

# Gender based knowledge and usage of ICT by the secondary school students in Tigray Region of Ethiopia

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## ABSTRACT

This study examined the gender based differences in knowledge and usage of ICT skills of secondary school students of tigray region government school students. This study covered 60 government schools in the tigray region. The data has been collected from students of grade 9 to 12 of each school. The equal number of students from each gender was selected by random sampling method for the investigative study of the knowledge level and usage of ICT. A questionnaire was prepared to fulfill the investigation need. The questionnaire consists of around 50 questions designed for both, boys as well as girls by the investigator in order to check their knowledge and usage of ICT at Secondary level. Based on the results there was a small but statistically significant difference between the genders in the total scores on the ICT knowledge and skill test. More consequential differences between the genders were found in the item level analysis. As explicit item level analysis indicated, boys tended to get better scores more from social interaction-related items and technical-oriented items, while girls got better scores from school work-oriented items. The results emphasize that gender differences in ICT skills are more item specific than general. More importantly, the variation between individuals in ICT skill items was extensive and in all likelihood more influential than the gender difference as such.

**Keywords** - ICT knowledge, ICT Usage, Gender differences.

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## 1. INTRODUCTION

Information and communication technology occupies more and more areas of our life nowadays. The growth and improvement of any country in the world primarily based on its educational system. Traditionally, educational system in Ethiopia has been almost entirely based on the teacher-centered approach. In recent years, there is a slow but distinct shift away from this pattern towards a more student-centered approach. This change happened because of the power of Educational Technology and advancement of present Information and Communication Technology (ICT).

ICT has its potential in schools, in the teaching of subjects, in examinations, in research, in systemic reforms, and above all, in teacher education, it overcomes the conventional problems of scale and reach through online, anytime, anywhere. ICT has the ability to improve the quality of life by providing new tools for improving access to information and knowledge management as well as sharing. These days the term information and communication technology (ICT) has come to mean all technical means used to handle information and aid communication, including computer and network hardware as well as necessary software.

It is clear that each year ICT knowledge is attained at an earlier stage. The standard of students' computer literacy states that it is necessary for each member of the present society to have at least a basic competence of using the computer and the ability to use ICT tools for a personal and public activity. A secondary school education plays an important role in solving this problem [1].

Nowadays women are progressing in every aspects and education is becoming more and more accessible to them it is yet to be established that they get equal opportunities in the process of getting ICT education. Information and Communication Technologies (ICTs) have influenced almost all the part of our society. But unluckily, they have not yet happened as expected in transforming our teaching and learning concept and practices. Various studies have revealed that ICT is not used by the adequate number of women students [2][3]. It is the high time to identify the ICT

knowledge and usage of secondary school students particularly finding out the difference among the boy and girl students in the usage of ICT. This study aims at identifying the gender based knowledge and usage level of ICT by the school students in order to empower the women.

This research project tries to study and explore the usage and knowledge level of ICT by the secondary school students. After understanding the usage level of those students this work recommends the methods and sources to increase the usage of ICT. To use the technology effectively one should have the enough knowledge on it. Hence this research further tries to find out the knowledge level of students. Based on the outcomes of the survey and study we can recommend the concerning secondary schools curriculum development board or committee about the approach required for the future ICT contents by considering the students knowledge and their need.

Since the education of women is essential for the development of any nation this study further aims at identifying the difference in knowledge and usage level of ICT by the boy and girl students at secondary schools. In addition to that this research work tries to identify and address the main factors that affect the improvement of ICT knowledge and usage of secondary school students.

Finally this study attempts to review the secondary schools' ICT education system, Evaluate significance and suitability of contents at present ICT syllabus in Ethiopian secondary school by assessing the needs of the country, Review the awareness and qualification of ICT teachers to teach the subject, Assess the availability of teaching/learning materials such as software, kits, computers, Internet connection, textbooks and reference books to propose recommendations for improving the ICT knowledge and usage among the students of secondary school.

## **2. REVIEW OF LITERATURE**

Students studying at secondary school level are adolescents. As adolescents are the future of tomorrow, if their energies are channelized in right direction; they can bring change wherever they go. This change brought by ICTs is most promising aid in the field of education, which plays a crucial role in accelerating and uplifting the quality of education at higher secondary school level [4][5].

Digital literacy is a deep understanding of ICT technologies which are spread in the labour market and at home. It also includes knowledge and competences at the user level required to use technical equipment and software which is popular both in the labor market and at home [6]. ICT becomes a dominant power for change in society and residents should have an understanding of the communal, moral, legal and financial inference of its use, as well as how to use ICT securely and sensibly [7]. Increased capability in the use of ICT supports initiatives and independent learning, as pupils are able to make informed judgment about when and where to use ICT to enhance their learning and the quality of their work [8].

In [9] the researcher focused on the ICT usage of Addis Ababa only and also there was no gender based study of ICT skills of the student. From the above discussion it is evident that no research work has been done on the gender based knowledge level, usage and availability of ICT facilities in secondary school level. As a result secondary schools are selected as a target group and decision was made to study the usage of ICT in Secondary Schools of eastern tigray region. The survey of computer literacy of the 9<sup>th</sup> to 12<sup>th</sup> form students are necessary to make conclusions about the standard of ICT curriculum and way of teaching science in secondary schools.

## **3. STATEMENT OF THE RESEARCH PROBLEM**

As the use of information technologies increases in our everyday life, secondary schools must gradually change their curriculum of ICT and the way of teaching the ICT concepts. The focus of the survey is to conduct an investigation into the ICT usage and knowledge of the grade 9<sup>th</sup> to 12<sup>th</sup> form students of tigray region secondary schools and explore its relationship with certain elements such as syllabus contents with omitted topics, complexity and consequence of some of the topics, availability of recommended software in the textbook and resources and teachers knowledge and skill, etc. Thus, it is high time to assess how the contents are appropriate and relevant to the present situation of the country.

It is essential to conclude the level of students' ICT knowledge on admission to colleges and universities and discover which areas have need of less (or maybe more) concentration when training the discipline of ICT in the institutions of higher education.

**The following questions are framed as the statement of our research problem**

1. What is the level of ICT knowledge of the secondary school students?
2. Is there any gender difference lies in using the ICT for learning?
3. What are the main factors that affect the improvement of ICT knowledge of secondary school students?

#### 4. METHODS

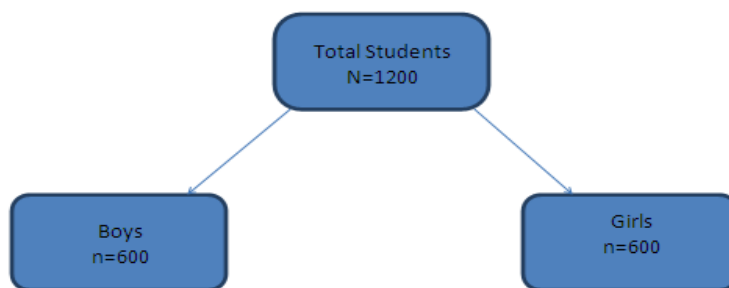
This study covers around 30 secondary schools in the tigray region. 40 students of each school have been selected by random sampling method for the investigative study of the knowledge level and usage of ICT. A questionnaire was developed to fulfill the investigation need. The questionnaire consists of around 50 questions designed for both, boys as well as girls by the investigator in order to check their knowledge and usage of ICT at Secondary level. Responses were marked under categories such as “Yes” and “No”, Strongly agree, Agree, Strongly Disagree etc.

##### a. Statistical Technique used

The analysis of data was done by using statistical technique percentage which was chosen only after it was found that they are most appropriate and compatible for the collected data.

##### b. Sample of the Study

The population selected for the present research work comprises of secondary school students of class 9th, 10th, 11th & 12th standard, of Tigray region. The sample extracted out of the population consists of total number of 1200 students (N=1200) out of which 600 were boys and 600 were girls. The sample break-up is as under:



#### 5. ANALYSIS AND INTERPRETATION OF THE RESULTS

The data have been critically analyzed and reported through textual discussions and tabular form. The textual discussions have been used to point out generalizations and significant interpretations. The table and a graph have been used to check the knowledge and usage of ICT by the boys' students is more than that of the girls' students. It is constructed in such a way that it is self-explanatory. Thus in order to study the usage of ICT in Secondary Level in Tigray and its usage among boys and girls, percentage and graph were taken as the statistical tool.

##### a. ICT Usage at Home and Other Places (i.e. at friends' or family member's home, public library, Internet cafe, etc.)

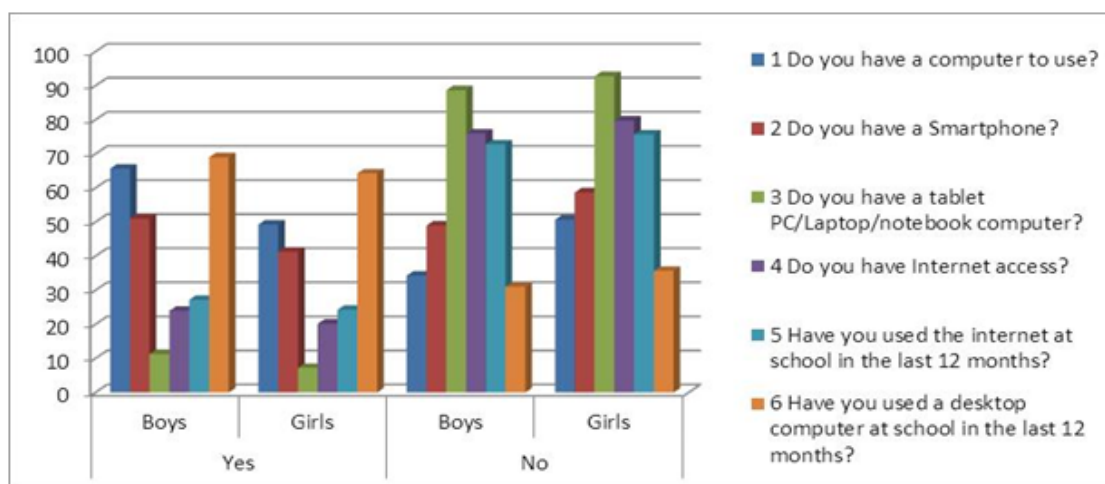
Education is the first and best key area for ICT applications. ICTs can help by providing alternative possibilities for education. The purpose of ICT in education is generally to familiarize students with the use and workings of computers, and related social and ethical issues. ICT has also enabled learning through multiple intelligence as ICT has introduced learning through simulation games; this enables active learning through all senses. Use of different information communication technologies has become inevitable for students in learning.

**Table 1: ICT Usage at Home and Other Places by boys**

S.No	Questions	Yes		No	
ICT USAGE		Frequency	Percentage	Frequency	Percentage
1	Do you have a computer to use?	394	65.7	206	34.3
2	Do you have a Smartphone?	306	51	294	49
3	Do you have a tablet PC/Laptop/notebook computer?	68	11.3	532	88.7
4	Do you have Internet access?	144	24	456	76
ICT Usage at School					
5	Have you used the internet at school in the last 12 months?	163	27.2	437	72.8
6	Have you used a desktop computer at school in the last 12 months?	414	69	186	31

**Table 2: ICT Usage at Home and Other Places by girls**

S.No	Questions	Yes		No	
ICT USAGE		Frequency	Percentage	Frequency	Percentage
1	Do you have a computer to use?	296	49.3	304	50.7
2	Do you have a Smartphone?	248	41.3	352	58.7
3	Do you have a tablet PC/Laptop/notebook computer?	43	7.2	557	92.8
4	Do you have Internet access?	121	20.2	479	79.8
ICT Usage at School					
5	Have you used the internet at school in the last 12 months?	146	24.3	454	75.7
6	Have you used a desktop computer at school in the last 12 months?	386	64.3	214	35.7



**Figure 1: Comparison of ICT Usage at Home and Other Places**

The above figure shows the ICT usage level of boys and girls, the percentage of boys having computer to use is 65.7% whereas only 49.3 % of girls are having computers to use. In the case of smartphones and laptops also boys have 9.7 % and 4.1 % respectively more than the girls. 20.2 % of girls are having the opportunity to access the internet whereas 24 % of boys are having the internet access. 24.3 % of girls have used the internet at school in the last 12 months at the same time 27.2 % of boys were used the internet at school in the last 12 months of time. 69% of boys used a desktop computer at school in the last 12 months whereas only 64.3 % girls used the desktop computer at school in the last 12 months.

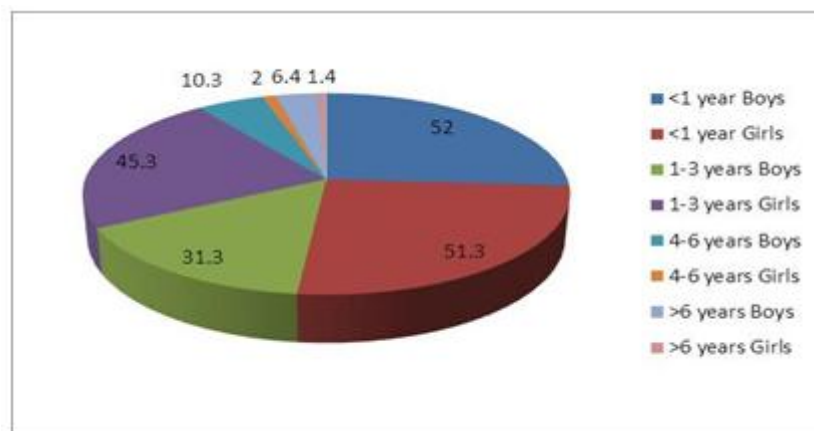
#### b. Knowledge in Basic Components and Tools of ICT

**Table 3: Knowledge in Basic Components and Tools of ICT by boys**

S.No	Questions	<1 year		1-3 years		4-6 years		>6 years	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	For how many years have you been using computers at home or places other than school?	312	52	188	31.3	62	10.3	38	6.4
		Yes				No			
		Frequency		Percentage		Frequency		Percentage	
2	Do you know how to connect input/output devices of a PC?	354		59		246		41	
3	Do you know the internal components of a PC and its configurations?	376		62.6		224		37.4	
4	How confident are you in troubleshooting the basic problems of a PC?	257		42.8		343		57.2	
5	Have you used the internet at school in the last 12 months?	294		49		306		51	

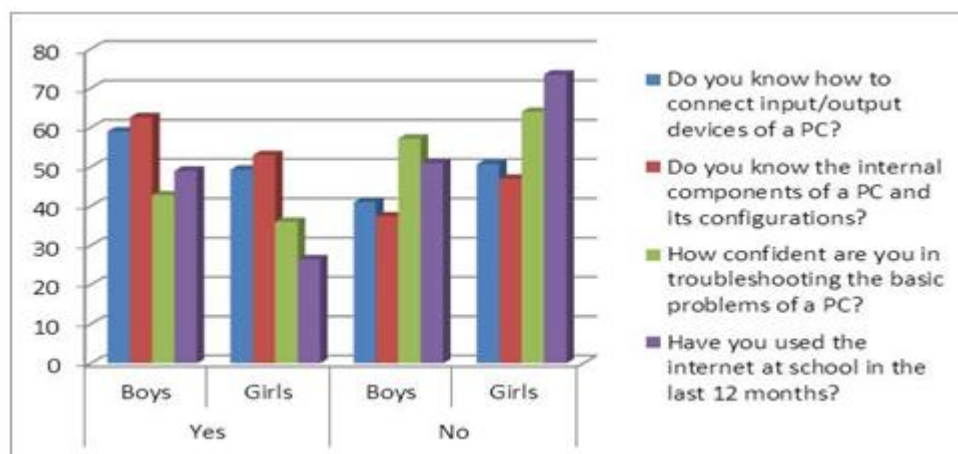
**Table 4: Knowledge in Basic Components and Tools of ICT by girls**

S.No	Questions	<1 year		1-3 years		4-6 years		>6 years	
1	For how many years have you been using computers at home or places other than school?	308	51.3	272	45.3	12	2	8	1.4
		Yes				No			
		Frequency		Percentage		Frequency		Percentage	
2	Do you know how to connect input/output devices of a PC?	296		49.3		304		50.7	
3	Do you know the internal components of a PC and its configurations?	318		53		282		47	
4	How confident are you in troubleshooting the basic problems of a PC?	216		36		384		64	
5	Have you used the internet at school in the last 12 months?	159		26.5		441		73.5	



**Figure 2: Years of using computers at home or places other than school**

Just more than half (51.3 %) of girls have been using computers at home or places other than school for last one year and similar kind of usage has been found in boys it is 52 %. Less than half of 48.7 % of girls have been using computers at home or places other than school for more than one year whereas 48 % boys have been using computers at home or places other than school for more than one year.



**Figure 3: Comparison of Knowledge in Basic Components and Tools of ICT**

When asked whether they know how to connect input/output devices of a PC 59 % of boys says yes whereas only 49.3 % of girls know about how to connect input and output devices. 62.6 % of boys are aware of the internal components of a PC and its configurations but only 53 % of girl students are aware of the internal components of a PC and its configurations.

When asked about their confidence in troubleshooting the basic problems of a PC 42.8 % of boys says they are confident in troubleshooting at the same time 36% of girls are confident in troubleshooting the basic problems of a PC. For the question of have you used the internet at school in the last 12 months slightly less than half (49 %) of boys says yes but unfortunately only 26.5 of girls students got the opportunity to access the internet at school in the last 12 months.

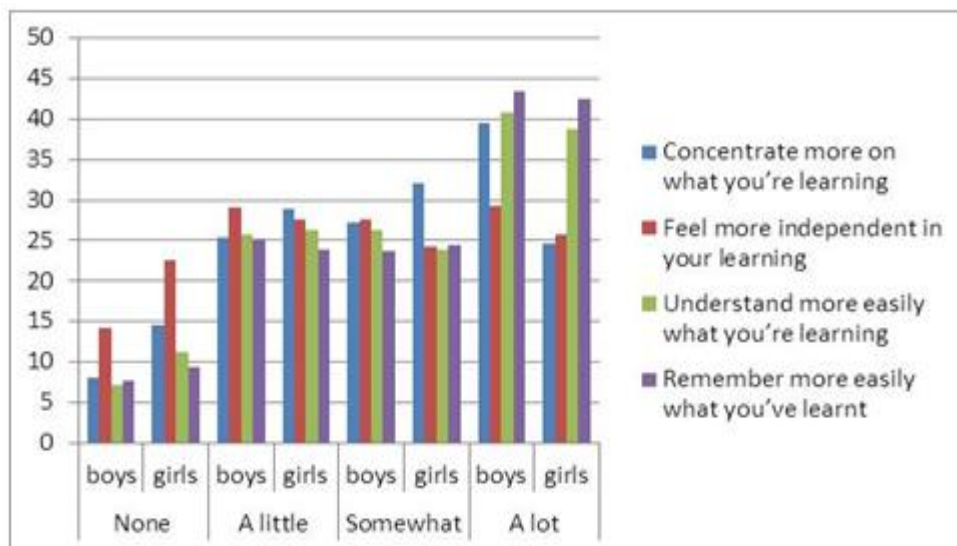
### c. ICT usage impact on learning

**Table 5: Impact of ICT usage on learning by boys**

Questions	None		A little		Somewhat		A lot	
	No.	%	No.	%	No.	%	No.	%
Concentrate more on what you're learning	48	8	152	25.3	163	27.2	237	39.5
Feel more independent in your learning	85	14.2	174	29	165	27.5	176	29.3
Understand more easily what you're learning	43	7.2	154	25.7	158	26.3	245	40.8
Remember more easily what you've learnt	46	7.6	151	25.2	142	23.7	261	43.4

**Table 6: Impact of ICT usage on learning by girls**

Questions	None		A little		Somewhat		A lot	
	No.	%	No.	%	No.	%	No.	%
Concentrate more on what you're learning	87	14.5	173	28.8	192	32	148	24.7
Feel more independent in your learning	135	22.5	165	27.5	146	24.3	154	25.7
Understand more easily what you're learning	68	11.3	157	26.2	143	23.8	232	38.7
Remember more easily what you've learnt	56	9.3	143	23.8	147	24.5	254	42.4



**Figure 4: Comparison of Impact of ICT usage on learning**

When asked about whether ICT helps to concentrate more on learning only 8% of boys says it has no positive impact otherwise all the 92% of boys unanimously agreed that ICT helps to concentrate more on learning. 14.5% of girls indicated that ICT has no positive impact but remaining 85.5 % of girls says ICT helps to concentrate more on learning.

85.8 % of boys feel more independent in their learning when the ICT is being used. The number of girls who feel more independent in their learning when the ICT is being used is 77.5 %. For the question about their easiness in understanding 92.8 % of boys agreed and 88.7% of girls express their acceptance in easiness of understanding the concept. 92.4 % of boys says ICT helps them more in remembering concepts whereas 90.7% of girls agreed ICT helps to remember the concepts.

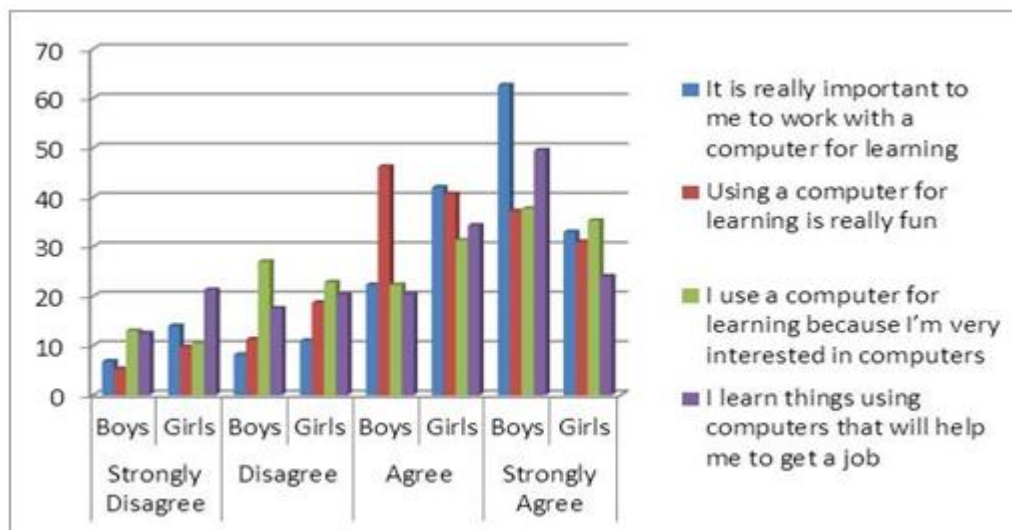
d. Attitudes towards ICT

**Table 7: Attitudes towards ICT by boys**

Questions	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
It is really important to me to work with a computer for learning	41	6.8	49	8.2	134	22.3	376	62.7
Using a computer for learning is really fun	32	5.3	68	11.3	277	46.2	223	37.2
I use a computer for learning because I'm very interested in computers	78	13	162	27	134	22.3	226	37.7
I learn things using computers that will help me to get a job	75	12.5	105	17.5	123	20.5	297	49.5

**Table 8: Attitudes towards ICT by girls**

Questions	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
It is really important to me to work with a computer for learning	84	14	66	11	252	42	198	33
Using a computer for learning is really fun	58	9.7	112	18.7	244	40.7	186	31
I use a computer for learning because I'm very interested in computers	63	10.5	137	22.8	188	31.3	212	35.3
I learn things using computers that will help me to get a job	128	21.3	122	20.3	206	34.3	144	24



**Figure 5: Comparison of Attitudes towards ICT**

The above table shows the opinions of the boys and girls about their attitude and experience towards using the ICT. When asked about the importance of computer for learning only 15 % of boys strongly disagree and disagree but all the remaining 85% of boys agreed and strongly agreed the importance of computer usage in education. For the same question 25 % of girls were strongly disagree and disagree and 75 % of girls were agreed and strongly agreed about the importance of computer in learning.

83.4 % of boys really feels that using a computer for learning is really fun but 16.6 % of boys strongly disagree and disagree this statement. At the same time 71.7 % girls says using a computer for learning is really fun but 38.3 % of girls did not agree using a computer for learning is really fun. 60 % of boys agree they are using a computer for learning because they are very interested in computers and 40 % of boys did not agree this statement. Whereas 66.6% girls agree they are using a computer for learning because they are very interested in computers and 33.4 % of girls did not agree.

Anonymously 70 % of boys agree that learn things using computers will help them to get a job only 30 % of boys did not agree this statement. Whereas 58.8 % girls agree that learn things using computers will help them to get a job and 41.2 % girls did not think they would get a job due to learning things through computers.

e. Reasons for Non/Limited usage and knowledge of ICT

Table 9: Reasons for Non/Limited usage and knowledge of ICT by boys

No	Options	No. of students	% of students	responses	% of responses
1	Inadequate resources	464	77.3	464	19.0
2	Lack of time	256	42.7	256	10.5
3	Slow speed of PC	215	35.8	215	8.8
4	Lack of support by IT staff	245	40.8	245	10.0
5	Lack of awareness on benefits of ICT	373	62.2	373	15.3
6	Electricity failure	267	44.5	267	10.9
7	Slow speed of internet	316	52.7	316	13.0
8	Lack of support by parents	304	50.7	304	12.5
	<b>Total</b>	<b>600</b>	<b>100 %</b>	<b>2440</b>	<b>100 %</b>

Table 10: Reasons for Non/Limited usage and knowledge of ICT by girls

No	Options	No. of students	% of students	responses	% of responses
1	Inadequate resources	458	76.3	458	19.4
2	Lack of time	232	38.7	232	9.9
3	Slow speed of PC	198	33.0	198	8.4
4	Lack of support by IT staff	243	40.5	243	10.3
5	Lack of awareness on benefits of ICT	348	58.0	348	14.8
6	Electricity failure	286	47.7	286	12.1
7	Slow speed of internet	267	44.5	267	11.3
8	Lack of support by parents	323	53.8	323	13.7
	<b>Total</b>	<b>600</b>	<b>100 %</b>	<b>2355</b>	<b>100 %</b>

Since students are allowed to choose multiple answers, to show the percentage distribution we must first determine the percentage base. Typically, the base is the number of respondents (in our case all 600 students). Alternatively, we may choose the number of all responses as the percentage base (in our case 2440 responses for boys and 2355 responses for girls). The below chart tells us the percentage based on all responses the Reasons for Non/Limited usage and knowledge of ICT.

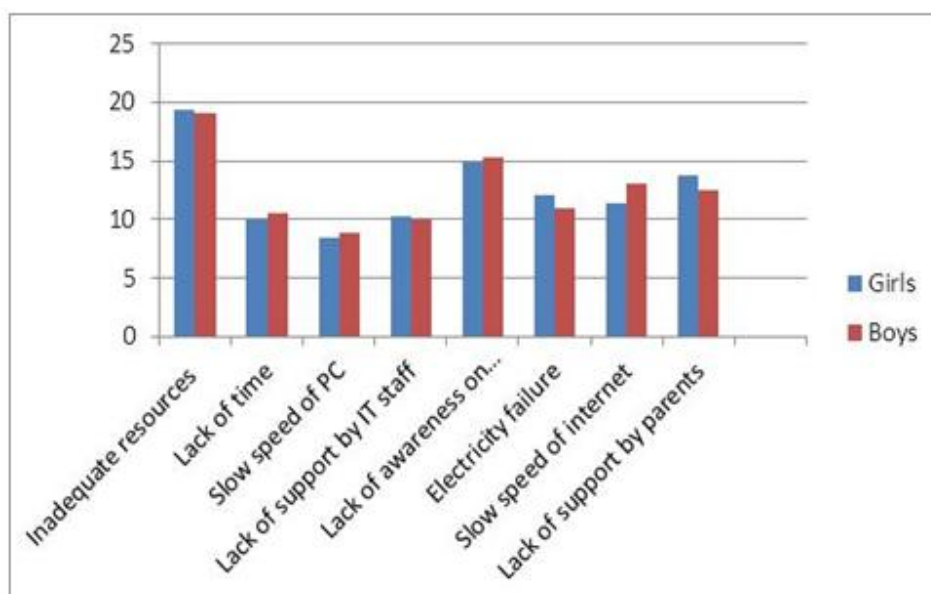


Figure 6: Reasons for Non/Limited usage and knowledge of ICT

The study results shows that there is no vast difference between the attitudes of boys and girls in terms of the reasons for Non/Limited usage and knowledge of ICT based on the chart almost equal percent of boys (19%) and girls (19.4%) says inadequate resources is the main reason for Non/Limited usage and knowledge of ICT. Lack of awareness on benefits of ICT is the second major reason for Non/Limited usage and knowledge of ICT 14.8 % girls and 15.3 % boys represented this as one of the main reason. 11.3 % of girls and 13% of boys mentioned Slow speed of internet, 28.5 % of girls and 22.5 % boys are mentioned Lack of support by parents and ICT staffs, Lack of time and Slow speed of PC are represented by 18.3 % girls and 19.3 boys, 12.1% girls and 10.9 % of boys responses were marked for Electricity failure as the reasons for Non/Limited usage and knowledge of ICT.

## **6. DISCUSSION**

The questionnaire is divided into two major parts, namely ICT usage and knowledge of ICT. The study reveals that majority of the students in the secondary schools sampled were computer and ICT literate. Although this is a very good indication, so much still needs to be done.

The study found that large number of the respondents irrespective of gender reported that they utilize ICT at their School computer lab. It was observed that their teachers sometimes use ICT during class hours. Results indicate that boys' students got more opportunities than the girl students in terms of using computers in home and other places. While internet and computers available in schools utilized by more female students than the male students.

Majority of the respondent's knowledge about ICT applications such as working with files and folders found sufficient at the same time sending emails searching information in online was not quite sufficient for learning purposes. Male students are outperforming female students in the case of knowledge in basic components and tools of ICT such as connecting input/output devices of a PC, knowledge of the internal components of a PC and its configurations, confidence in troubleshooting the basic problems of a PC. The results stated that boys are very much interested in knowing the hardware components of a computer and showing good confidence in troubleshooting the computer components.

The majority of the respondents strongly agreed that ICT have great impact on their learning as it helps in improving their skills. Teachers should use ICT and use of ICT is better than the use of traditional way of teaching. Slightly more number of male students strongly agrees than the female students that ICT has a positive impact in all aspects of learning such as concentrate more on learning, feel more independent in learning, understand more easily while learning Remember more easily what they learnt.

There is a marginal difference in the attitude between boys and girls towards ICT in all the aspects such as importance, interest and easiness of computer in learning and towards getting a job in future. Highly more number of boys' students strongly agrees that ICT really helps them in all the above mentioned aspects. Whereas less number of girl students only have positive attitude with ICT than the boys.

Majority of the students irrespective of their gender have been facing the problems in the order of inadequate resources, Lack of awareness on benefits of ICT, Lack of support by parents, Lack of support by IT staff, slow speed of internet, slow speed of PCs, lack of time in utilizing ICT resources, and electricity failure. From the responses it is found that all the students mentioned inadequate resources is the primary reason for Non/Limited usage and knowledge of ICT. Next to that students considered lack of awareness on benefits of ICT and support by ICT staffs and parents.

## **CONCLUSION AND RECOMMENDATIONS**

The integration of ICT can promote significant changes in the practices of teaching and learning and is beneficial for students, in this study, the respondents reported that comparatively equal number of boys and girls accessed the computer and internet in the school in the last 12 months. But more number of boys have used the computer and accessed the internet places other than the school which shows girls have limited access to the ICT resources outside the school campus.

Girls are underperforming than the boys in the case of knowledge in basic components and tools of ICT this may be caused due to lack of interest of girls towards acquiring knowledge about the components and configurations of computers. Even though the positive impact of ICT on learning is accepted by most of the boys and girls there is a slight difference in their attitude and experience about the ICT usage. It is found that inadequate resources, lack of awareness on benefits of ICT and support by ICT staffs and parents are the main reasons for Non/Limited usage and knowledge of ICT.

From the data it is quite evident that boys' usage and knowledge of ICT is more as compared to girls. The low usage and knowledge of ICT by the girl students might be due to the fact that the female students have fewer opportunities to access the resources, lack of awareness and interest than that of the male students. Keeping the importance and features

of ICT in view, the study recommended that teachers should make maximum use of ICT during their lecture because it has a great impact on student's learning. The government in conjunction with the ministry of education should ensure the adequacy of resources such as sufficient number of computers with internet connection and also required ICT trainings to the school teachers.

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