth that has not been possible in the past. The power of computers leads to fundamental changes in mathematics instruction. For example, the ability to build and run complex mathematical models, and easy exploration of what if questions through parametric variation has opened up new avenues for mathematics (Dreyfus, 1991). Furthermore, as Munirah (1996) observes, the teaching of calculus has seen a dramatic change now that activities such as exploring data or graphical data analysis have been revolutionized by computer technology. The new role of computers is clearly expressed by Peters, Briscoe & Korth (1995).

There by ICT can ensure the acquisition of key concepts in mathematics among students in secondary schools and improve their learning motivation and of course contribute to the success of students deciding their future with total certainty to scientific expertise, the use of multimedia offers teachers the possibility of dynamic images played by the simulation of theoretical concepts difficult to grasp otherwise (Perreault, 2000) using dynamic geometry software.

For over two decades many stakeholders have highlighted the potential of digital technologies for mathematics education. The U.S. National Council of Teachers of Mathematics, for example, in its position statement claims that “Technology is an essential tool for learning mathematics in the 21 century and all schools must ensure that all their students have access to technology” (NCTM, 2008). ICMI devoted two studies to the integration of ICT in mathematics education, the second one expressing that "digital technologies were becoming ever more ubiquitous

and their influence touching most, if not all, education systems" (Hoyles & Lagrange, 2010).

Despite the mandate that accompanies this policy document that computer technology be integrated in the range of courses in the secondary mathematics key learning areas, there is evidence to suggest that computers are not widely integrated into Australian secondary mathematics classrooms (D'Souza, Sabita & Wood, 2003). Similarly, for teachers in the USA, where despite teachers' increasing knowledge of and familiarity with technology and there being infrastructure to support it, many mathematics teachers are still not effectively integrating technology into their teaching (Foley & Ojeda, 2007). The international evidence suggests that one reason for the teachers not embracing technology is the fear that it might replace teachers in the school system (Li, 2007). Others attribute the ineffective integration of technology to the lack of adequate knowledge about when and how computers could be used in mathematics instruction and lack of sufficient training (Jamieson-Proctor & Finger, 2008).

Policy and Practice Use of ICT in School Education in Nepal

National IT policy 2010 (revised version of IT policy, 2000) put greater emphasis on IT in school education with policy provision of: expansion of access of the internet to all schools, co-ordination and collaboration with national and international institutions to develop skilled human resources for continuous, relevant and quality education, promotion of Industry-Academia Collaboration(IAC), and formulation and implementation of special ICT programs focusing students, teachers and schools to develop competent human resources. More importantly, government's development plans like Poverty Reduction Strategy Paper (PRSP 2002) and Three years Interim Plan (TYIP 2007) had significantly enriched ICT policy, 2010 through

inclusion of ICT on educational programs in terms of ICT skilled human resource development management, increasing access to education narrowing down the digital divide, integration of ICT in all aspects of education, and infrastructure development.

Following National IT policy 2000, there were numbers of initiatives taken by MOE in ICT in school education before revision of national IT policy 2000 in 2010. For example, under the Formative Research Project within Education for All (EFA, 2004-2009) Programs, 62 schools were supported with one computer and one printer (ICT MP, MOE 2013). Similarly, under the matching grant schemes (2007-2010), Department of Education (DOE)provided 2 computer and one printer to 3038 schools, and internet connectivity to 85 secondary schools conducting distance education programs(ICTMP, MOE 2013). Further, others programs related to ICT related as noteworthy in EFA period could be considered: like OLPC piloting programs in selected 26 schools of six districts, lab model(computer sharing mechanism)project, computer lab with internet connection from local IPSs, and internet connectivity to all central level departments, regional and district offices under MOE with their own websites in place.

School sector Reform Program (SSRP, 2000-2014) is another reform initiative of MOE, which made policy and programs provisions of ICT on school education with emphasis on IT teaching learning in all schools, development of ICT infrastructure, alternative mode of schooling through IT, and professional development of teachers and personnel (distance and on line mode) course for professional development. Meantime, recognizing the importance of IT on education, MOE developed stand-alone ICT in education Master Plan (2013-2017) on education focusing in four components: Development of ICT infrastructure, Development of human resources, Development of digital learning materials, and Enhancement of

education system. The plan also provisioned Steering committee at policy level and Co-ordination committee at implementation level, chaired by member (education) of planning commission and education secretary respectively to have better institutional arrangement, which are now in operation. Based on these policy guide lines, DOE is implementing ICT on school education program that supports schools with a fund of NRS. 200,000 for four computers and one printer where school contribution to this fund has to be 40,000.Besides these; there were also some initiations with regard to digitalizing learning materials of grade 2-8 (Nepali, Mathematics, English and science) in collaboration of partnership with Open Learning Education (OLE). Curriculum Development Center has posted these materials in its web-site but lagging behind in reaching need school, teachers and students. Similarly, NCED has initiated ICT teacher training through Teacher Professional Development(TPD) Programs as an ample effort at resource center level but it lacks in teacher preparation programs, where majority of teachers are prepared, organized by Higher Secondary Board(HSEB) and Universities, specifically faculty of education, Tribhuwan University(TU).

Statement of the Problem

Knowledge is expanding day by day. So teaching becoming one of the most challenging professions in our society. While learning mathematics, learner expect from facilitator to facilitate meaningful learning rather than just knowledge and skills. In this modern period the use of ICTs in teaching mathematics provides new possibilities in teaching profession. Different research indicates (Bansal, 2007) that ICT can change the way of teaching and it is useful in supporting more student-centered approaches to instruction and in developing the higher order skills and promoting collaborative activities. Teachers who are able to use ICT tools in the

classroom today can prepare their students who can use effectively many other tools in future. The government of Nepal emphasizes integrating technology in teaching and learning mathematics (MOE, 2072). ICT based course has been practiced in basic level to higher level of mathematics education. There is no such study carried out on use of ICT in Mathematics Education in the secondary level. So the purpose of this study is to find use of ICT in Mathematics in secondary level at Kathmandu. In this regards the study were concern with following specific research questions: Research Questions

1. What are the status of the teachers regarding teaching and learning mathematics with used ICT?
2. What are the confident level of the mathematics teacher regarding teaching and learning mathematics with used ICT?

Objectives of the study

The objectives of this study are follows**:**

- To measure the status of using ICT tools in teaching mathematics.
- To explore the confidences level of Mathematics teachers in using ICT.

Significance of the Study

The significant of the study is as follows:

- To use of ICT in mathematics teaching at secondary school.
- This research would provide suitable plans and pedagogies to bring out improvement in the existing system.

- This study would provide the important information to the instructor in using ICT in mathematics education.
- This research would be helpful for many students, teachers, educators, policy makers and so on as well as it were be very helpful for me too for my career in teaching profession.

Hypothesis of the Study

The following hypotheses are formed in null form for statistical testing at 0.05 significant level:

H01: There is no significant difference between the status of using ICTs tools in teaching Mathematics in relation to school types, gender, age, experience, appointment types and training status.

H02: There is no significant difference between the confident levels of using ICT of Mathematics teacher in relation to school types, gender, age, experience, appointment types and training status.

Delimitation of the Study

Every task or work has its own delimitation because of some issues like delimitation of area of study, its geographical location, cost, time and sampling etc. This study is related to use of ICT in Mathematics teaching process thus the following delimitations were specify:

- The study area is confined and delimited to the Kathmandu district of Nepal.
- This study is limited only on 50 secondary schools.

- This study focused only on the confidence level of mathematics teachers in using ICT.
- This study to the mathematics teachers teaching at secondary levels from class 1 to 10.

Operational Definition of the Key Terms

Information Communication Technology (ICT): Technologies and tools that people use to share, distribute and gather information, and to communicate with one another through the use of computer and interconnected computer networks.

Mathematics Teaching: The practice of mathematics teaching at secondary level based on the curriculum of government of Nepal.

Secondary school: Secondary school is a public or private school providing instruction at the level of secondary education including the classes from1to 10.

Public school: The secondary school present under the sole management of government or its agencies is called a public school.

Private school: The secondary school managed by private organization or persons, either partially or totally is considered as a private school.

Mathematics teacher: Result of the study be helpful to mathematics teacher to adopt the effectives teaching method using ICT.

Teacher ICT Skill: Working knowledge of basic hardware and software operation as well as productivity applications software, a web browser, communications software, presentation software and management application.

Chapter II

REVIEW OF RELATED LITERATURE

The literature review helps to get better understanding of the study problem in terms of trends and methods. Kumar R. says that literature review can helps in four ways; bringing clarity and focus to research problem, improve to research methodology; broaden knowledge base in research area; and contextualize findings. Therefore, it provides guidelines for selecting design, sample, tools, data collection procedure, analyzing data and making decision in order to make the research valid and reliable.

Empirical Literature

Empirical literature review contains the methodology adopted, key finding and conclusion of previous studies carried out by other researchers on similar topics. Some of the researches carried out earlier in this field are reviewed here.

Duglas (2011), studied on ICT use in the teaching of mathematics: implications for professional development of pre-service teachers in Ghana. This paper reports on a study conducted to explore the feasibility of ICT use in mathematics teaching at senior high school levels in Ghana. Interviews and survey data were used for data collection. Preliminary results showed that mathematics teachers in Ghana do not integrate ICT in their mathematics instruction. Among the major perceived barriers identified were: Lack of knowledge about ways to integrate ICT in lesson and Lack of training opportunities for ICT integration knowledge acquisition. To overcome some of these barriers, opportunities of a professional development arrangement for pre-service mathematics teacher were explored.

Finding from the study revealed specific features of a professional scenario that matters for ICT integration in mathematics teaching in the context of Ghana.

Jacob (2006), conducted a Studied on Use of ICT in Mathematics Teaching, A survey design was conducted to study the barriers preventing the integration and adoption of information and communication technology (ICT) in teaching mathematics. Six major barriers were identified: lack of time in the school schedule for projects involving ICT, insufficient teacher training opportunities for ICT projects, inadequate technical support for these projects, lack of knowledge about ways to integrate ICT to enhance the curriculum, difficulty in integrating and using different ICT tools in a single lesson and unavailability of resources at home for the students to access the necessary educational materials. To overcome some of these barriers, this paper proposes an e-portal for teaching mathematics. The e-portal consists of two modules: a resource repository and a lesson planner. The resource repository is a collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics. The lesson planner is a user friendly tool that can integrate resources from the repository for lesson planning.

Joshi (2016), conducted a studied on Status of Use of ICT by Secondary School Students of Nepal. The main objectives of the study ware to study the status of ICT instruments with secondary school students and use of ICT by secondary school students at their home and school.106 students of class 9 and 10 from Kathmandu district were purposively selected for the study and data were analyze by using percentage and Mann Whitney U test. It was found that most of the students of that level are weakly using technology and public school students were poorer in several measured items even boys and girl students were not differ in the use of ICT.

Kemal (2018), conducted a studied on Examining High School Teachers' Attitudes towards ICT Use in Education .With this regard, the objective of this study was find the use of ICT in mathematics teaching at secondary school and used survey design, He examined whether the teachers' attitude significantly differ according to their gender, age, teaching experience, ICT experience, ICT skills and ICT training. The participants consisted of 353 teachers working in different high schools in Ankara in the academic year 2016-2017. Research results illustrated that teachers have a high level of positive attitude towards ICT use in their classes, yet there is no significant difference between teachers' ICT willingness by their gender, age, teaching experience, ICT experience, ICT skills and ICT training. However, they have significantly different negative attitude (ICT anxiety) towards ICT use in education by their ICT experience, ICT skills and ICT training.

Rosnaini & Ismail (2010), conducted examined the "Impact of training and experience in using ICT on in-service teachers‟ basic ICT literacy". The study found that majority of the teachers had moderate basic ICT knowledge and skills, and perceived ICT positively. Formal ICT training and ICT experience influence the teachers‟ knowledge, skills and attitude. Therefore, teachers especially the older ones and normally with more teaching experience need to be identified, and provided with specially designed training programs, in various forms of ICT courses and workshops.

Theoretical Literature

Constructivism and Connectivism

Research and theory are interrelated and inseparable. A theory provides a conceptual framework for research in term contribute to the development of theory.

Theory plans and directs the research studies. All aspects of the research are related to constructivism theory.

The word “construct" is to build or make something. We always use this word in our daily life. In the field of education, “construct” means to develop an idea or a belief that is based on various pieces of evidence which are not always true. Many theories/approaches have been introduced in teaching learning field. The “Constructivism” has also developed as a philosophy in different discipline. It has become a strong means in teaching/learning approach. This point of view maintains 15 that people actively construct new knowledge as they interact with their environment. Constructivist theory of learning believes that the knowledge can be developed within the classroom, being participated in different activities, using different learning agents and through different meaning making processes. One of the key assumptions of constructivism is that “Knowledge is symbolically constructed by the learners who are making their own representations of action” (Gagnon et al.). The guideline principle of constructivist learning theories is the learner’s own active initiative and control in learning, and personal knowledge construction that is self-regulation of learning (Chan, 2002, p. 3).

Most of the educators utilizing a constructivist perspective may emphasize an active learning environment that may incorporate learners centered and problem-based learning in which students are actively engaged in critical thinking activities so Use of ICT in classroom is based upon the assumptions of constructivism where teachers should play role of instructor and students are actively participate in classroom. In constructivist classroom student try to find the solution of the problems by learning in a group where students are motivated to do their work themselves and find the solution and teacher work is just to facilitate the student. By using ICT in

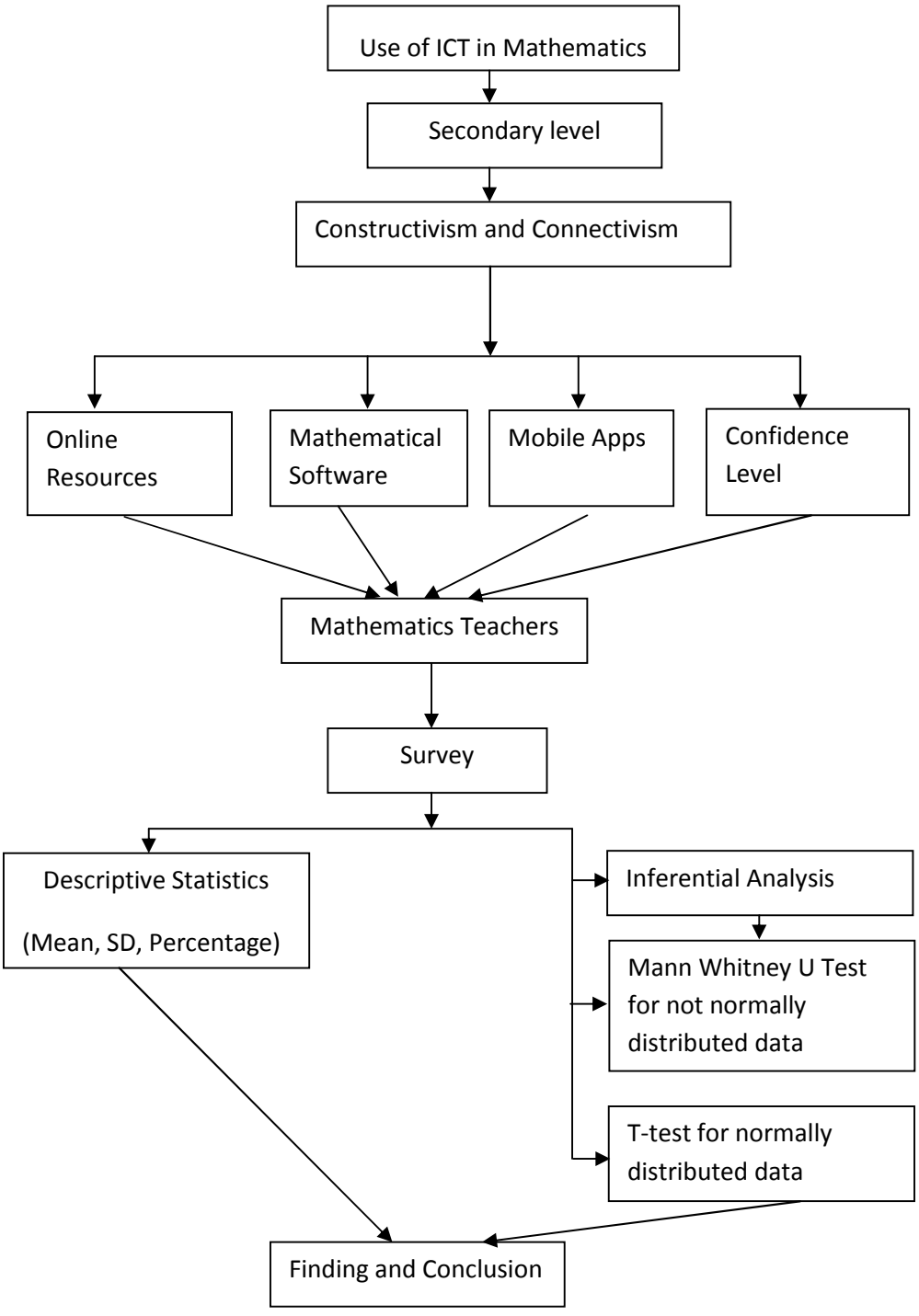
math classroom student will develop their knowledge by visualizing and here teacher role is just as a facilitator. Further, in this type of constructivist class student are motivated to share their ideas, expand their knowledge through ICT or by utilizing their experience (Tyler, 2002).

All in all ICT supports constructivist pedagogy where students use technology to explore and reach an understanding of mathematical concepts where it promotes higher order thinking and better problem-solving strategies (lttigson & Zewe, 2003 as cited in Keong, Horani & Daniel 2005).

Connectivism is a theoretical framework for understanding learning in a digital age. It emphasizes how internet technologies such as web browsers, search engines, wikis, online discussion forums, and social networks contributed to new avenues of learning. Technologies have enabled people to learn and share information across the World Wide Web and among themselves in ways that were not possible before the digital age, (Simens & Downes 2019). Learning does not simply happen within an individual, but within and across the networks. What sets connectivism apart from theories such as constructivism is the view that "learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing" (Cires & Susan 2015). Connectivism sees knowledge as a network and learning as a process of pattern recognition, (Cires & Susan 2015). Connectivism has similarities with Vygotsky's zone of aproximal development (ZPD) activity theory, (Fry & Heather 2003). The phrase "a learning theory for the digital age" indicates the emphasis that connectivism gives to technology's effect on how people live, communicate, and learn. (Fry & Heather 2003).

Conceptual Framework

A theory provides a conceptual framework. A conceptual framework provides a clear road map for researcher. The framework is as follows:



From the above review of literature and the theoretical model, the researcher has come to the point that the topic of current research use of ICT in mathematics

teaching at secondary school of Kathmandu valley. The main propose of the research is to measure the status of using ICTs tools in teaching mathematics and to explored the confident level of mathematics teacher in using ICTs. The use of ICT in mathematics about online resource, mathematics software, mathematics application and confident level on using ICTs of mathematics teacher are the main domain of the study. So they determined the used of ICT in Mathematics Education. All these aspect created the constructivism learning theory. So the conceptual framework of the study is based on these aspects and constructivism theory. The researcher collected the data through survey.

Conclusion of Review

For my research proposal I went through different books, journals and Researches which were carried out in relation to use of ICT in mathematics classroom for my literature review and most of them, I found that they have more or less similar type of conclusion that ICT helps of a lot for learning mathematics. By reading different journals and book I found that there are a number of issues about the research and evidence on the use of ICT in teaching mathematics in secondary schools. Research is rarely comparative in nature and so cannot help us to identify whether ICT is better than other approaches and this make it difficult to decide whether the use of ICT is cost-effective (Higgins, 2000) though these various research studies have been carried out in the field of ICT in mathematics, yet I felt a lot of gap prevailing in these various researches carried out. Although, I don't claim that my research will be completely different than these previous researches, but still I can claim that my research will be quite different from those researches.

Chapter III

METHODS AND PROCEDURES

Research Methodology deals with the methods and procedures of the study under consideration in order to achieve the objectives of the research Newman, (2003). It describes in detail about the works that is to be done in course of conducting the research. It consists of design of the study, population of the study, sample of the study, data collection tools, validation of the tools, data collection procedures and data analysis procedure.

Research Design

The design of the study depends on the nature and objectives of the study. Since the study with about the use of ICT in mathematics teaching at secondary level, the survey design was followed. Since a survey is defined as a research method used for collecting data from a pre- defined group of respondents to gain information and insights on various topics of interest. Surveys have a variety of purposes and can be carried out in many ways depending on the methodology chosen and the objectives to be achieved, (Cohen, Manion & Morrison 2007). The data were collected with the help of questionnaire which was prepared with the help of the subject expert.

Population of the Study

Population of the study includes schools situated in Kathmandu. All mathematics teachers working there comprised of the population of the study. The private and public school of Kathmandu were visited randomly. The teachers who were teaching mathematics in secondary level are selected as respondent.

Sample and Sampling of the Study

A sample in a research study refers to any group on which information is obtained and number of individuals in a sample is called the sample (Pandit, 2014). Sampling is not merely substitution of a partial coverage for a total coverage. Sampling is the science and art of controlling and measuring reliability of useful statistical information through the theory of probability (Deming, 1950). All mathematics teachers from 50 secondary school is taken as a sample for the study. As survey for measure the status of using ICTs tool in teaching mathematics and to know confident level of mathematics teacher in using ICTs, researcher used purposive sampling technique for the selection of 50 school.149 mathematics teachers were participated from private and public schools of Kathmandu district.

Independent and dependent Variables

Independent Variables: the values that can be changed or controlled in a given model or question. They provide the input which is modified by the model to change the output. An independent variable is the variable that changed or controlled in a scientific experiment to test effects on the dependent variable. It is a variable that stands alone and is not changed by other variable you are trying to measure.

Dependent Variables: The value that the result from the independent variables. A dependent variable is the variable being tested and measured in a scientific experiment. Just like an independent variables, dependent variable is exactly what it sound like. It is something that depends on other factors.

Tools for data Collection

Tools are important for collecting the data. There was only one set of questionnaire as a tool for collecting data which was as follows.

Questionnaire

This research is of quantitative in nature questionnaire was used as a research tool. The questionnaire has been considered on the basis of mathematics related online resources, software, mobile application and teacher confident level in using ICT. The questionnaire also consists of personal information of respondent such as name, age, gender, qualification, ICTs training status, name of institution and length of teaching experience. The questionnaire was prepared carefully after going through several researches carried in the field and was approved by the subject expert. It was designed using 5-point Likert Scale, for positive statements the value of 5, 4, 3, 2 and 1 were assigned for the response of always, often, sometime, rarely and never respectively. To measure the confident level, the other five point Likert scale including very confident, confident, unsure, unconfident and very unconfident was prepared which was also approved by the subject expert.

Validity and Reliability of Tools

In ordered to maintain validity of the research instrument, the researcher consulted the thesis supervisor and the subject expert. The research tool was also improved later as per the feedback of the subject expert. Similarly a pilot test was also administered in 10 schools in Kathmandu.

In testing the questionnaires validity the researcher was aiming to find out whether she could “draw meaningful and useful inferences from scores on the instrument” (Creswell 2003, p.157), to know if the questions were clear and don’t contain any confusion to teachers when they answering it. Testing a questionnaires reliability assesses the internal consistency of items that is “the degree to which the items that make up the scale are all measuring the same underlying attribute” (Pallant

2001, p.6). Reliability is a concept that shows how well the different items in a single dimension combine to measure the same thing. Alpha (Cronbach) coefficients were calculated for the components of each measurement scale to verify internal consistency. The internal consistency estimates for every component of each dimension are reported in Table below. A value of 0.716 or above for coefficient alpha were considered good, while values between 0.60 and 0.70 were considered acceptable and adequate. The results in Table indicate that the Cronbach alpha levels of the value of 0.716 suggested as acceptable (Mohsen Tavakol & Reg Dennick, (2011)

Cornbach's Alpha	Number of items
0.826	45

Data Collection Procedures

I myself visited each of the sample schools of Kathmandu valley and fulfill the questionnaire to collect the data. Meeting with Principal of school and take permission is the first work I have did. When I was introduce with mathematics teacher by help of school principal. I well instruction in a conductive environment of the teacher was provided before fulfill the form. This was all for the teacher and they are responsible for questionnaire to fill correctly and thoughtfully.

After setting down all that pre-adjustment and management in co-ordination with the school principal and especially the subject teacher and head teacher, the researcher himself requested to fulfill the questionnaire to the sample teachers of the sample schools to observe the use of online resources, mathematical software, mobile apps and using ICT level.

Data Analysis Procedures

The systematically collected data is analyzed, interrelated and presented descriptively. I have presented the data in tables statistically using SPSS. Mainly the statistics device mean, SD, t-test and Mann-Whitney U test were applied to find the use of ICT in mathematics teaching at secondary level. The Mann-Whitney U test use the non-parametric equivalents of the t-test for two independent samples for two related samples, both for used with one categorical variable and a minimum of one ordinal variable, (Cohen, Manion & Morrison 2007). Since Mann-Whitney U test is used to compare differences between two independent groups when the dependent variable is ordinal. The t-test is used to discover whether there are statistically significant differences between the means of two groups, using parametric data drawn from purposive samples with a normal distribution, (Cohen, Manion & Morrison 2007). While analyzing the data as normalize test it shows that using ICTs level of mathematics teacher is normal so researcher used t-test for the analysis of ICT using level by secondary level mathematics teacher. The researcher analyzed collected data descriptively and analytical. Thus the data is analyzed and interpreted according to the target research finding.

Tests of Normality

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	**df**	**p-value**	**Statistic**	**df**	**p-value**
Confident Level	.054	149	.200*	.991	149	.425*
Use of Online Resources	.178	149	.000	.874	149	.000
Use of mathematical Software	.221	149	.000	.841	149	.000
Use of Mobile Apps	.159	149	.000	.854	149	.000

P*<0.05 is significant.

Normality were calculated by using K-S and the S-W test by using SPSS 23 version. Before normality test the assumption was the data are normally distributed. The assumption is rejected on use of online resources ($p=0.000<0.05$), use of mathematical software and mobile apps ($p=0.000<0.05$) even the assumption is accepted in confident level ($p=0.0425<0.05$).

Quantitative research emphasizes on the holistic perspective. This type of research aims at discovering and underlying motives and desires. The systematically collected qualitative data were represented descriptively in table and were explained. Descriptive statistics like percentage, mean and SD were used to calculate the status of used of online resources, mathematical software, mobile apps and using confident level of mathematics teachers. To calculate the significant difference of using online resources, mathematical software and mobile apps with reference to school types, gender, age, teaching experience, appointment types are independent variables. The U test was used because above table shows that the data are not normal and t-test was used to calculate the significant differences between the means of ICT using level in relation to school types, gender, age, teaching experiences, appointment types are dependent variables of Mathematics teachers.

Chapter IV

DATA ANALYSIS AND INTERPRETATION

This is survey study based on quantitative data which was taken through questionnaire. Thus far, the research has considered the relevant literature, the general background to the study and the methodology undertaken in gathering the data. This chapter presented the result of statistical analysis of collective data from the secondary school of Kathmandu district. One hundred forty-nine teachers were selected from 50 secondary schools in Kathmandu district. The questionnaire was prepared under the supervision of subject expert and supervisor. The questionnaire was based on 5-point Likert scale. Now, the data is analyzed with a view to answering the research questions outlined in Chapter 1 of this thesis. The quantitative analysis is undertaken by examining the questionnaire of teachers. For analyzing the data, mean, percentage, standard deviation u-test, t-test were used in 0.05 level of significance.

Questionnaire Analysis

The level of ICT use among teachers is considered to be the basis for identifying the use of online resource, Mathematical software, mobile application in teaching Mathematics and ICT using level of secondary level mathematics teacher. In order to determine the level of ICT usage among teacher means, standard deviations, rank, and percentages regarding ICT skills and its applications were calculated. Furthermore, an arbitrary level was identified (high, medium, low) based on the following equation:

$$\frac{\text{The scales highest value – the scales lowest value}}{\text{Number of level}} = \frac{5-1}{3} = 1.33$$

Level Scales value low is 1.33 to 2.33, medium 2.34 to 3.67 and 3.67 to 5.00 is high. Eid. Alharbi,(2014). The results of these inferential statistics are presented in the following tables.

Table 1: Status of Use of Online Resources (n=149)

S.N.	Statement	Mean	SD	Percentage					Level
				Always	Often	Sometimes	Rarely	Never	
1.	Khullakitab.com	2.30	0.88	0.00	10.7	26.3	45.0	18.1	Low
2.	Youtube.com	3.92	0.96	32.9	34.2	26.8	4.0	2.0	High
3.	Mathword.com	1.79	0.81	0.7	2.0	14.1	41.6	41.6	Low
4.	Khanaacademy.com	1.70	0.88	2.0	3.4	6.0	40.3	48.3	Low
5.	Coolmath.com	1.61	0.77	0.0	4.0	6.0	36.9	53.0	Low
6.	Kopykitab.com	1.44	0.76	0.7	0.7	10.7	18.1	69.8	Low
7.	Midaseclass.com	2.09	1.04	3.4	6.7	18.8	38.3	32.9	Low
8.	Olenepal.org	1.53	0.71	0.7	0.7	6.7	34.9	57.0	Low
9.	Mathworksheet.com	1.58	0.83	0.7	3.4	8.1	29.5	58.4	Low
10.	Mathplanet.com	1.42	0.67	0.7	1.3	2.7	29.9	65.8	Low
Total		1.94	0.41						Low

Table 1 that the level of status of use of online resources is low with an overall mean of 1.94 with SD of 0.41, since the SD is relatively low. The results show that the using level of Youtube.com is high mean = 3.92, σ = 0.96. Using level of Khullakitab.com is very low because sum of frequency of rarely and never is 63.10%. Using level of Mathword.com is very low because sum of frequency of always and often is 2.7%. Using level of Khanaacademy.com is very low because sum of frequency of rarely and never is 88.6%. Using level of Coolmath.com is very low because sum of frequency of rarely and never is 89.9%. Using level of Copykitab.com

is very low because sum of frequency of always and often is 1.4%. Using level of Midaseclass.com is very low because sum of frequency of rarely and never is 71.2%. Using level of Olenepal.Org is very low because sum of frequency of rarely and never is 91.9%. Using level of Mathworhsheet.com is very low because sum of frequency of rarely and never is 87.9%. Using level of Mathplanet.com is very low because sum of frequency of always and often is 2.0%.

Table 2: Status of Use of Mathematical Software (n=149)

S.N.	Statement	Mean	SD	Percentage					Level
				Always	Often	Sometime	Rarely	Never	
1	Graphic calculator	1.91	0.77	1.3	3.4	7.4	60.4	27.5	Low
2	Mathtype	1.70	0.97	2.7	4.7	6.7	31.5	54.4	Low
3	Mathematica	1.78	0.87	0.7	2.7	17.4	32.2	47.0	Low
4	Microsoft Mathematica	1.72	0.83	1.3	2.0	10.7	38.9	47.0	Low
5	Math Editor	1.63	0.74	0.7	1.3	8.1	40.3	49.7	Low
6	GeoGebra	2.64	1.04	4.7	14.8	34.9	31.5	14.1	Medium
7	Total	1.90	0.41						Low

Table 2 shows that the level of status of use of mathematical software is low with an overall mean =1.90, σ = 0.41 since the SD is relatively low. The results also show that the using level of GeoGebra is medium mean= 2.64, σ =1.047. Using level of Graphic calculator is very low because sum of frequency of rarely and never is 87.9%. Using level of Mathtype is very low because sum of frequency of always and often is 7.4%. Using level of Mathematica is very low because sum of frequency of rarely and never is 79.2%. Using level of Microsoft Mathematica is very low because

sum of frequency of rarely and never is 85.9%. Using level of Math Editor is very low because the sum of frequency of always and often is 2%.

Table 3: Status of Use of Mobile Apps (n=149)

S.N.	Statement	Mean	SD	Percentage					Level
				Always	Often	Sometime	Rarely	Never	
1	Math Playground	1.66	0.74	0.7	1.3	8.1	43.6	46.3	Low
2	Math solver	1.84	0.78	0.7	2.0	14.1	47.0	36.2	Low
3	Math Helper	1.63	0.82	0.7	4.7	4.0	38.3	52.3	Low
4	Equation Tree	1.60	0.90	1.3	4.0	8.7	25.5	60.4	Low
5	Malmath	1.46	0.66	0.00	1.3	5.4	31.5	61.7	Low
6	Math Game	2.05	0.98	2.7	6.7	14.8	44.3	31.5	Low
7	Photomath	1.81	0.87	1.3	3.4	12.1	41.6	41.6	Low
8	Mathking	1.64	0.80	0.7	1.3	12.8	31.5	53.7	Low
9	Mathway	1.44	0.59	0.00	0.7	3.4	34.9	61.1	Low
10	Equation Solver	1.87	0.92	2.7	3.4	10.7	45.0	38.3	Low
11	Total	1.70	0.37						

Table 3 shows that the level of status of use of mobile apps is low with an overall mean=1.70 with σ =0.37. Since the SD is relatively low. Using level of Math playground is low because sum of frequency of rarely and never is 89.9%. Using level of Math Solver is low because sum of frequency of always and often is 2.7%. Using level of Math Helper 90.6%. Using level of Equation Tree is low because sum of frequency of rarely and never is 85.9%. Using level of Malmath is low because sum of frequency of rarely and never is 93.2%. Using level of Math Game is low because

sum of frequency of rarely and never is 75.8%. Using level of Photomath is low because sum of frequency of rarely and never is 83.2%. Using level of Mathking is low because sum of frequency of rarely and never is 85.2%. Using level of Mathway is low because sum of frequency of always and often is 0.7%. Using level of Equation Solver is low because sum of frequency of rarely and never is 83.3%.

Table 4: Status of ICT Usage Level (n=149)

S.N.	Statement	Mean	SD	Percentage					Level
				Very Confident	Confident	Unsure	Not confident	Very unconfident	
1.	Basics of operating	4.62	0.48	61.7	38.3	0.00	0.00	0.00	High
2.	Managing file	4.58	0.57	60.4	38.9	7	0.00	7.00	High
3.	MS word	4.38	0.67	43.6	53.0	2.0	1.3	0.00	High
4.	MS Excel	3.85	0.80	20.1	49.0	26.8	3.4	0.7	High
5.	MS PowerPoint	3.89	0.83	22.8	51.0	18.8	7.4	0.00	High
6.	Database processor	3.70	0.90	16.1	51.0	20.8	11.4	0.7	High
7.	Create presentation	3.73	0.87	14.8	56.4	16.1	12.8	0.00	High
8.	Save data on hard disk	3.86	0.78	18.1	56.4	18.8	6.7	0.00	High
9.	Edit picture	3.80	0.86	20.1	48.3	22.8	8.7	0.00	High
10.	Internet browsing	3.85	0.86	21.5	50.3	19.5	8.7	0.00	High
11.	Search internet	3.83	0.82	18.1	55.0	18.1	8.7	0.00	High
12.	Download file	3.81	0.80	15.4	58.4	18.8	6.7	0.7	High
13.	Use email	3.91	0.75	18.1	61.1	14.8	6.0	0.00	High
14.	Use social media	3.90	0.76	18.8	57.7	18.8	4.0	0.7	High
15.	Design webpage	3.87	0.75	14.8	63.8	16.1	4.0	1.3	High
16.	Online resource	3.86	0.76	11.4	71.8	10.7	3.4	2.7	High
17.	Mathematical software	4.05	0.68	22.1	65.1	8.7	4.0	0.00	High
18.	Related apps	4.24	0.61	31.5	63.1	3.4	2.0	0.00	High
19.	YouTube channel	4.36	0.54	38.9	58.4	1.3	0.7	0.00	High
20.	Total	4.01	0.40						

Table- 4 shows that the status of ICT usage level is high with an overall mean=4.01, σ = 0.40. Since the SD is relatively low. Using the level of Basic of operating is high because frequency of very confident is 61.7%. Using the level of managing file is high because sum of frequency of very confident and confident is

99.3%. Using the level of Search internet is high because sum of frequency of very confident and confident is 73.1%. Using the level of Download file is high because of frequency of very confident and confident is 73.8%. Using the level of Use email is high because of frequency of not confident and often very unconfident is 6%. Using the level of Mathematical software is high because sum of frequency is not confident and very unconfident is 4%. Using the level of Use social media because sum of frequency of always and often is 4.7%. Using the level of YouTube channel is high because sum of frequency is always and often is 97.3%.

Table 5: Significant Difference on Use of Online Resources

Socio demographic variables	**Categories**	**Number**	**Use of online resources**		**p-value**
		N (%)	**Mean Rank**	**SD**	
School types	Private	110 (73.83)	73.67	1.92	0.52
	Public	39(26.17)	78.76	1.96	
Gender	Male	110(73.83)	77.95	0.41	0.15
	Female	39(26.17)	66.68	0.39	
Age	<35 years	85(57.04)	71.61	0.40	0.26
	≥35 years	64(42.95)	79.50	0.41	
Experience	<10 years	113(75.83)	69.99	0.38	0.11
	≥ 10 years	36(24.16)	90.74	0.45	
Appointment types	Permanent	58(38.92)	74.64	0.45	0.93
	Temporary	91(61.04)	75.23	0.37	
ICT training	Yes	109(73.15)	79.49	0.42	0.04
	No	40(26.84)	62.76	0.32	

*$p<0.05$ is level of significant

Table- 5 shows that significant difference was found ($p=0.04<0.05$) in the use of online resources between trained and untrained teachers on ICT. Even the significant difference did not exist in the use of online resources.

Table- 5 shows that no significant was found (p=0.52>0.05) in the use online resources between public and private schools teachers. Even no significant difference between male and female teachers were the use of online resources is accepted.

Table -5 shows that no significant was found (p=0.26>0.05) in the use of online resources between below thirty-five and above thirty-five ages teacher. Even the no significant difference between below thirty-five and above thirty-five age's teacher in the use of online resources is accepted.

Table -5 shows that no significant was found (p=0.11>0.05) in the use online resources between below ten and above ten years experiences teachers on ICT. Even the no significant difference between below ten and above ten years experiences teachers were the use of online resources is accepted.

Table -5 shows that no significant was found (p=0.15>0.05) in the use of online resources between male and female teachers. Even no significant difference between male and female teachers was found in the use of online resources is accepted.

Table -5 shows that no significance was found (p=0.93>0.05) in the use of online resources between permanent and temporary teachers. Even the no significant difference between permanent and temporary teachers were the use of online resources is accepted.

Table6: Use of Mathematical Software

Socio demographic variables	Categories	Number	Software		p-value
		N (%)	Mean Rank	SD	
School types	Private	110 (73.83)	74.27	0.50	0.72
	Public	39(26.17)	77.06	0.49	
Gender	Male	110(73.83)	78.05	0.53	0.14
	Female	39(26.17)	66.40	0.38	
Age	<35 years	85(57.04)	73.25	0.55	0.56
	≥35 years	64(42.95)	77.33	0.42	
Experience	<10 years	113(75.83)	72.00	0.51	0.12
	≥ 10 years	36(24.16)	84.40	0.47	
Appointment types	Permanent	58(38.92)	75.74	0.46	0.86
	Temporary	91(61.07)	74.53	0.52	
ICT training	Yes	109(73.15)	77.14	0.51	0.31
	No	40(26.84)	69.16	0.47	

*$p<0.05$ is level of significant

Table-6 shows that significant difference was found ($p=0.72>0.05$) in the use of mathematical software between private and public school teachers. There is no significant difference between private and public teachers is use of mathematical software is accepted.

Table- 6 shows that no significant was found ($p=0.14>0.05$) in the use of mathematical software between male and female teachers. Even no significant difference between male and female teachers were the use of mathematical software is accepted.

Table-6 shows that no significant was found (p=0.56>0.05) in the use of mathematical software between below thirty-five and above thirty-five ages teacher. Even it was found that there was no significant difference between below thirty-five and above thirty-five age's teacher in the use of mathematical software is accepted.

Table -6 shows that no significant was found (p=0.12>0.05) in the use mathematical software between below ten and above ten years experiences teachers on ICT. Even the no significant difference between below ten and above ten years experiences teachers were the use of mathematical software is accepted.

Table -6 shows that no significance was found (p=0.86>0.05) in the use of mathematical software between permanent and temporary teachers. Even the no significant difference between permanent and temporary teachers were the use of mathematical software is accepted.

Table -6 shows that no significant was found (p=0.31>0.05) in the use mathematical software between trained and untrained teachers on use ICT. Even no significant difference between trained and untrained teachers were the use of mathematical software is accepted.

Table7: Use of Mobile Apps

Socio demographic variables	**Categories**	**Number**	**Use of mobile apps**		**p-value**
		N (%)	**Mean Rank**	**SD**	
School types	Private	110 (73.83)	77.12	0.35	0.33
	Public	39(26.18)	69.03	0.37	
Gender	Male	110(73.83)	74.08	0.38	0.66
	Female	39(26.18)	77.59	0.27	
Age	<35 years	85(57.05)	77.01	0.37	0.10
	≥35 years	64(42.96)	72.34	0.34	
Experience	<10 years	136(91.28)	77.56	0.38	0.19
	≥ 10 years	36(24.17)	66.96	0.26	
Appointment types	Permanent	58(38.92)	77.84	0.36	0.51
	Temporary	91(61.07)	73.19	0.36	
ICT training	Yes	109(73.15)	75.71	0.41	0.74
	No	40(26.84)	73.08	0.36	

*$p<0.05$ is level of significant

Table-7 shows that significant difference was found ($p=0.33>0.05$) in the use of mobile apps between private and public school teachers. There is no significant difference between private and public teachers in the use of mobile apps is accepted.

Table- 7 shows that no significant was found ($p=0.66>0.05$) in the use of mobile apps between male and female teachers. Even no significant difference between male and female teachers were the use of mobile apps is accepted.

Table-7 shows that no significant differences was found (p=0.10>0.05) in the use of mobile apps between below thirty-five and above thirty-five ages teacher. Even the no significant difference between below thirty-five and above thirty-five age's teacher in the use of mobile apps is accepted.

Table -7 shows that no significant was found (p=0.19>0.05) in the use mobile apps between below ten and above ten years experiences teachers on ICT. Even the no significant difference between below ten and above ten years experiences teachers were the use of mobile apps is accepted.

Table -7 shows that no significance was found (p=0.51>0.05) in the use of mobile apps between permanent and temporary teachers. Even the no significant difference between permanent and temporary teachers were the use of mobile apps is accepted.

Table -7 shows that no significant was found (p=0.74>0.05) in the use mobile apps between trained and untrained teachers on use ICT. Even no significant difference between trained and untrained teachers in the use of mobile apps is accepted.

Table 8: ICT using Level

Socio demographic variables	**Categories**	**Number**	**ICT usages level**		**P-value**
		N(%)	**Mean**	**SD**	
School types	Private	110 (73.83)	3.99	0.42	0.52
	Public	39(26.17)	4.05	0.42	
Gender	Male	110(73.83)	4.04	0.40	0.53
	Female	39(26.17)	3.90	0.36	
Age	<35 years	85(57.04)	4.00	0.40	0.83
	≥35 years	64(42.95)	4.01	0.38	
Experience	<10 years	113(75.83)	3.98	0.37	0.03
	≥ 10 years	36(24.16)	4.06	0.46	
Appointment types	Permanent	58(38.92)	3.99	0.40	0.99
	Temporary	91(61.07)	4.02	0.39	
ICT training	Yes	109(73.15)	4.04	0.41	0.17
	No	40(26.84)	3.89	0.34	

*p<0.05 is level of significant

Table-8 shows that significant difference was found (p=0.52>0.05) in the use of using ICT tools between private and public school teachers. There is no significant difference between private and public teachers in the use of using ICT level is accepted.

Table- 8 shows that no significant was found (p=0.53>0.05) in the use of using ICT level between male and female teachers. Even no significant difference between male and female teachers were the use of using ICT level is accepted.

Table-8 shows that no significant was found ($p=0.83>0.05$) in the use of using ICT level between below thirty five and above thirty five ages teacher. Even the no significant difference between below thirty five and above thirty five age's teacher in the use of using of ICT level is accepted.

Table -8 shows that no significant was found ($p=0.03<0.05$) in the use of using between below ten and above ten years experiences teachers. Even the significant difference between below ten and above ten years experiences teachers were the use of using ICT level is rejected.

Table -8 shows that no significance was found ($p=0.99>0.05$) in the use of using ICT level between permanent and temporary teachers. Even the no significant difference between permanent and temporary teachers were the use of using ICT level is accepted.

Table -8 shows that no significant difference was found ($p=0.17>0.05$) in the use mobile using ICT level between trained and untrained teachers on use ICT. Even no significant difference between trained and untrained teachers were the use of using ICT level is accepted.

Chapter V

SUMMARY, FINDING, CONCLUSION AND RECOMMENDATION

After the analysis and interpretation of collected data as the design of study and the research questions in this concluding chapter on attempt has been made to drive conclusion. This chapter represents the summary of the study with major finding and conclusion. Finally, the last section present recommendations for the future study.

Summary of the Study

This study was carried out to examine the use of ICT in teaching Mathematics at secondary school of Kathmandu District. The objectives of the study were to measure the status of using ICT tools in teaching mathematics and to explore the confident level of mathematics teachers in using ICT. The data for the study were collected through with the help of questionnaire, Mann-Whitney U test and t-test was applied to analyze the data. 50 secondary school and 149 Mathematics teacher of Kathmandu district were sample of the study and the sampling process was a purposive sampling. The data collection process was the research visited the selected school of selected mathematics teacher to collect by questionnaire to use of ICT in mathematics at secondary school. The respondent teachers were requested to provide their valuable suggestions. The data were tabulated using five point Likert scale for statistical analysis. The score of 1,2,3,4,5 were used to the skill in favor of always, often, sometime, rarely and never these five points of Likert scale was adopted were asked to indicator their options with tick mark. The statistical device Mann-Whitney U test and t-test was applied to find out the opinions of the mathematics teachers use of ICT in mathematics at secondary school. The statistical tools of u-test was used to find out significance difference between mean scores of teachers the use of ICT in

teaching mathematics. The collected data tabulated data analyzed for the study. This chapter deals with the statistical analysis and interpretation of the data. To analyze and interpret the collect data Mann-Whitney U test and t-test. I used at 0.05 level of significance teachers were asked to response 45 statements to assess their response the use of ICT in teaching mathematics at secondary school of Kathmandu district.

Finding

After the uses of statistical device for the analysis and interpretation of the collected data the following results were obtained as s finding the study:

- You Tube was found to be highly used any other online resources.
- The level of status of use of mathematical software is low but the GeoGebra was found to be used at medium level.
- The level of status of use of all mobile apps is low.
- The level of status of ICT using is high.
- The null hypothesis there is no significant difference in the use of online resources mathematical software and mobile apps between private and public schools, male and female age groups, below 35 years and above 35 years ages groups, below ten years and above ten years experiences, permanent and temporary teachers were accepted.
- The null hypothesis there is significant difference in the use of online resources between trained and untrained on ICT teachers is rejected.
- The null hypothesis there is no significant difference in the usage level between private and public schools, male and female age groups, below 35 years and

above 35 years age groups, below ten years and above ten years experiences, permanent and temporary teachers is accepted.

- The null hypothesis there is no significant difference in the usages level below ten years and above ten years experiences teachers is rejected.

Conclusion and Discussion

The collected data were analyzed and interpreted to find the answers of the research questions of the study and it was conclude that through there is higher using level of ICT in teaching Mathematics in the secondary level. The result revealed that there is poor use of Mathematical tools and applications in teaching and learning of Mathematics in the classrooms in the secondary level. On the whole null hypothesis was accepted through as there was no significant difference in terms of school type, age, gender, teaching experience, appointment type with online resource, mathematics software, mobile application and ICT using level on teaching learning mathematics.

Nepal is underdevelopment country and ICT are somehow using in teaching learning mathematics. As the indicator of ICT using level of simple and basic things are seen high due to Nepali context, low development of ICT based material, less knowledge about ICT application. As that the use level of online resource, mathematical software and mobile apps are seen low.

Recommendations

On the basis of the above findings, the following recommendations have been made:

- The mathematics teacher should use ICT tools any kind in teaching mathematics to the students of secondary levels.

- Training should be provided to all the mathematics teachers regarding the use of ICT tools in teaching mathematics.
- We should construct the virtual classroom using ICT in teaching mathematics at secondary school.
- Curriculum should incorporate the ICT based methodology for teaching Mathematics at secondary level.
- The government should set up computer labs in all the schools for teaching Mathematics in secondary level.
- School provide strong pedagogical, physical, social support as well as technological support to mathematics teachers.
- Teachers should be aware of learners need and their different learning styles and before going to classroom every teacher should, developed their confident level in using ICT materials.

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