Teachers' Perceptions of the Barriers in ICT Integration in Teaching among the Public Schools in Male'

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Abstract- **In an era of information communication technology, people are increasingly dependent on technological devices in every aspect of their lives including in the field of teaching and learning in classrooms. Therefore, the main objective of this research is to examine the teachers' perceptions of the barriers in ICT integration in teaching in public schools of Male'. Focus also will be given to examine whether there is a significant difference between gender and secondary/primary grade teachers perception with regard to the main barrier in ICT integration in teaching. A total of 120 Likert scale survey questionnaires were filled from randomly selected participant teachers of 8 public schools from Male'. By using quantitative research design, the data ware analyzed using SPPS and the findings of the study revealed that the most predominant barrier according to the perception of respondents was issues related to technical, professional support and training followed by barriers related to availability and accessibility of ICT resources and the third barrier was challenges associated with school leadership and organizational support. Furthermore, the analysis of the data revealed that there is a significant difference between the perceptions of the main barrier on technical, professional support and training between male/female and secondary/primary grade teachers. Implications of the research include assist in policy makers and school administrators to identify the existing issues so that e teaching and learning can be improved by utilizing efficient ICT resources. Hence future research can be carried out on organizational strategies that can reduce the existing challenges faced by public school teachers.**

IndexTerms—ICT, ICT integration, Barriers, Teaching (key words)

INTRODUCTION
BACKGROUND TO THE STUDY
In an era of information communication technology, with the bombardment of new technological tools every day, people are increasingly dependent on simple to complex technological devices in every aspect of their lives. Correspondingly, in the field of education ICT play a crucial role and provides a massive transformation in the area of teaching and learning process in classrooms. The research examines the perceptions of teachers on the existing challenges and barriers of integrating ICT in teaching in the context of the public schools of Male'. Being the capital city it is believed that comparatively, that the best technological infrastructure of the country will probably be available in schools of Male' in comparison with other outer island schools. Therefore it will be useful to carry out the study in these schools of Male' in order to recognize the emerging issues that are present and the concerns that are embedded in the utilization of ICT in instruction. Having an understanding of the challenges that teachers are confronting every day; in 11 the process of utilizing ICT in instruction; it can assist in recognizing and identifying the key issues. In addition to that it can provide very important information and evidences that can be used to develop and to alienate the barriers that hinder effective integration of ICT in classrooms. Furthermore, this kind of research study can also assist to comprehend the current status and the degree of the existing problems in classrooms with regard to ICT integrated instructional process. Moreover the information can also be used to develop policies, allocate funding and to guide future directions in the area of teacher training, school leadership and other aspects relating to pedagogy.

PROBLEM STATEMENT
In recent years, the Maldives has seen a rapid increase in appreciation of ICT. More people use variety of ICT tools and are increasingly having excess to internet. This observation has also been applauded by the ITU Report [1] in which Maldives stands 81st place out of 167 countries in the global ICT Development Index ranking and also Maldives stays ahead of all the south Asian countries. Furthermore, the former education minister of Maldives Dr. Ahmed Asim also applauds the above scenario by stating that in the Maldives the acceptance of the latest technology is very high that parents themselves involves in the process. [2] Moreover according to the ITU Report [1] Maldives have achieved the number one ranking in internet penetration among the countries of south Asia. Furthermore, it has been observed, in recent years that many schools of Male' has been developing ICT infrastructure in a competitive manner by getting funds from various sponsors and other sources. In this process parents also contribute in order to maintain the available technologies so that it can be utilized efficiently in a regular basis. One such example is Majeediyya School where each parent has to pay 600 rufiyaa per year to aid fixing and maintenance of ICT related facilities. [3] Moreover according to [2] parents take initiatives in many schools to encourage ICT based education in the teaching process by raising required finances, supplying TV, Smart-board, computer etc. to schools and hence promotes internet based learning. With these plentiful contributions from parents, several schools initiated in investing on information communication technology. In recent times it can be seen that there is competition between schools to attain the utilization of latest ICT tools including smart-boards, projectors and LCD TVs in classrooms. [4] Besides that the new national curriculum give prominence on ICT skills and one of the seven key competencies that need to be attained by students, comprises of the use of media and technology effectively. [5]Therefore it is essential to scrutinize the existing state and the challenges that are eminent in the incorporation of ICT in

teaching so that further modifications can be carried out to improve the practice and application of ICT in teaching and learning. The most important rationale behind the selection of the research topic is the fact that in the Maldives it has been noticed that there are limited amount of published research studies on the field of ICT integration in teaching. Nevertheless there are a few research studies carried out based on ICT integration in relation to various other aspects of education sector. One such research study was conducted by [6] however the focus was primarily based on higher education sector. Furthermore [4] studied the Challenges in Transforming Education in Maldives although it has not given any emphasis to public schools of Male. However the study lead by [7] has emphasized the perceptions of the barriers of ICT integration at Villa International High School (VIHS) based on the views of its users. VIHS is a private international school and probably will have varying status in terms of ICT integration when compared to that of the public schools of Male. Moreover it is also important to note that there have been carried out very limited research studies similar to this proposed study. In short it can be said that there is a gap of literature and research studies in the Maldivian context with regard to ICT integration in teaching in public schools of Male' hence it is vital to carry out a study like the one proposed here. Besides that the effective integration of ICT in teaching and learning process, it is also been used as a tool to measure the quality of the teaching process. This explanation can be acknowledged based on the ministry of educations' Child friendly Baraabaru school indicators which comprises of effective ICT integration as an indicator to characterize the quality standard of teaching and learning. [8] In the end all the above aspects explains the need to carry out a research on examining the barriers of ICT integration in teaching since a study like this can dig out the crucial reasons why there are several challenges and in turn it can assist to resolve the issues and barriers and can improve the current status in technology integration.

OBJECTIVES OF THE STUDY

The objectives of the research is to examine the perceptions of teachers on the Barriers in ICT Integration in Teaching among the selected public schools of Male'. Furthermore the research study will also compare the views between male and female teachers as well as between primary and secondary teachers in terms of their perceptions of the main barrier in ICT integration in the process of teaching and learning.

RESEARCH QUESTIONS AND HYPOTHESES

The purpose of the research is primarily based on examining the following three research questions.

1. What are the main Barriers in ICT integration in teaching in Public Schools of Male', according to the perceptions of teachers'?
2. Is there any significant difference in the perceptions of the main barrier in ICT integration between male and female teachers?
3. Is there any significant difference in the perceptions of the main barrier in ICT integration between primary and secondary teachers?

For the research questions 2 and 3 the data can be tested hypothetically since the nature of the data allows to make assumptions regarding the population parameters. Hence below gives the hypotheses that are derived from the research questions 2 and 3.

HYPOTHESIS OF RESEARCH QUESTION 2

H0: There is no significant difference in the mean score of the *main barrier in ICT integration between male and female teachers.

Ha: There is a significant difference in the mean score of the *main barrier in ICT integration between male and female teachers.

HYPOTHESIS OF RESEARCH QUESTION 3

H0: There is no significant difference in the mean score of the *main barrier in ICT integration between primary and secondary teachers.

Ha: There is a significant difference in the mean score of the *main barrier in ICT integration between primary and secondary teachers.

Note: Main barrier is the predominate barrier that derives based on the analysis of the first research question

METHODOLOGY
RESEARCH METHOD:
A SURVEY RESEARCH STUDY

Survey research is a basis that can be utilized to obtain scientific knowledge of a particular phenomenon. It can be carried out to answer specific questions, to resolve problems that have been observed, to analyze perceptions and to explain what has been present in a given context. [9] There are distinct features of survey research; one is that it can be used to describe a given aspect within a population in a quantitative manner; the data are collected from people and it should select a sample from a given population and the results can be generalized to the population. Furthermore according to [9] there are specific advantages of carrying out a survey research. It can be utilized to obtain information from a large group of people easily and is very appropriate to gather demographic information of people. In addition to that survey research can be used to study a wide range of variables with minimal investment. [10] Besides that survey research can be used to study aspects such as attitudes and perceptions of people which are difficult to study through observations. In this research it will particularly utilize cross-sectional survey research method to collect data for the study. In cross-sectional survey researches it assembles information from a sample taken from a population at one point of time. [10]However data collection duration vary form one week to six months depending on the

challenges that are facing to the researcher. Information can also be based on past, present or future developments of a given phenomenon. According to [11] the purpose of a cross-sectional survey is to study the occurrence and the frequency of the outcome of interest to a sample population within a target population at a given time. Similarly in this study it focuses on examining the perceptions of public school teachers with regard to ICT integration in teaching at the time of study. They can also share their views with regard to ICT integration in the past and the present conditions and the existing barriers that they face.

POPULATION & SAMPLE
POPULATION

The participants of the study are 120 teachers of selected eight public schools of Male'. Public schools are defined as the government funded schools located in the capital Male' city. Participant teachers comprises of both male and female teachers working in those selected schools and consists of local as well as expatriate teachers. Their teaching levels are either primary grades (grade 1-7) and or secondary grades (grade 8-10). The participant teachers have varying socio-economic backgrounds; and are from various parts of the country or are expatriates. Their technological competencies may have different levels based on their past trainings or experiences. Furthermore different participants of the population have varying levels of educational qualifications as well as teaching experiences. However it has been observed by the researcher that in all the schools that the participant teachers working; have generally similar kind of technological infrastructure available for them to utilize. There are mainly two kinds of population when it comes to a research study. One is the target population which is referred as the entire population or the all-inclusive group of people or objects to which the researcher will be interested in studying and will be making generalization based on the outcomes of the research study. However it is important to know that it is practically almost impossible to carry out a research based on collecting data from the entire population and hence there is another group of people called the accessible population. It is a sub-group of the target population and a sample is drawn from the accessible population by the researcher so that the outcomes based on the data collected from this subset of the target population can be generalized to the whole population of interest. [10] In this research study the target population is the teachers of the selected public schools of Male' and from the accessible population approximately 25% sample of teachers will be drawn as a subject of the research. Figure 1.0 gives population and sampling frame depicting how the research subjects will be selected from the total population.
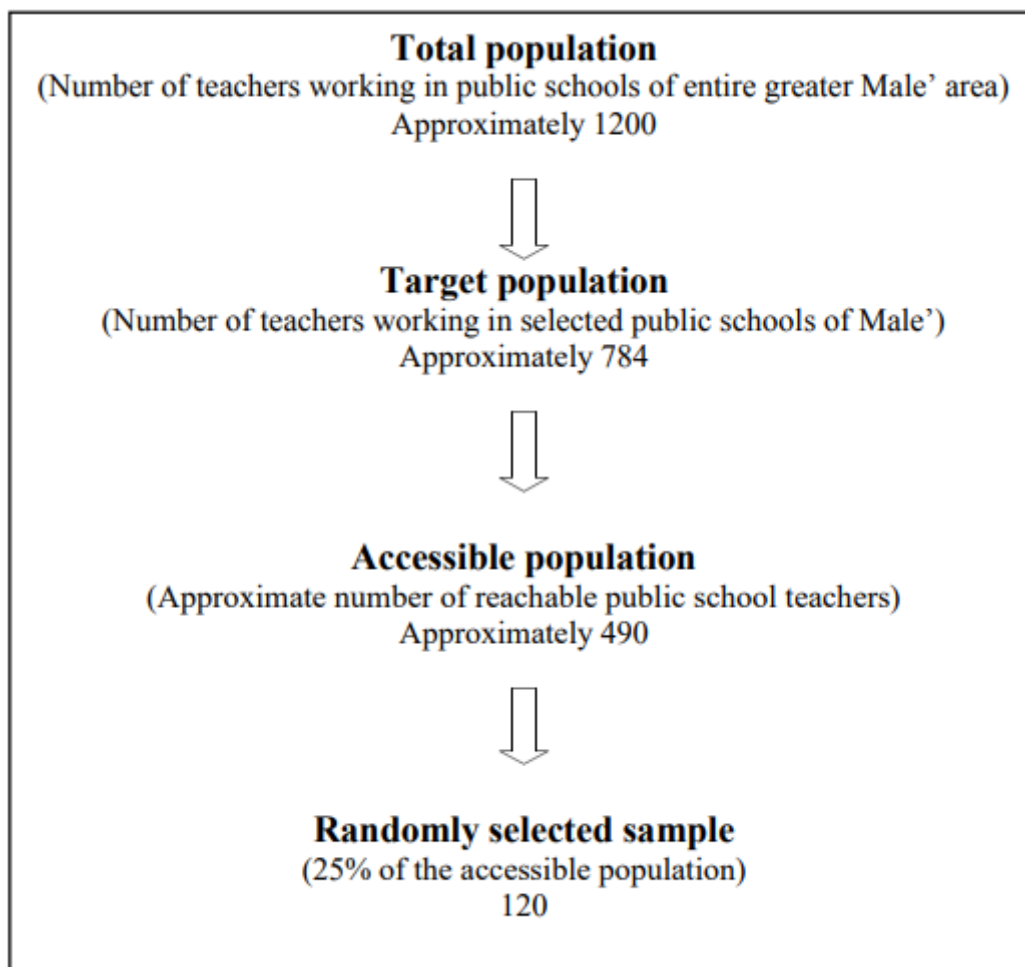

Figure 1: Population and Sampling Frame[12]

SAMPLING

Stratified random sampling technique will be utilized in this research study based on the fact that the method is more appropriate to the study and to derive the outcomes of the research based on the proposed research questions. In stratified random sampling

designs it gives the assurances that the participants have certain characteristics. [10] Furthermore stratified random sampling method has its own unique characteristics. This include that the population comprises of a specific number of elements and should be divided into different strata based on variables of interest in the given research. It is also important to note that each element of the population can only be allotted to one stratum. Furthermore samples from each stratum can only be selected based on random sampling mechanisms. Another important characteristics of the strata is that the subjects must be non-overlapping. [10] The advantages of carrying out a stratified sampling method involves that it can ensure that the sample is representative and the sample is sufficient enough to analyses the subgroups within the population hence can provide precise information of the strata. In the case of this study the subjects are the selected public school teachers of Male'. Therefore it is important to consider the subjects are chosen from different schools in a similar manner and percentages. The selected schools will have equal say based on their staff population. This can ensure that all the data are not derived from one or two schools. Hence a given common percentage of teachers can be randomly selected from each school. For that purpose 25% sample of teachers were selected from the accessible population from each school. Furthermore the research objectives include the comparison between male/female and primary/secondary teachers' perception in terms of the barriers in ICT integration in teaching. Therefore stratified sampling design is selected since it helps to avoid a sample that is not proportionate or does not include a sufficient number of subjects from each category of gender or teaching level. However it is important to note that after stratification; the subjects within the category was randomly selected from groups such as males and females. The percentage should be equal or approximate with the total percentage of each category within the target population reflecting that the numbers does not necessarily be equal for the category rather it should be representative and sufficient based on the available percentage of members within the population. For that aim based on the available data from the ministry of education regarding the percentage of teachers according to their gender was identified as 37% of teachers are males and 63% are female teachers. [12] These percentages were then used to select the number of participants based on their gender from the selected total number of samples from each school. This number of the gender stratum from each school can be seen from the table 1.0.

School	Actual no. of Teachers	Approximate no. of accessible Teachers	25% sample of teachers from each school's accessible population	Based on gender	
				Male (37%)	Female (63%)
Majeediyya (School A)	110	110	28	10	18
Aminiyya (School B)	113	80	20	8	12
Dharumavantha (School C)	86	40	10	4	6
Hiriya (School D)	70	40	13	5	8
Iskandhar (School E)	128	65	17	7	10
Kalaafaanu (School F)	78	30	8	3	5
Imaadhuddin (School G)	113	60	15	6	9
Thaajuddin (School H)	91	40	10	4	6
TOTAL	784	448	121	49	74

Table 1: stratified random sampling frame details.

QUESTIONNAIRE

 The instrument used in this survey research study was a Likert-scale questionnaire (see appendix A) since questionnaires are very efficient mechanism of collecting data based on peoples' knowledge, attitudes, opinions, perceptions, facts, behavior and other various information. [13]

The questionnaire consists of two parts and in the first part it clarifies the demographic information of the respondents particularly the gender, name of the school and the teaching level of the respondent teachers since those are the relevant demographic information with regard to the research objectives. Hence other aspects such as teachers' age, teaching experience etc. were not required to be stated. The second part of the questionnaire is based on identifying respondents' perceptions of the barriers in ICT integration in teaching. The questionnaire is also based on 4-point Likert scale ranging from 4= Fully Agree (FA) 3= Partially Agree (PA) 2=Little Agree (LA) and 1=Strongly Disagree (SD). There are a total of 18 items in the questionnaire. The items are arranged in such a way that there are total five main barriers given and in each category several statements are used as items to collect respondents' perception. The five main broad barriers are:
1. Resources, availability & accessibility of ICT infrastructure
2. Teacher attitude and confidence
3. Teacher competence and pedagogical Knowledge
4. Leadership and organizational support
5. Technical, professional support and training

VALIDITY AND RELIABILITY OF THE QUESTIONNAIRE

To ensure internal 61 consistency among the items in the instrument, prior to the actual data collection process, questionnaires were administered to a group of 15 subjects which are similar to the target population and all are teachers. The acquired data from the subjects were then analyzed using SPSS software to generate Cronbach's alpha value as given below.

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RELIABILITY
 /VARIABLES=Barrier_1a  Barrier_1b  Barrier_1c  Barrier_1d  Barrier_2a  Barrier_2b  Barrier_2c
Barrier_2d  Barrier_3a  Barrier_3b  Barrier_3c  Barrier_4a  Barrier_4b  Barrier_4c  Barrier_5a  Barrier_5b
Barrier_5c  Barrier_5d
 /SCALE('ALL VARIABLES') ALL
 /MODEL=ALPHA
 /STATISTICS=DESCRIPTIVE SCALE CORR
 /SUMMARY=TOTAL.
```

The outcomes derived from the SPSS software are given in the table 2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.896	.884	17

Table 2: Reliability statistics table

FRAMEWORK OF DATA ANALYSIS

 The data that will be gathered from the questionnaire items will be analyzed using SPSS 20.0 software. The kind of statistical analysis that will be utilized depends on the given research questions in chapter 1. Basically both descriptive statistics and inferential statistics will be used to describe and infer the outcomes and the results of the study.

DATA ANALYSIS OF RESEARCH QUESTION 1

The first research question on examining the main barriers in ICT integration in teaching was analyzed using descriptive statistics. Interpretation of the SPSS Output
 Figure 2 the frequency histogram representing the average score of the items given in the category of barrier 1
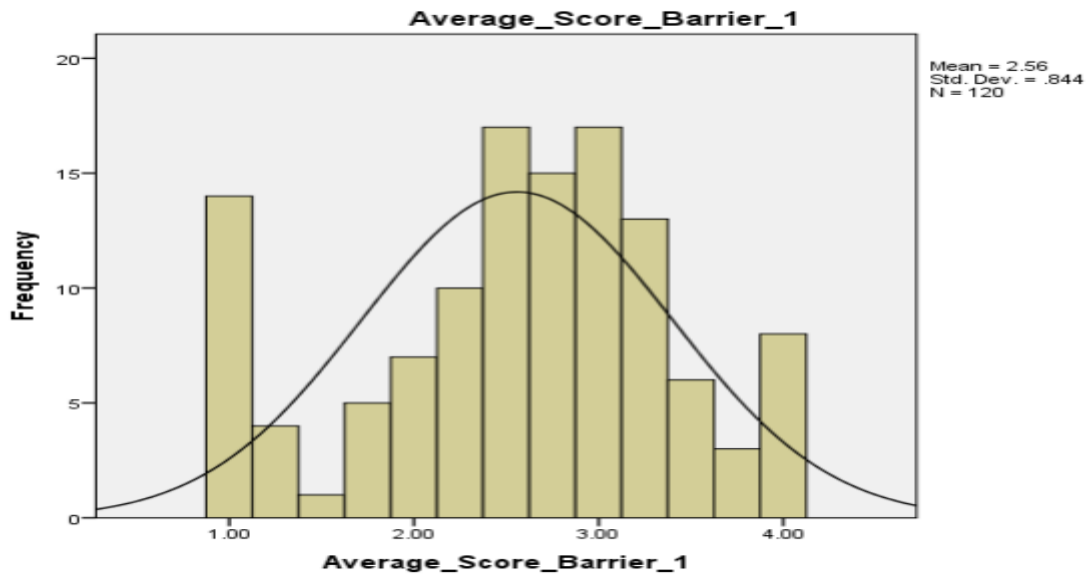
Figure 2: : histogram showing the frequency of responses in the category of the average score of the barrier 1

The mean value of the barrier on resources, availability and accessibility of ICT infrastructure (barrier category 1) is 2.56. The score is towards disagreement of the existence of enough ICT resource availability and accessibility. The standard deviation is 0.844 which indicates the variation or the dispersion of the scores within the given range. In this particular instance it can be stated that most of the scores lie between ± 0.844 from that of the mean value of 2.56. In other words that 95% of the instances the score are between 3.4 to 1.72. The histogram shape also reflects that most of scores lies 79 in the middle of the distribution, however it can also be noted that there are quite a number of participants in both extremes of the graph and may also have an influencing factor of the total mean. Yet the overall picture reveals that in average most of the participants of the research believes that in their respective schools have a lot of challenges in the area of availability of ICT infrastructure and its accessibility to utilize in teaching process.
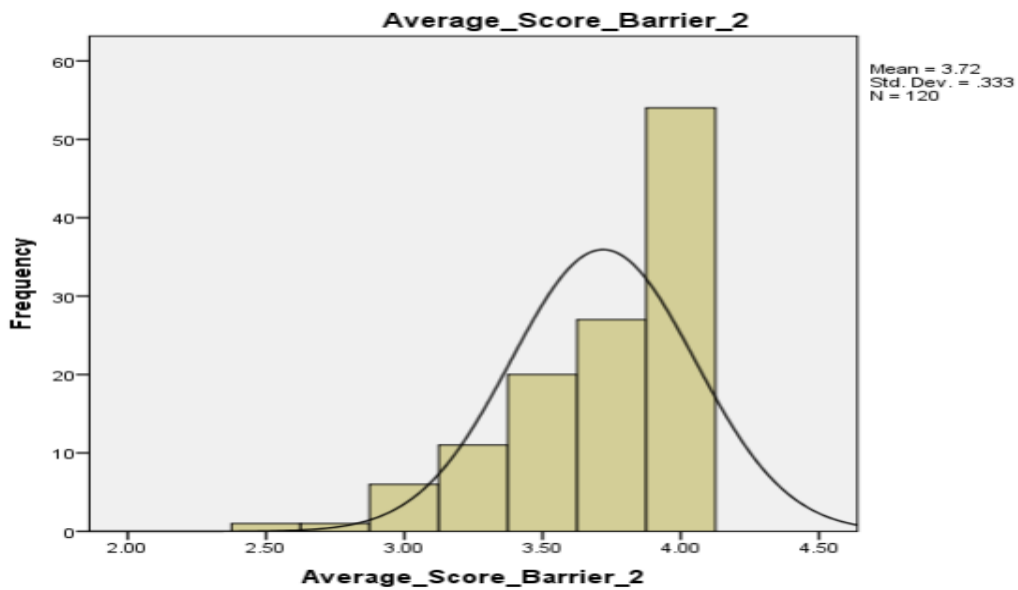

Figure 3 the frequency histogram representing the average score of the items given in the category of barrier 2.

According to the barrier 2 the mean score is 3.72 and the standard deviation is 0.333. The dispersion of the scores are less compared to barrier 1 explained earlier. 80 Furthermore unlike the histogram representing barrier 1, the barrier 2 histogram is skewed right reflecting that most of the participants are towards the side of agreeing that teacher attitudes and confidence is not a challenge for them in the process of ICT integration in teaching.

Figure 4: the frequency histogram representing the average score of the items given in the category of barrier 3.
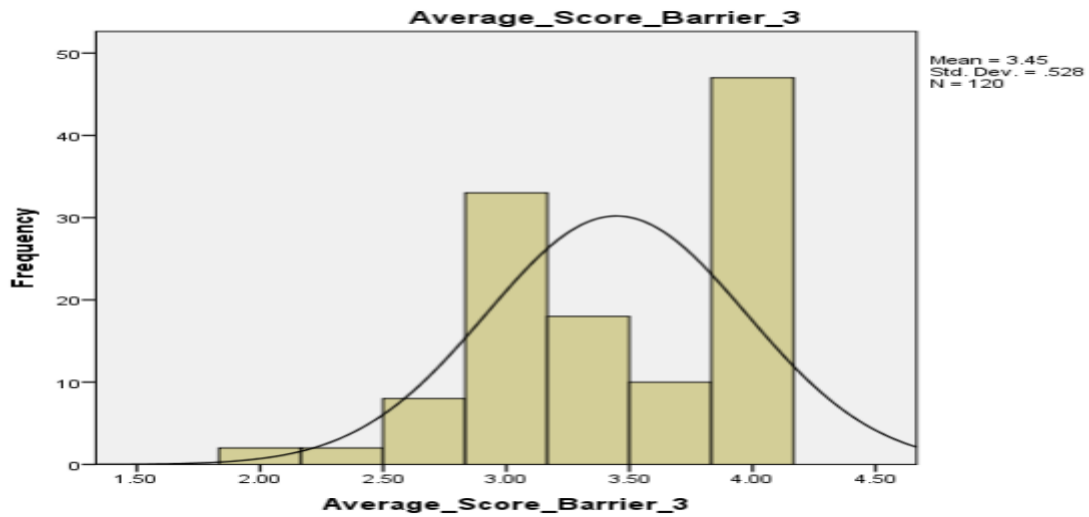
The average score of the barrier category 3 (Teacher Competence and Pedagogical Knowledge) is 3.45 and the standard deviation is 0.528. The result shows that the participants view towards teacher competence in relation to ICT integration is not much 81 an issue since the value is close to fully agree and hence participants believe that they are competent enough to integrate ICT in teaching. Furthermore the standard deviation value illustrates that there is a spread of scores between ±0.528. In other words the scores of the participants spread between 2.922- 3.978 in 95% of the cases. Moreover the histogram also illustrates that there is a higher number of frequency in which the participants fully agree on their competency of ICT integration.

Figure 5: the frequency histogram representing the average score of the items given in the category of barrier 4.
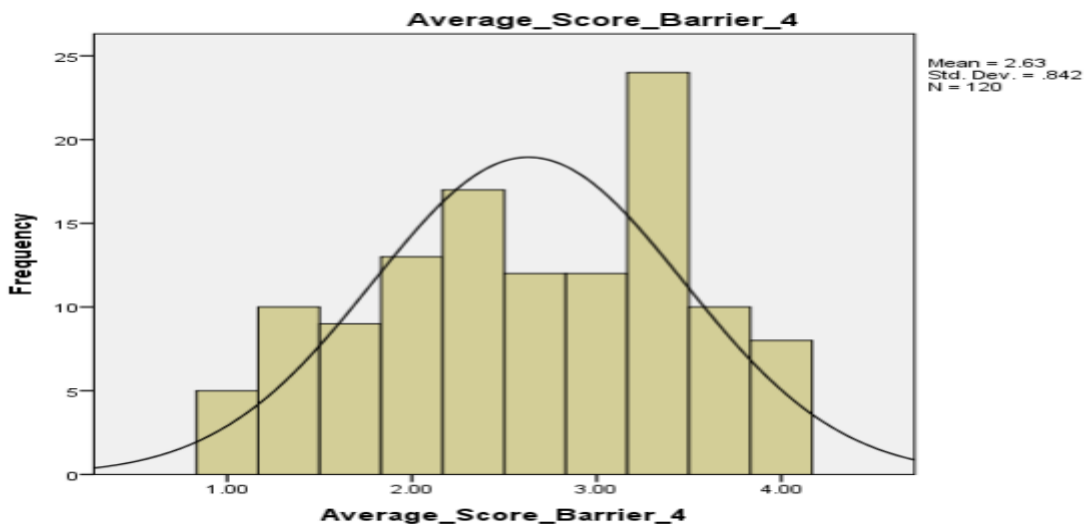
According to the figure 1.8 the mean score of the barrier category 4 on leadership and organizational support is 2.63 and the standard deviation 0.842. The mean score reflects 82 that the majority of the participants believe that they are more towards accepting that leadership and organizational support level is of a barrier. In other words that the participants have a perception on the aspect of leadership and the organizational issues as part of a barrier in the process of integrating ICT in teaching. According to the shape of the histogram it shows that most of the responses follow normal distribution, and extreme views are less and frequency is higher in the middle. However there is a big jump on the frequency close to 4 which in turn may affect the overall mean. The spread of the scores ranges from 3.4-1.8 in 95% of the cases.

Figure 6: the frequency histogram representing the average score of the items given in the category of barrier 5.

Average_Score_Barrier_5
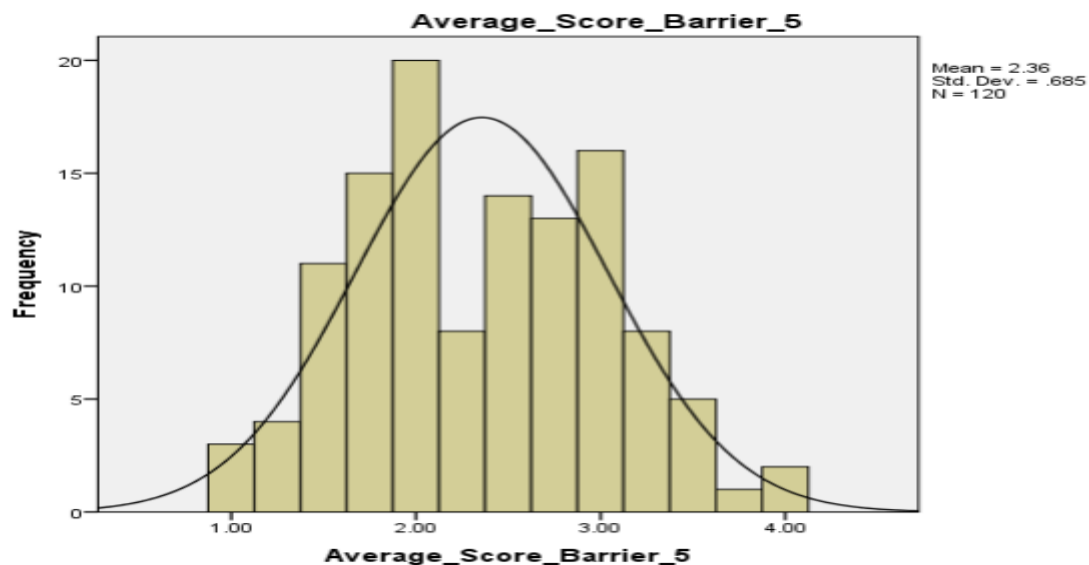
The mean value of the barrier on technical, professional support and training (barrier category 5) is 2.36. The score is the lowest of mean among all the five categories reflecting that respondents are very much towards disagreement that they receive enough training and professional support. The standard deviation is 0.685 which indicates the variation or the dispersion of the scores within the given range. In this particular instance it can be stated that most of the scores lie between $\pm$ 0.685 from that of the mean value of 2.36. In other words that 95% of the instances the score are between 3.0 to 1.68. The histogram shape also reflects that most of scores lies in the middle of the distribution and less scores are towards both the extremes also reflecting the data is normally distributed. The overall picture reveals that in average most of the participants of the research believes that in their respective schools have a lot of challenges in the area technical assistance, professional support and training.

Table 3: sows the descriptive statistics that compares the parameters among the five categories of barriers.

Statistics

		Average_Score_Barrier_1 (resources availability & accessibility)	Average_Score_Barrier_2 (teacher attitude & confidence)	Average_Score_Barrier_3 (Teacher competence & pedagogical knowledge)	Average_Score_Barrier_4 (leadership & organizational support)	Average_Score_Barrier_5 (technical, professional support & training)
N	Valid	120	120	120	120	120
	Missing	0	0	0	0	0
Mean		2.5583	3.7188	3.4472	2.6306	2.3563
Median		2.7500	3.7500	3.3333	2.6667	2.2500
Mode		2.50ᵃ	4.00	4.00	3.33	2.00
Std. Deviation		.84374	.33299	.52837	.84216	.68497
Variance		.712	.111	.279	.709	.469
Skewness		-.389	-1.177	-.438	-.210	.155
Std. Error of Skewness		.221	.221	.221	.221	.221
Range		3.00	1.50	2.00	3.00	3.00

a. Multiple modes exist. The smallest value is shown

The table 4.1 illustrates the descriptive statistical comparison among the five barrier categories including the measures of central tendency, variance, skewness and range. Based on the Likert scale of the questionnaire the smallest mean value represent does not agree and the highest value describes fully agree on the given statement or item in the questionnaire. Hence based on that information it has been observed that category 5 on technical, professional support and training is the barrier that has got the lowest mean (0.23563) among all the five categories reflecting that it is the most predominant main barrier that was identified based on the survey research. This was followed by category 1 having a mean score of 2.5583 and the third lowest score (2.6306) is the category on leadership and organizational support. Mean score gives a very efficient summary measure of the given category however it can also be affected by extreme values.

In conclusion for research question 1 on examining the main barriers of ICT integration in teaching based on the perception of selected public school teachers of Male' are as follows:

1. Barriers related to technical, professional support and training
2. Barriers related to resources, availability and accessibility of ICT infrastructure
3. Barriers related to leadership and organizational support

DATA ANALYSIS OF RESEARCH QUESTION 2

To analyze the second research question on the perception of teachers with regard to the main ICT integration barrier based on gender, the first step was to carry out a descriptive statistic to identify and to illustrate the frequency and the number of male and female teachers who has participated in the research.

The output of the frequencies of the variable gender gives the table 7 illustrating the frequency of male and female participants and the valid and cumulative percentage of each category.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	48	40.0	40.0	40.0
	Female	72	60.0	60.0	100.0
	Total	120	100.0	100.0	

Table 7

According to the output a total of 48 male teachers and 72 female teachers participated in the research. The percentage of male teachers is 40 and that of female teachers is 60 percent. This number of more than 30 cases under each category can help to ensure that it is having enough numbers to prove that it would be a normal distribution. [10]The proposed data analysis technique that will be used in testing the hypothesis of the second research is based on using t-test. The hypothesis that was tested in the second research question is stated below. H0: There is no significant difference in the mean score of the main barrier in ICT integration between male and female teachers. Based on the result of the first research question it has revealed that the main barrier according to the perception of public school teachers is the technical, professional support and training area which is the barrier marked as number 5. Hence it becomes the construct that will be tested against gender.

INTERPRETATION OF THE SPSS OUTPUT

The table 8 illustrates the output derived from the t-test carried out to analyze the main barrier technical, professional support and training in terms of males and females.

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Average_Score_Barrier_5	Male	48	2.2604	.65833	.09502
	Female	72	2.4201	.69938	.08242

Table 8

The 'Group Statistics' table 4.3illustrates that the mean value of the Average score of the barrier number 5(technical, professional support and training) in male teachers is 2.2604 and the standard deviation is 0.65833. Similarly in female teachers the mean 89 value is 2.4201 and the standard deviation is 0.69938. The results reveals that there is less dispersion of scores in male teachers when compared to female teachers. Yet it does not show whether it is having a significant difference or not between the mean scores of male and female teachers perceptions. However table 9 can be used to give answer to the research question based on the significance values.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
Average_Score_Barrier_5	Equal variances assumed	.233	.630	-1.254	118	.212	-.15972	.12733	-.41187	.09243	
	Equal variances not assumed			-1.270	104.988	.207	-.15972	.12579	-.40914	.08969	

Table 9

The table 9 on independent sample test illustrates several information of the data. However, the first aspect that need to be looked is whether the data meet the 'Homogeneity of Variance' assumption. For that purpose, the Levene's Test for Equality of Variances is been analyzed. According to the output table, the alpha value is 0.630 which is greater than 0.05 hence it can be concluded that the variances are equal, and the Homogeneity of Variance assumption is not violated. Therefore, the equal variance will be assumed to analyze further. The t-value is -1.254 which reflects how far the difference of the two samples of male and female falls when compared to 0 in relation to the standard error. Most notably the table on independent sample test reveals that the p-value in the 'sig (2 tailed)' column is 0.212 which is greater than the alpha value of 0.05 hence need to reject the null hypothesis. Therefore, the alternative hypothesis will be accepted. In other words, the null hypothesis sating that there is no significant difference in the mean score of the main barrier of Technical, professional support and training between male and female teachers is rejected. Therefore, it can be concluded that there is a significant difference between female and male teachers' perception in terms of technical, professional support and training in the area of ICT integration in teaching.

DATA ANALYSIS OF RESEARCH QUESTION 3

The third research question also tests a hypothesis on the perception of teachers on the main barrier (technical, professional support and training) based on primary and secondary teachers. Similar to the research question 2, the research question 3 will also be analyzed by performing t-test.

Interpretation of the SPSS Output

Group Statistics

	Teaching Level	N	Mean	Std. Deviation	Std. Error Mean
Average_Score_Barrier_5	Primary Level	61	2.3443	.71321	.09132
	Secondary Level	57	2.3640	.66492	.08807

Table 10

The 'Group Statistics' table 10 displays that the mean value of the Average score of the barrier number 5(technical, professional support and training) in primary level teachers is 2.3443 and the standard deviation is 0.71321. Similarly in secondary teachers the mean value is 2.3640 and the standard deviation is 0.66492. The results reveals that there is less dispersion of scores in secondary level teachers when compared to primary level teachers. In other words the score is spread out to a larger area in primary level teachers.

Table 11 will illustrate the significance values of the two independent groups of primary level and secondary level teachers against the main barrier of technical, professional support and training.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
Average _Score_ Barrier_5	Equal variances assumed	.128	.722	-.155	116	.877	-.01977	.12717	-.27165	.23211	
	Equal variances not assumed			-.156	116.000	.876	-.01977	.12687	-.27105	.23150	

Table 11

The first step in the interpretation of the table involves analyzing whether the data meet the 'Homogeneity of Variance' assumption. According to the Levene's Test for Equality of Variances the value is 0.722 which is greater than 0.05 hence conclude the variances are equal and the Homogeneity of Variance assumption is not violated thus the equal variance will be assumed to carry out further analysis. The t-value is -1.55 reflecting how far the mean values of the two groups of teaching level falls from that of 0. Furthermore, the table 3.2 shows that the p-value in the 'sig (2 tailed)' column is 0.877 which is greater than the alpha value of 0.05 hence need to reject the null hypothesis and accept the alternative hypothesis. Therefore, it can be concluded that there is a significant difference between the mean score of primary and secondary level teachers 93 in terms of their perceptions of the barrier involved in technical, professional support and training area in the field of ICT integration in teaching purpose.

SUMMARY/CONCLUSION
 The summary of data analysis shows that the main barrier in integrating ICT in teaching among public schools of Male' based on the perception of teachers is the issues related to technical, professional support and training. Furthermore, it has also revealed that there is also a significant difference of the mean score between male and female as well as primary and secondary teacher's perception of the main barrier of technical, professional support and training. Hence the null hypotheses were rejected, and the alternative hypotheses were accepted.

DISCUSSION
Research question 1
 The discussion will be based on the three main barriers that has emerged from the findings of the barriers in ICT integration in teaching in Public Schools of Male', according to the perceptions of teachers.

Barriers of Technical, Professional Support and Training
According to the perception of public-school teachers of Male' it has revealed that the most predominant barrier in ICT integration in teaching is issues related to technical, professional support and training. The mean score of the barrier is 2.3563 which is the lowest among all the five categories. The low mean score shows that most of the participants of the research believes that they receive very little amount of training, technical assistance, and professional support in the area of ICT integration in teaching. Hence it has been concluded that the stated barrier is the major challenge in the area of ICT integration in the process of teaching in the selected public schools of Male'. This finding is in line with that of the theoretical and conceptual foundation of the study. According to the Diffusion of Innovation (DOI) theory the use of technology and its adaptation is linked with both external and internal characteristics of the institution.[14] This has been further elaborated in the conceptual framework where it has given importance to the characteristics of the organization. The total conceptual framework is broadly categorized in to two and one of the aspects is school associated barriers. And schools come across several challenges in terms of ICT integration. The concepts that are involved mainly includes lack of technical support, lack of training, lack of availability and accessibility and other aspects. Hence the findings of the study provides good relationship between the proposed frameworks and the results of the study. In addition to the frameworks, the results can also be compared with other empirical studies and various literature to explore the relevancy of the outcomes. The study by Michael [15] specifically has highlighted that there are several issues associated with in-service training of teachers on innovative ICT based strategies that can be utilized in teaching. He has also highlighted that ICT based professional development programs and other opportunities that provide specific information, ideas and practical sessions are essential for effective ICT integration process. Furthermore, in contrast to this research, [15] was able to identify specific training issues such as ineffective training programs where it provides general knowledge rather than the

numerous skills that are required for teachers. Furthermore, a survey research conducted in Turkey among elementary schools also concludes that getting enough required training is one of the biggest barriers in ICT integration in teaching. The findings is similar to this research however in the case of public schools of Male' training and professional development issues are the most dominant barrier however in elementary schools of Turkey the issue is the second most prevailing challenges. According to the researchers own experiences in the field of teaching it has been noticed that schools give emphasis only to have some kind of technological tools and equipment. But it is also essential to train teachers so that effectively any available ICT facilities can be utilized. This has to be given importance and periodic training and professional support programs need to be conducted. Technical issues including repair and maintenance of ICT tools and equipment is one important aspect that comes under the barrier on issues related to technical, professional support and training. The research findings shows that most of the teachers' perception on this aspect is that they do not receive required level of technical assistance from school IT section neither there so many issues related to maintenance of equipment. This finding is also in line with several other studies such the research by [15] has stated that technical support and dependable regular assistance in maintaining, updating, and renewing ICT based teaching and learning resources is a huge challenge. In the case of public schools of Male' it has been observed that IT technician job which comes under the Civil Service employment category receives low salary compared to the higher remuneration when it comes to private sector. Therefore, it is believed that in most of the time, schools do not get the most qualified people to handle the immense ICT related work, nor they get the desired number of technicians.

Barriers related to Resources, Availability and Accessibility of ICT infrastructure.

The second most perceived barrier in terms of ICT integration in teaching among the public-school teachers was barriers related to resources, availability, and accessibility of ICT infrastructure. The mean score of the barrier was 2.5583 which reflects that most of the participants are towards little agreement on the availability and accessibility of various technological tools and software in their respective schools. Once again, the finding is in align to the proposed frameworks of the study. The internal and external characteristics of the organization that plays a major role in the utilization and adaptation of ICT is theoretically explained in the DOI model. One major concept that comes under the organization in this instance, schools include the issues of ICT facility availability and accessibility to teachers. In other words, the features and characteristics of the school can reflect the kind of ICT infrastructure that is available to teachers and students. The findings is also parallel to other similar studies, and they all have highlighted the issue as one pivotal concern in the area of ICT integration in teaching. For example, the research by [16] has revealed that around 80% of respondents has stated that availability of ICT resource is the major setback. Availability and accessibility of ICT facilities in public schools of Male' can also be explained in several angles. According to the information received by the researcher from several school officials, that the ministry of education does not provide specific funds to get ICT facilities and hence schools raise funds and sponsors from external sources to get the facilities such as interactive boards for all the classes, projectors etc. Hence the availability will vary from school to school. Beside the availability issue, there is another important aspect on accessibility. According to the researcher's own experience in one of the public schools of Male' where the school has got major ICT facilities in all its classrooms yet is unable to utilize them regularly. There have been issues of maintenance and technical problems hence the available facilities are not 100 accessible to teachers in most of the days. These different factors could have been the reasons why so many respondents of the research perceived that the availability and accessibility of resources is one major obstacle in integrating ICT in teaching.

Barriers related to Leadership and Organizational Support

Barriers related to leadership and organizational support is the third biggest challenge when it comes to the aspects of ICT usage in schools for the purpose of teaching. The findings of the research has shown that the mean score of the category 4 on leadership and organizational support is 2.6306. The result also weighs towards little or partial agreement on the positive statements given in the questionnaire based on the stated barrier. Hence respondents of the research perceived it as one of the barriers in ICT integration in teaching. This finding similar to other barriers also depends on the same framework highlighted earlier. Characteristics of the organization as stated in the DOI model comprises of concepts such as leadership along with technical and availability issues as major challenges. [15] Research studies of [17] and others have highlighted that school leadership can influence the manner in which ICT usage in teaching and learning process. They also have emphasized that leaders have a role in promoting technology-based teaching in terms of making such facilities available in their schools and supporting teachers through training and providing effective technical support. Research by [17] concludes that empowered leaders will have a shared vision and a plan to incorporate ICT resources in teaching and learning. The researcher has also experienced the kind of differences that can be seen from principal to principal when it comes to ICT use in school. Those leaders who give importance to it in teaching indeed provide all required support for teachers so they can 101 utilize ICT effectively in teaching. However, a change in school principal on the other hand can drastically change the utilization process of ICT in teaching. This happens since regular monitoring and maintenance of ICT based tools and the emphasis on the utilization, all diminishes and at the end accessibility of the facilities will be a major obstacle that prevents the use of the available facilities. Hence school leadership plays an immense role in the successful integration of ICT in teaching and learning.

Research question 2
ICT integration barriers and the views of male and female teachers

The findings of the research reveals that the null hypothesis sating that there is no significant difference in the mean score of the main barrier of technical, professional support and training between male and female teachers is rejected. And it concluded that there is a significant difference between female and male teachers' perception in terms of technical, professional support and training in the area of ICT integration in teaching. The research question is also based on the proposed frameworks of the study.

Barriers in relation to the technological aspects includes a theory based on Technology Acceptance Model (TAM) which explains the Perceived Usefulness and Perceived Ease of Use that deals mainly the beliefs of individuals regarding technology and the attitude towards the utilization of technology. [18] Hence the research aims to examine the perceptions of both male and female respondents based on the predominant barrier of ICT integration in teaching. The research finding when compared to other such research have revealed mixed outcomes. According to the research by [19] that female teachers have less interest towards technology, and they utilize less when compared to male teachers. Furthermore, a study by [20] has shown that there is a significant difference between genders in relation to ICT related technical skills and abilities hence more male respondents utilize ICT tools when compared to female teachers. This was also supported by [21] and he has reported that many female teachers find difficulty in solving technical issues while utilizing technology in teaching process compared to male teachers. All these findings shows that there is a significant difference between male and female teachers when compared with their competencies of the use of ICT tools and technical skills and capabilities. Therefore it is also believed that the perceptions of such matters among female and male teachers will also varies in line with the above literature and researches. Hence the research findings of this study is in agreement of those researchers. However, there are some research studies that concludes that there are no noticeable differences between gender and the technology integration in instruction and their perceptions in terms of the stated barrier.[22]

Research question 3
ICT integration barriers and the views primary and secondary level teachers
The findings of research question three, concluded that there is a significant difference between the mean score of primary and secondary level teachers in terms of their perceptions of the barriers involved in technical, professional support and training in ICT integration in teaching purpose. In the theoretical and conceptual frameworks of the study comprises of TAM model which gives emphasis on Perceived Usefulness and Perceived Ease of Use of technology and individual beliefs with regard to ICT that it plays. [18] Hence the study aims to examine the individual beliefs and perceptions of barriers that affect ICT integration in teaching and one such aspect is the difference of perceptions of teachers who teach to secondary level grades and that of primary level grades. According to a study conducted by [23] on the barriers to use ITC in teaching in Saudi Arabia by utilizing primary teachers revealed that lack of technical assistance is the main barrier that they come across in the process. In another study by [24] on science teachers experiences of ICT integration revealed that primary, middle school and secondary grade teachers perceived that there is lack of administrative and technical support and assistance. Furthermore, they also believe that there is inadequate professional development and training in the field of ICT integration in teaching. Furthermore, a study by [25] also revealed that both primary and secondary teachers believes that lack of technical issues is a major barrier in utilizing ICT in teaching. These findings of [24] and [25] both are therefore in contrary to the findings of this research. However, it is important to note that that research have conducted using different methodologies and the purpose of the research are not necessarily used to compare the significant differences between secondary and primary teachers' perceptions. Hence the above findings may have differences. Furthermore, the researcher also believes that the context and the place of research, sample size and the aim of the research all can affect the findings and outcomes.

CONCLUSION

The research aims to identify the predominant barriers of ICT integration in teaching and to explore whether there is any significant differences among gender and between primary and secondary grade teachers in terms of ICT integration barriers. The findings of the study revealed that the most prevalent barrier is on issues related to technical, professional support and training, followed by availability and accessibility of ICT tools and the third was issues related to leadership and organizational support. Furthermore, it has also revealed that there is a significant difference between male and female 105 teachers as well as primary and secondary teachers' perception on the barrier of technical, professional support and training. The findings may have an implication to the relevant stakeholders in addressing the issues at hand so that teachers can effectively integrate ICT in teaching so that it may help to reach to the desired learning outcomes of the students.

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