



وزارة الإتصالات و تكنولوجيا المعلومات

Ministry of Information and  
Communications Technology



*JORDAN*  
*Education Initiative*



# *ICT Use and Penetration in Schools of Jordan*

*July 2012*

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## ACKNOWLEDGMENT

The Ministry of Education (MoE), the Ministry of Information and Communication Technology (MoICT), and the Jordan Education Initiative (JEI) genially appreciate the efforts of all work teams and officials for shouldering responsibility and performing their mission remarkably, and for their contribution to facilitating procedures and application of this study .Hence, the results of this study will tremendously help in making the right decisions based on up-to-date and accurate data related to the ICT use and penetration in Jordanian schools, school readiness and infrastructure, and the extent to which technology is being utilized and equally distributed in the different geographic areas of the Kingdom.

We especially appreciate efforts by the main study team who have prepared the study’s concept paper and designed the different tools. They have followed the implementation process, held various workshops, collected quantitative and qualitative data, analyzed and presented the results, and finally prepared the Study Report. They are as follows:

Jordan Education Initiative	Ministry of Information and Communication Technology	Ministry of Education
<ul style="list-style-type: none"> <li>• Dr. Osama Obeidat</li> <li>• Maram Barqawi (project manager)</li> <li>• Ziad Jouaneh</li> </ul>	<ul style="list-style-type: none"> <li>• Raghda AL-faouri (project manager)</li> <li>• Ruba Mansour</li> <li>• Hamed Al-shrideh</li> <li>• Linda Al-Khatatbeh</li> </ul>	<ul style="list-style-type: none"> <li>• Dr. Khalida Shatat (project manager)</li> <li>• Dr. Majed Alzyoud</li> <li>• Faten Areidha</li> <li>• Mustafa Yaseen</li> </ul>

We are also deeply grateful to the following team members who followed up with the liaison officers during the data collection phase, participated in conducting various workshops, collected the quantitative and qualitative data, and analyzed the results. They are as follows:

1. Eng. Wafa Al-Nimri/ MoE
2. Raja Abdul Hadi/ MoE
3. Mohammad Al-Absi/MoE
4. Mazen Anees/ MoE

Our sincere thanks also go to the Steering Committee members, who followed up with the core study team and provided them with the necessary support and facilities. They are as follows:

- HE The Secretary General of the MoE Education and Technical affairs
- HE. The Secretary General of the MoICT
- HE. The Chief Executive Officer of the JEI

Special thanks also go to Mrs. Yara Abdel Samad, director of the Policies and Strategies Directorate at MoICT, for reviewing the project's deliverables.

This report was produced for review by the Ministry of Education, the Ministry of Information & Communications Technology and the Jordan Education Initiative in Jordan. It was prepared by a team representing all three parties, and was partially funded by the United States Agency for International Development (USAID) through the Education Reform Support Program (ERSP). The content of this report is the sole responsibility of the Ministry of Education, the Ministry of Information & Communications Technology and the Jordan Education Initiative, and does not necessarily reflect the views of the USAID or the US Government.

## **EXECUTIVE SUMMARY**

This study aims to examine the readiness and use of ICT in all schools in Jordan and create a national database on the readiness and usage of ICT infrastructure in the schools of the Kingdom. The study also seeks to assist in developing plans, strategies and programs that support education reform for the knowledge economy.

This study will specifically answer the following questions:

1. What is the extent of ICT infrastructure readiness in Jordanian schools?
2. What is the extent of ICT penetration in Jordanian schools?
3. What are the ICT uses in schools, and to what extent are they used?

The following research methods were used to answer the study questions:

1. The descriptive quantitative survey method was used to describe the extent of ICT readiness in both administrative and educational aspects in all public and private Jordanian schools, and to investigate the obstacles and causes that might hinder ICT use, by conducting a comprehensive survey based on a well-designed questionnaire. The quantitative data were then collected and analyzed.
2. The qualitative research method was used in order to investigate the views of the stakeholders about the extent of ICT readiness, and to assess possible obstacles to ICT usage. This was conducted through a number of focus groups that consisted of students, teachers, school principals and parents.

This study was implemented in April and May 2011. The study population consisted of all public, private, and UNRWA schools in Jordan, approximately 4610 schools, excluding kindergartens. The qualitative study sample consisted of 135 participants of the study population, which included public school principals, teachers, students, as well as parents.

To achieve the objectives of this study, the work team developed a questionnaire that contained eight major sections: general information about schools, ICT expenditure in schools, infrastructure, curricula, teachers and administrators, students, technical support and the local community services. This questionnaire was published on the MoE website.

Moreover, three types of question models were developed for target groups in focus groups (school's staff, students and parents).

The key results of the study were as follows:

1. 76% of all schools in Jordan own at least one landline phone.
2. There are more than 95,000 computers in schools (97% of them are desktop PCs).

3. 99% of schools have at least one computer (desktop PC or Laptop) that is either used for teaching or administrative purposes.
4. The ratio of students per computer at the Kingdom's level was approximately 14:1. The highest ratio was in UNRWA schools.
5. 96% of schools had responded positively about accessing EduWave for mainly administrative purposes, such as recording students grades.
6. 85% of total schools have at least one computer lab.
7. 62% of schools indicated that they use additional educational software other than those posted on EduWave; 34% of these schools said they buy the software from the market; while more than half of the schools stated that they use free software.
8. 46% of schools reported that teachers produce the software while 37% said students produce it.
9. 86% of schools have Internet connection with the highest broadband speed.
10. Slow Internet connection and other technical issues were major challenges facing schools while using the Internet and the EduWave.
11. The study has revealed that approximately 14% of schools have their own websites.
12. 77% of the teachers working in the respondent schools have their own PCs, 41% of them can surf the Internet at home, and 57% of them have personal e-mails.
13. An average of 62% of students use computers in their schools, 41% of them use the Internet, while the percentages of students who have their own PCs and can surf the Internet at home were 58% and 28% respectively.
14. Regarding the use of social network sites as a means of communication, results showed that 11% of respondent schools use Facebook, 1.3% use Twitter, while 9% said they use other networks.

**Some of the main recommendations of the study:**

1. The study stressed the need for effective and continuous maintenance for school PCs and equipping schools with additional computer labs to implement the e-content.
2. Computers should be redistributed in schools in a way that is compatible with students' numbers and educational needs.
3. Activating and promoting the EduWave role in the educational process. EduWave should be sustainably serviced to avoid technical problems that end-users might face. Furthermore, the published e-content must be updated to meet the students' needs.
4. Activating the MoE website and the (EduWave) role in surveying the end users' views regarding the implementation of technology in education. The study also

recommended activating e-mail accounts as a means of communication among MoE employees.

5. Finding radical solutions for slow Internet connection and other disconnection inconveniences.
6. Attracting and involving the private sector in the development of the infrastructure of less fortunate schools.
7. Activating computer labs for training local community members to integrate technology in education in afterschool hours. Moreover, the study highly recommended honoring and motivating those teachers and students who participate in creative initiatives to integrate ICT in education.
8. Conducting specialized surveys on students' and teachers' views about integrating ICT in education and the obstacles that they might face.

## **INTRODUCTION**

### **Background**

The ICT sector in Jordan has recently witnessed major development due to the growing penetration and diversity of services, in addition to the increasing volume of investment and employment in both public and private sectors. This rapid technological development has had impact on the various economic, social, and educational aspects of life.

The Ministry of Education (MoE) has made extraordinary efforts to implement ICT in schools, where computer labs have been introduced in public schools and simultaneously equipped with computers, Internet lines, and peripherals such as printers, scanners and data show projectors. The MoE has created the e-learning portal (EduWave) which enables all end-users to communicate smoothly through discussion forums, e-exams, e-mails and other media. This portal also enhances better education by activating the various e-content subjects, such as Math, Science, English and Arabic languages, IT, as well as Civic and Health Education. The MoE has also begun teaching computer since 2000 for grades 7-11, and has been keen on encouraging all teachers to attend ICDL, Intel Teach to the Future, and Word Links professional development programs, and it has granted scholarships to some teachers to obtain ICT diplomas or Master's degrees in education.

The Ministry of Information and Communication Technology (MoICT) has established the National Broadband Network Program (NBN Program) which contributes to developing Jordan educational system by increasing ICT penetration in universities, community colleges, schools and learning centers throughout the kingdom. This high speed, fiber-optic based network is expected to connect to nearly 20% of Jordanian schools by 2011.

The Jordan Education Initiative has emerged as the first model that manifests true partnership between the public and private sectors. It was launched by the World

Economic Forum and the Jordanian Government during the extraordinary meeting of the Forum that took place under the patronage of His Majesty King Abdullah II at the Dead Sea in June 2003. The initiative was launched in the presence of over 100 local and international participants, with the aim of supporting Jordan's efforts in improving the level of education, encouraging creativity, developing capabilities and building knowledge economy by using the latest technological tools in 100 public schools, later named "Discovery Schools."

The Jordan Education Initiative has emerged as the first model that manifests the true partnership between the public and private sectors, by the World Economic Forum and the Jordanian Government, during the extraordinary meeting of the Forum that took place under the patronage of His Majesty King Abdullah II at the Dead Sea in June 2003. It was launched in the presence of more than one hundred local and international participants, with the aim of supporting Jordan's efforts in improving the level of education, encouraging creativity, developing capabilities and building knowledge economy by using the latest technological tools in one hundred governmental schools that was later named "Discovery Schools."

The Jordan Education Initiative one of Her Majesty's Queen Rania Al-Abdullah non-profit organizations that had, since its launching 6 years ago, the care and support of Her Majesty through her close follow up to every creativity and excellence. Because of this care and follow up, many countries have sought the help of this initiative especially in terms of electronic curriculums, providing infrastructure for utilizing technology in education, and in the implementation of creative and unique programs for the factors of the educational process "The Student, The Teacher, The School Unit."

The Initiative has worked in the Discovery Schools and has influenced 80,000 students, 3000 teachers, provided technological climates and electronic resources, and unprecedented and qualitative achievements. The initiative was registered as a non-profit organization, and had the honor of Her Majesty Queen Rania Al-Abdullah to launch the second phase of the initiative in 2008.

To pursue the efforts made in the field of implementing specialized studies to measure the impact of ICT on education, MoICT, MoE and the JEI have conducted a comprehensive survey of all local and private Jordanian schools to measure a set of indicators in the use of ICT in education, which in turn will help in taking decisions that are based on reliable and updated data.

A committee from the three parties was formed in order to design and implement the study and analyze the findings. The three parties signed a Memorandum of Understanding (MoU) on January 5, 2011, identifying the tasks and responsibilities assigned to each party in order to achieve satisfactory results.

A steering committee was formed to follow up the implementation of the study and provide the necessary facilitation.

## **Study Objectives and Questions**

This study aims to examine and create a national database on the readiness and use of ICT in all schools in Jordanian schools. It also aims to assist planners and policymakers in developing plans, strategies and programs that support educational development based on the education reform for the knowledge economy.

### **Main objectives**

1. Providing a frame of reference for the indicators of ICT penetration and use in schools, which supports national initiatives and programs concerned with education.
2. Providing a reliable data source that meets the requirements of local, regional and global organizations by providing analytical reports on the strengths and weaknesses of the education sector, particularly with regard to the impact of ICT on education
3. Introducing decision makers to the actual needs of the education sector in Jordan.
4. This study is considered the first national survey to investigate ICT readiness in Jordanian schools.
5. It provides the private sector with a clear picture on the tools and solutions the education sector needs for right investment purposes.
6. The study provides relevant information on the quality of e-education applied in schools.
7. It contributes to identifying the views of the stakeholders of the educational process on various ICT issues.

Based on these objectives, three research questions were formulated as follows:

- What is the readiness of ICT infrastructure in Jordanian schools?
- What is ICT penetration rate in Jordanian schools?
- What are the areas and purposes in question and to what extent is ICT used in Jordanian schools?

## METHODOLOGY AND PROCEDURE

This study used the following research methods:

1. The analytical, descriptive quantitative method was used in order to describe the extent of ICT readiness in both administrative and educational fields in all Jordanian public and private schools, and to identify the possible obstacles to ICT usage and the reasons behind these obstacles by conducting a comprehensive survey and well-designed questionnaire.
2. The qualitative method was used in order to investigate the views of stakeholders about the extent of ICT readiness, and to identify the obstacles that might face ICT usage. This was implemented by conducting focus groups with students, teachers, school principals, and parents.

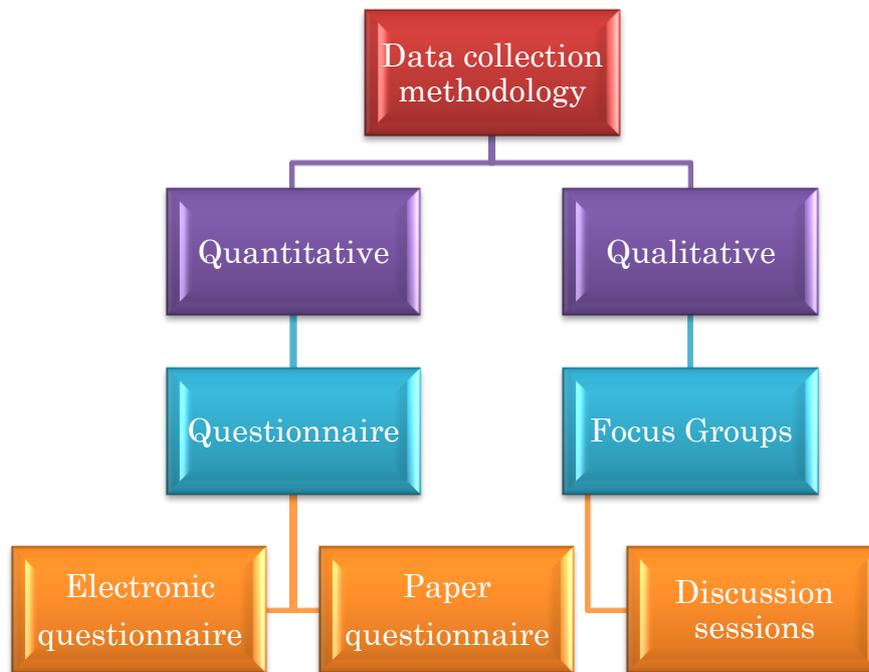


Figure (4.1) Data collection methodology

### 1. Study Sample and Population:

The target groups of this study were all public and private schools, as well as schools of the United Nations Relief and Work Agency (UNRWA). According to the Ministry of Education's database, the total number of schools at the time the study was conducted was 4610.

A sample of 135 participants, including public schools principals, teachers, students, and parents were selected as focus groups.

The focus groups were assigned randomly by governorate and gender. These were 9 focus groups; 3 in the north (Irbid), 3 in the center (Amman), and 3 in the south (Tafilah). The 3 focus groups in each area consisted of students, parents, teachers and principals.

Table (4.1) shows the distribution of schools that participated in the study.

<b>Sector</b>	<b>Supervising Authority</b>	<b>Number of schools</b>
Public (government) (3453 schools)	Ministry of Education	<b>3420</b>
	Ministry of Islamic Affairs	<b>4</b>
	Ministry of Defense	<b>29</b>
Private (984 schools)	Private Education	<b>967</b>
	Jubilee School	<b>1</b>
	Ministry of Higher Education	<b>4</b>
	Ministry of Social Development	<b>12</b>
UNRWA (173 schools)	UNRWA Schools	<b>173</b>
<b>Total number of schools</b>		<b>4610</b>

Table (4.1): Number of schools according to supervising authority and sector

### **1) Response rate:**

The Study response rate was very high; 4439 out of 4610 schools completed and submitted the questionnaire, accounting for more than 96% of the Jordanian schools.

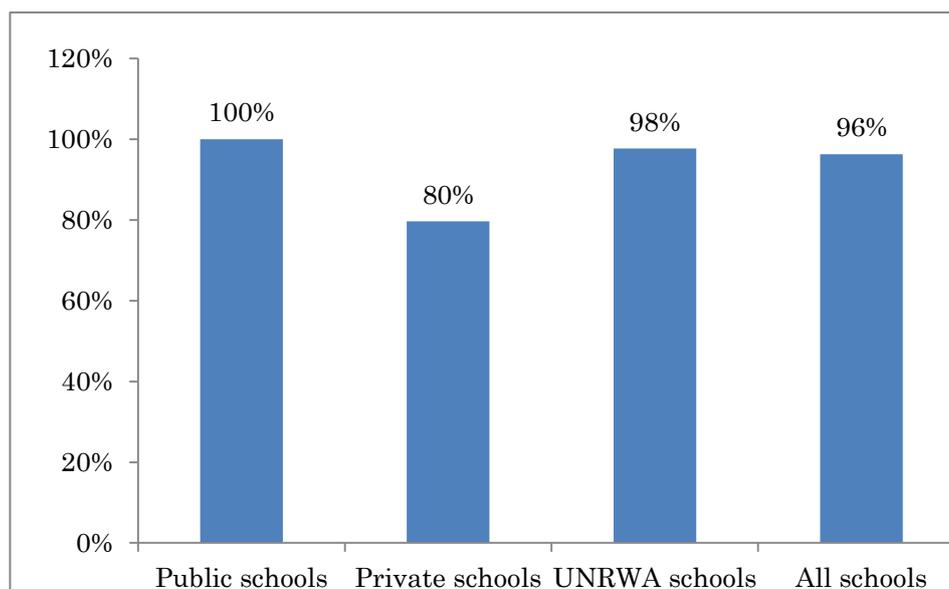


Figure (4.1.1): School percentages according to sector

As figure (4.1.1) illustrated, the response rate in the public schools was 100%, UNRWA schools came second with a rate of about 97%, and private schools came third with a response rate of 80%.

## **2) Characteristics of Targeted Population:**

- a. The geographical distribution by governorate:

The majority of respondent schools were in Amman, the capital, (28%), followed by Irbid and Zarqa respectively. This is due to the large number of schools located in Amman.

- b. The percentage distribution of the respondent schools by supervisory authority:

Public schools (affiliated with the MoE) were dominant in this survey, accounting for about 78% of the total schools; while private and UNRWA schools accounted for 18%, with the total number of schools amounting to 173.

- c. The percentage distribution of respondent schools by education stage:

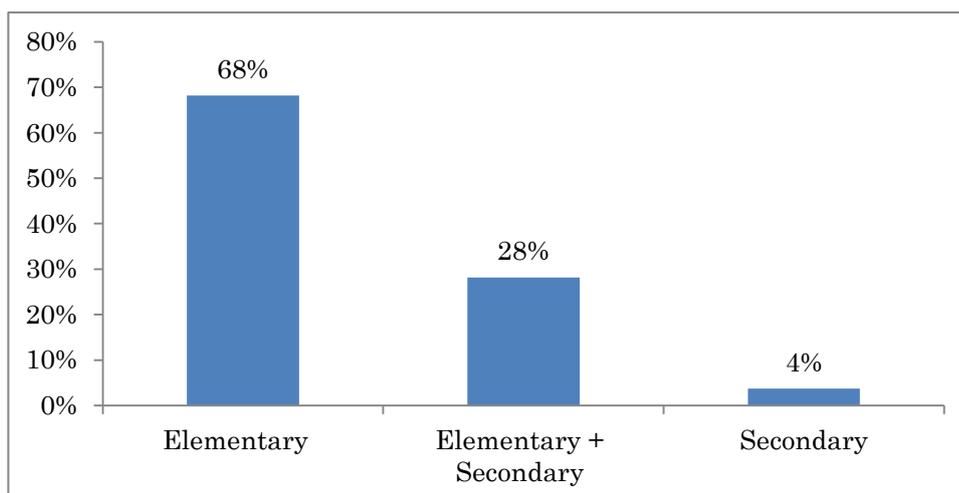


Figure (4.2.1): Percentage distribution of all respondent schools by educational level

As shown in figure (4.2.1), 68% of the respondent schools were elementary; 28% of the schools covered both levels; and 4% were secondary schools. Figure (4.2.2) also illustrated the distribution of the schools by educational level in each sector.

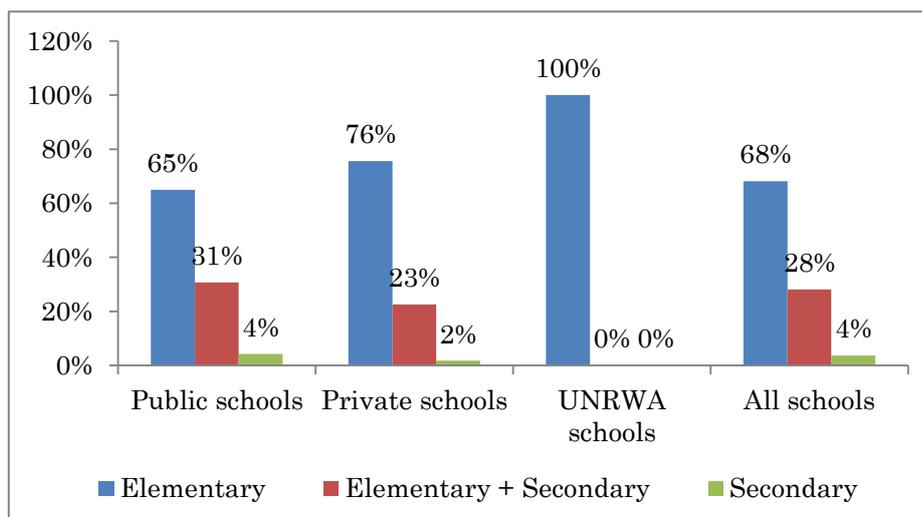


Figure (4.2.2): Percentage distribution of respondent schools by education level in each sector

- d. Figure (4.2.3) shows the percentage distribution of respondent schools by number of shifts: A total of 89% of schools in Jordan work one shift, while 11% apply the double-shift system and most of these schools are concentrated in Zarqa and Amman Third Directorate.

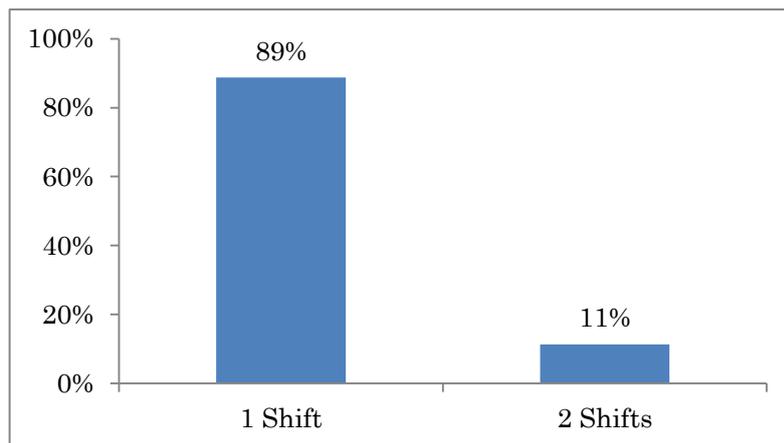


Figure (4.2.3): Percentage distribution of respondent schools by number of shifts

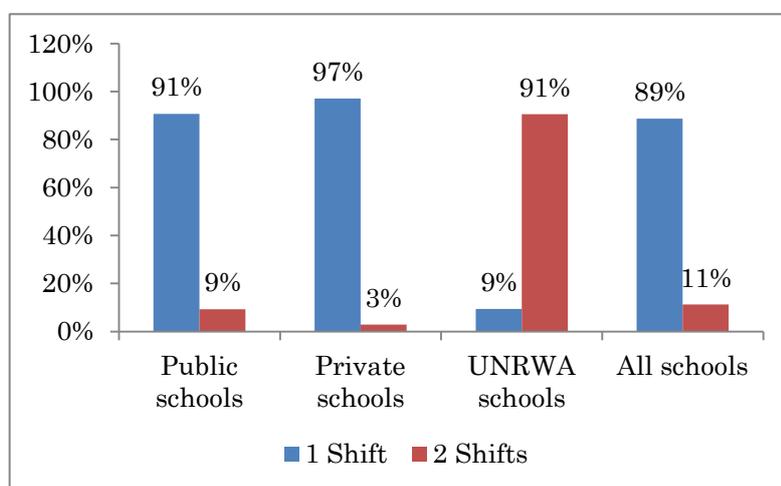


Figure (4.2.4): Percentage distribution of respondent schools by number of shifts in each sector

Figure (4.2.4) illustrates the percentage distribution of schools by number of shifts for each sector. More than 90% of private and public schools work one shift while 91% of UNRWA schools work double-shifts.

- e. The percentage distribution of respondent schools by gender:

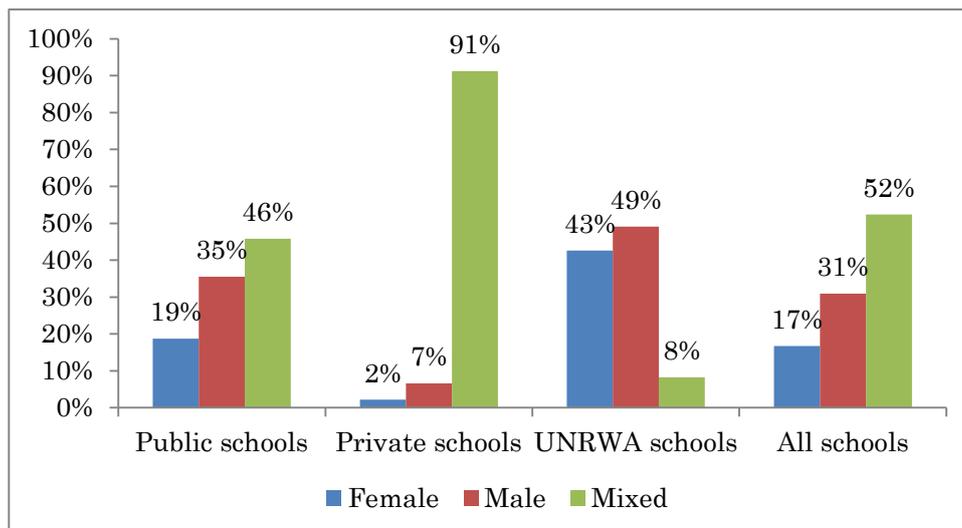


Figure (4.2.5): Percentage distribution of respondent schools by gender in each sector

Figure (4.2.5) shows that about half of schools are mixed, 31% are for boys, and 17% are for girls; the highest percentage of mixed schools was in the private sector with a total of 91%.

- f. The percentage distribution of respondent schools by ownership of premises:

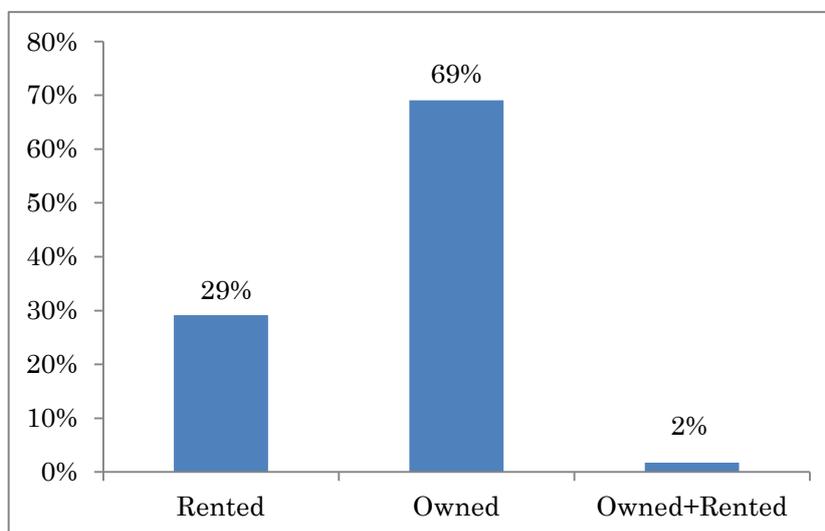


Figure (4.2.6): Percentage distribution of respondent schools by ownership of premises

As shown in figure (4.2.6), a total of 69% of the schools own their premises, while 29% of the school premises are rented; and 2% of the premises are either owned or rented.

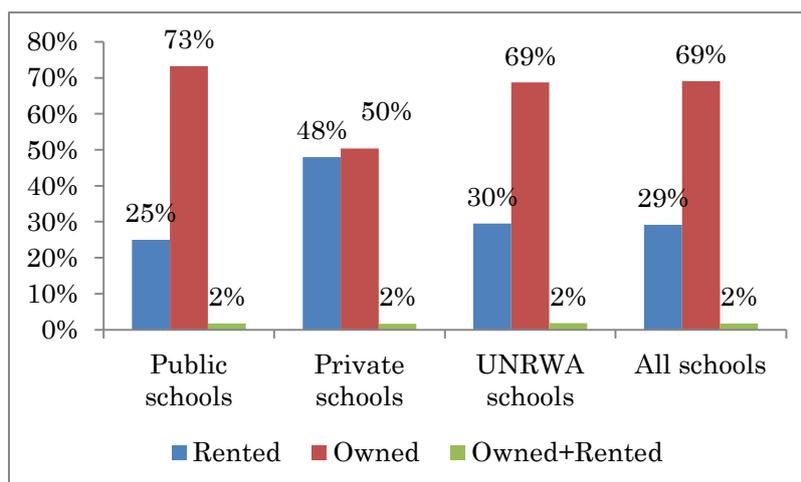


Figure (4.2.7): Percentage distribution of respondent schools by ownership of premises in each sector

Figure (4.2.7) shows that 25% of the public schools are rented, and that 48% and 30% of the private and UNRWA schools are rented respectively.

## 2. Study Tools:

The study team developed a number of tools to enable them to collect the required quantitative and qualitative data. To achieve the objectives of this study, the researchers developed a reliable questionnaire based on previously developed indicators to gather the required data.

The questionnaire consisted of eight major sections: general information about schools, ICT expenditure in schools, infrastructure, curricula, teachers and administrators, students, technical support, and the local community partnerships.

In addition to the questionnaire, the researchers developed some questions in order to collect the qualitative data through discussion sessions that focused on the following main topics:

- Schools' satisfaction with ICT infrastructure
- Extent of actual ICT implementation at schools
- Tendency toward using ICT in education
- Impact of applying ICT on education partners.
- Teachers and principals' professional development
- Challenges and obstacles to maximum implementation of ICT
- Success stories in the use of technology in schools.

### **3. Study Procedures:**

The implementation of this study required rigorous efforts by the three parties; MoICT, MoE and JEI, as this is the first national study of its kind in Jordan.

The following procedures were followed in order to achieve the expected objectives of the study:

1. Forming a committee representing the three partners in order to prepare the concept paper of the study by the three partners in March 2010. The committee then developed a comprehensive study document that included all related aspects: backgrounds, objectives, questions, population, sample, methodology, and tools.
2. Creating different work teams that represent the three parties in November 2010. The teams were divided as follows:
  - The main study team that consists of (10) specialists who represent the three main study parties.
  - The follow-up team that provides the necessary technical support, consisting of (4) MoE specialists.
  - The liaison officers team that consists of (79) members from the MoE, UNRWA, and Military Education Directorate.
3. The three parties signed an MoU on January 5, 2011 in order to identify the tasks and responsibilities assigned to each party.
4. Designating a steering committee to follow up the implementation of the study and to facilitate the process. This committee includes:
  - a. Secretary General of MoE Education and Technical Affairs
  - b. Secretary General of the MoICT
  - c. The JEI Chief Executive Officer
5. Creating a list of indicators concerning the integration of ICT in education based on global indicators and standards and previous studies, taking into account the reality of the Jordanian society, available means, the national ICT strategy, the MoE plan for applying ICT in education, and activating EduWave in Jordanian schools.
6. Piloting and finalizing the questionnaire, and presenting the findings to the steering committee.

7. Developing the e-questionnaire and publishing it on the MoE website ([www.moe.gov.jo](http://www.moe.gov.jo)).
8. Developing the questionnaire manual which includes the mechanism of handling the questionnaire, guided notes key answer, definitions of ICT terminology, the time needed to fill out the e-questionnaire, and the school team in charge of filling out the questionnaire. The manual had been published on the MoE website before applying the pilot survey.
9. Testing the e-questionnaire on 28 schools in order to find out the technical problems that might face the questionnaire application mechanism, and to issue the survey initial data. The feedback was attached to the questionnaire.
10. Holding three workshops to train the concerned liaison officers on the mechanism of filling out the e-questionnaire on March 29, 2011. These workshops were distributed according to geographical regions (North, Center, and South). The manual was distributed to fill out the questionnaire and identify the objectives, distribution mechanisms and follow-up within the specified time.
11. Presenting the study concept and procedure to the MoE Planning Committee. The presentation highlighted the importance of this survey, and how critical it is for the MoE to provide technical support to achieve better results.
12. Conducting a comprehensive survey between April 11, 2011 and May 2, 2011: The survey was made public in advance by posting it on the MoE website and by publishing the manual, names and phone numbers of the follow-up team members, the e-mail address created to receive the liaison officers' notes, the e-questionnaire URL, as well as the liaison officers' names, phone numbers and e-mails. During the implementation of the study, the follow-up team had the role of stimulating the liaison officers to follow up on non-respondent schools, or those who did not complete the questionnaire correctly.
13. Extending the survey period up to May 9, 2011 in order to improve the response rates.

14. Collecting the quantitative data electronically via the e-questionnaire website while the paper questionnaires were collected by the liaison officers. The paper questionnaires have been filled out in schools that do not have Internet access and under the supervision of the liaison officers and the study and the follow-up teams. Various reports were published during the process of gathering the quantitative data which reflected different technical problems such as multiple entries, entry errors and multiple entry versions. Such errors underlined the need to modify the lists of schools and their national numbers and to unify the names of schools in all reports. It was difficult to track repeated entries, which required concerted efforts by all teams to modify the data when necessary.
15. Analyzing the quantitative data by the main study and follow-up team members, then converting the data to Excel sheets and extracting statistical reports based on approved indicators.
16. Preparing the focus groups' questions based on the list of indicators that have been approved in the study, and identifying the directorates and schools from which the focus groups were selected, as mentioned earlier in the "Study Population" section.
17. Addressing the directorates of education to nominate the names of focus groups according to the criteria adopted by the main study team.
18. Conducting discussion sessions for the three focus groups; the Central Region on 16/5/2011, the North Region on May 17, 2011, and the South Region on May 18, 2011. These discussion sessions were recorded, and reports were written to get the required qualitative data needed for the study.
19. Analyzing the qualitative data by the main study team and the follow-up team members by documenting the focus groups' discussion sessions that were based on the focus groups' questions adopted for the three categories.
20. Discussing quantitative and qualitative analysis results by the main study team, and agreeing on how to present them.
21. Forming a team to write the report in the Arabic Language once the framework structure of the report is approved.
22. Holding a meeting for the Steering Committee of the study on 14/4/2011 to discuss the draft of the final report. The observations of the committee

members were taken into consideration and the report was formally approved.

23. Preparing an English version of the study summary based on the Arabic version.
24. Providing technical and linguistic editing for both the Arabic and English versions of the report.
25. Announcing the study results on February 22, 2012 during a workshop that gathers stakeholders from the sectors of education and information technology.
26. Printing the Arabic and English versions of the report and distributing them to stakeholders.

## FINDINGS

### Quantitative Research Findings:

The captured results out of the questionnaires are listed below:

#### 1) Schools Infrastructure

Figure (5.1.1) shows that 76% of all schools in Jordan have at least one telephone line. Almost all UNRWA schools (98%) have one telephone line while 71% of public schools have one telephone line each.

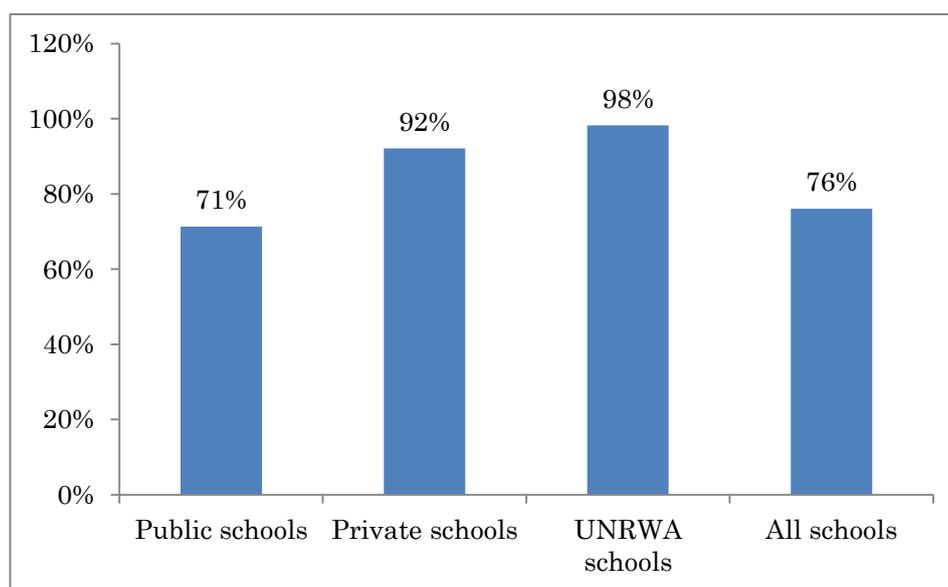


Figure (5.1.1): Percentage of schools that have at least one telephone line

Figure (5.1.2) shows that 20% of the schools in Jordan have mobile phone lines. Only 2% of UNRWA schools have mobile phone lines compared to 76% of private schools.

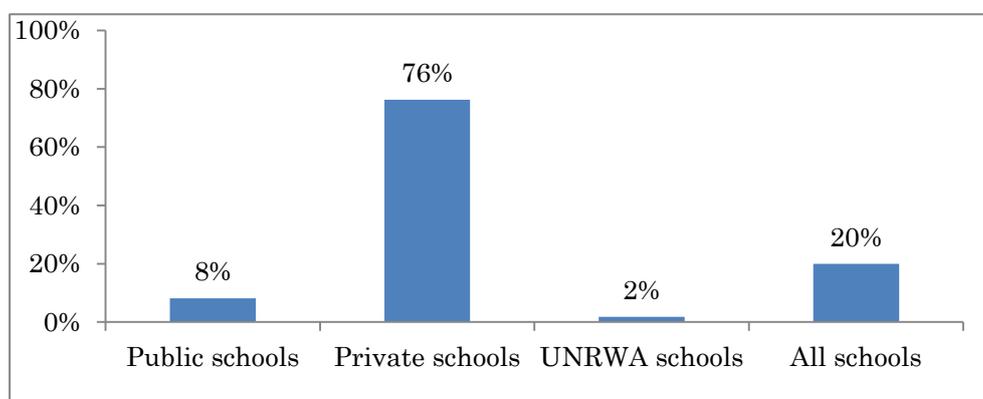


Figure (5.1.2): Percentage of schools that have at least one mobile phone line

The study shows that 98.6% of all schools in Jordan have at least one computer -- see figure (5.1.3).

The total number of computers available in schools is around 95750, 97% of them are desktop PCs (around 92713) while only 3% of the computers available were laptops (3037).

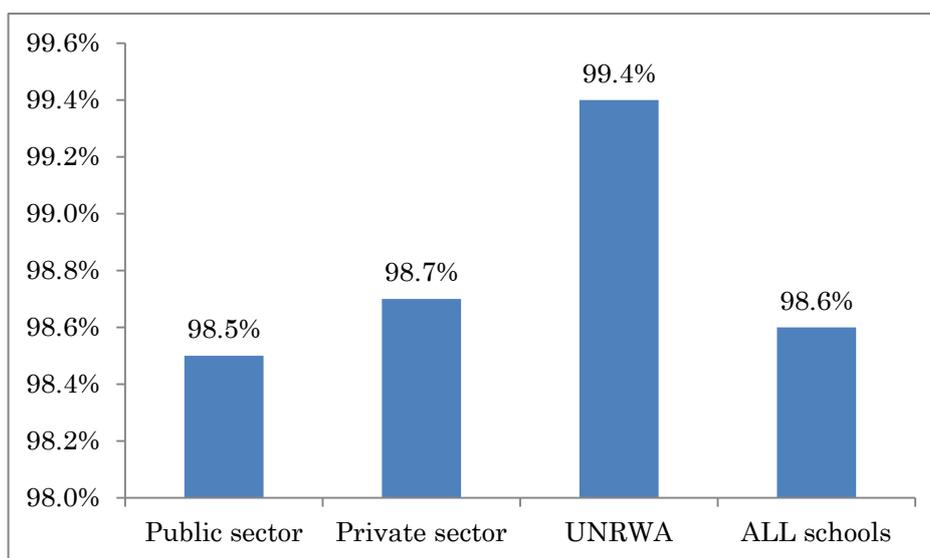


Figure (5.1.3): Percentage of schools that have at least one computer by sector

Figure (5.1.4) shows that 85% of the desktop PCs in schools are used for educational purposes, compared with 71% of laptops that are used for the same purposes.

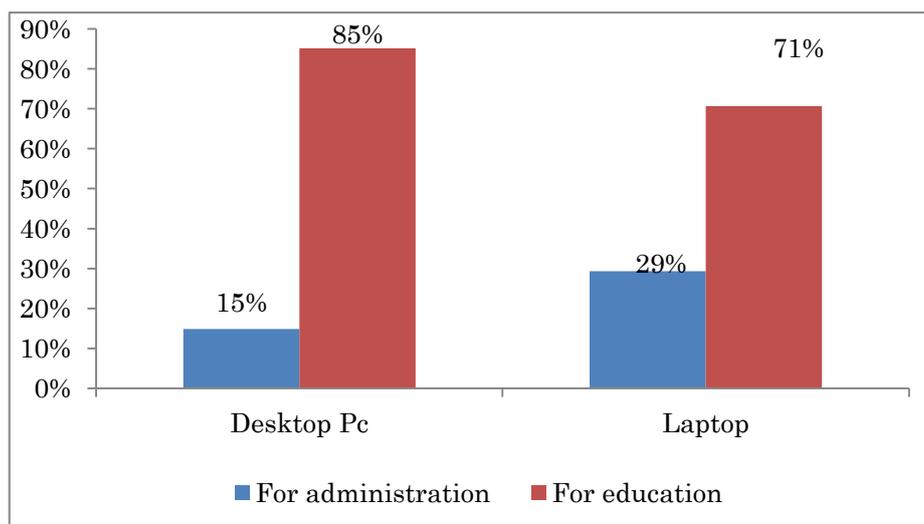


Figure (5.1.4): Percentage of computers at schools by type and purpose of use

**a. Students per computer ratio**

Figure (5.1.5) shows that the students per computer ratio for all schools in Jordan is 14.3:1; the highest ratio was in UNRWA schools (28.8:1) while the lowest was in private schools (11.9:1).

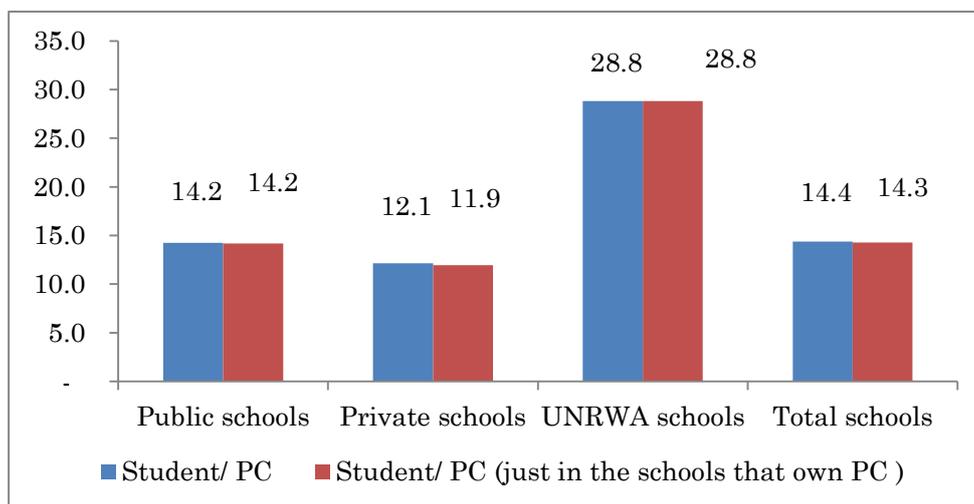


Figure (5.1.5): Students per computer ratio in schools that own PCs and others that don't

**b. Reasons behind not utilizing available computers:**

The study indicates that there are around 8800 computers that are not utilized in Jordanian schools for several reasons. As figure (5.1.6) shows, 40% of the schools indicated that their computers need maintenance while 16% of the schools reported that the computers are not used because they are damaged. Another reason as stated by 3% of the respondents was due to the fact that these computers have not been installed yet.

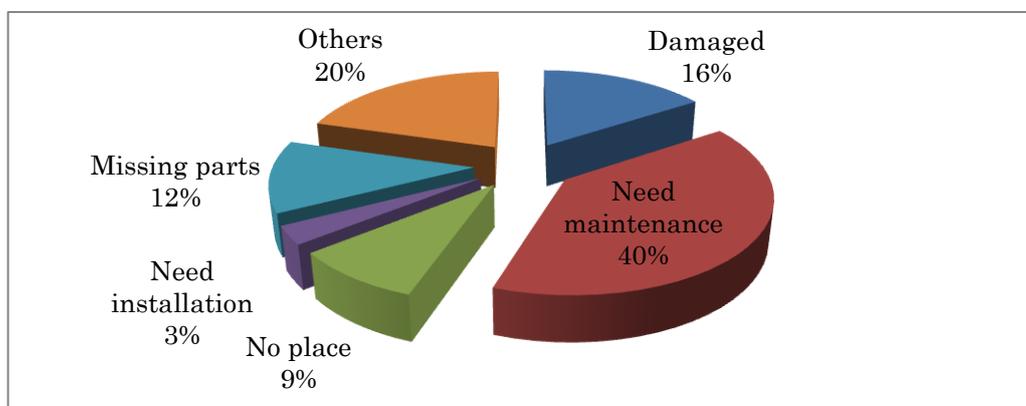


Figure (5.1.6): Reasons behind not utilizing all available computers

**c. CPU Speed:**

Figure (5.1.7) shows the distribution of computers based on the CPU speed; the processors of the majority of the computers (63.2%) are Pentium IV.

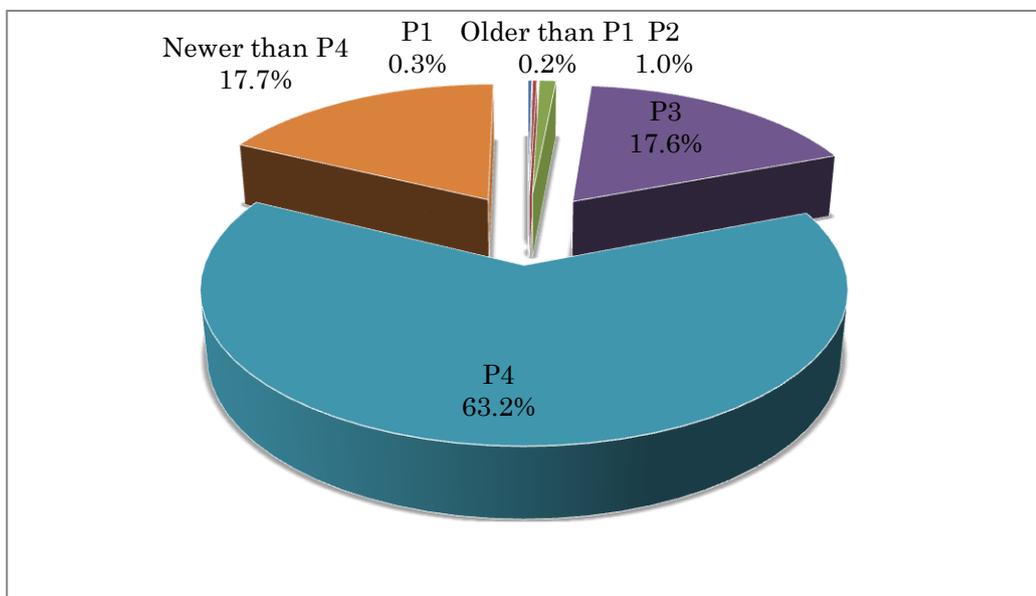


Figure (5.1.7): Distribution of computers by CPU speed (P=Pentium)

**d. Computer Labs:**

Around 5900 computer labs are available in the kingdom's schools; the majority of them are located in private schools, and the lab per school ratio was 1.3:1, while the computer per lab ratio was around 11:1.

As shown in figure (5.1.8) at least one lab is available in 85% of the schools in Jordan; 96% of the UNRWA schools are equipped with at least one lab, while 83% of the public schools have labs.

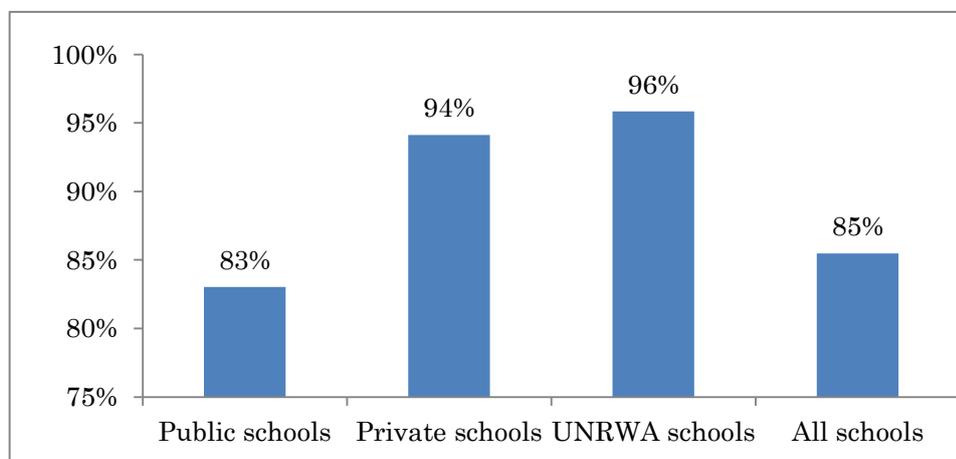


Figure (5.1.8): Percentage of schools with at least one computer lab

**e. Servers:**

Figure (5.1.9) shows the percentages of servers available in schools. A total of 47% of the schools have at least one server.

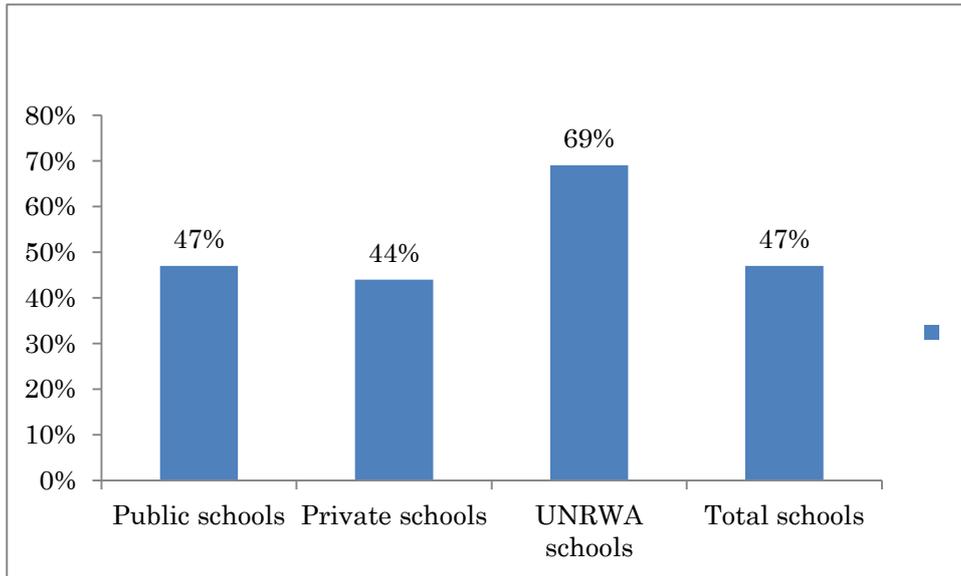


Figure (5.1.9): Percentage distribution of schools with at least one lab

**f. Computer Peripherals:**

As shown in figure (5.1.10) most schools have printers; 55% have scanners, and 58% have data show projectors.

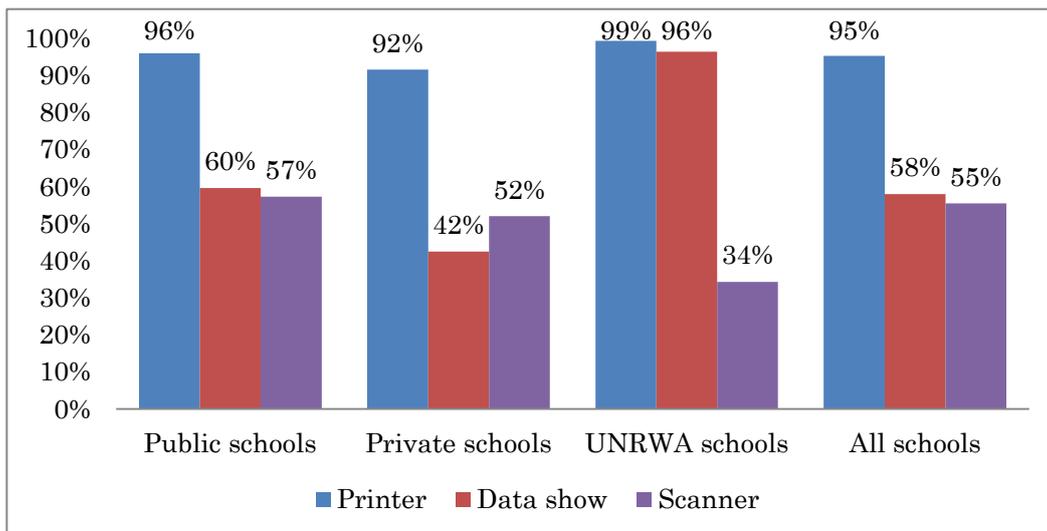


Figure (5.1.10): Percentage of schools equipped with computer peripherals

**2) Software at schools:**

Around 62% of all the schools use additional educational software not available on EduWave. Figure (5.2.1) shows that 34% of these schools buy their software; more than half stated that they used free software; 46% of the schools reported that the software was produced by teachers while 37% said it was their student’s production.

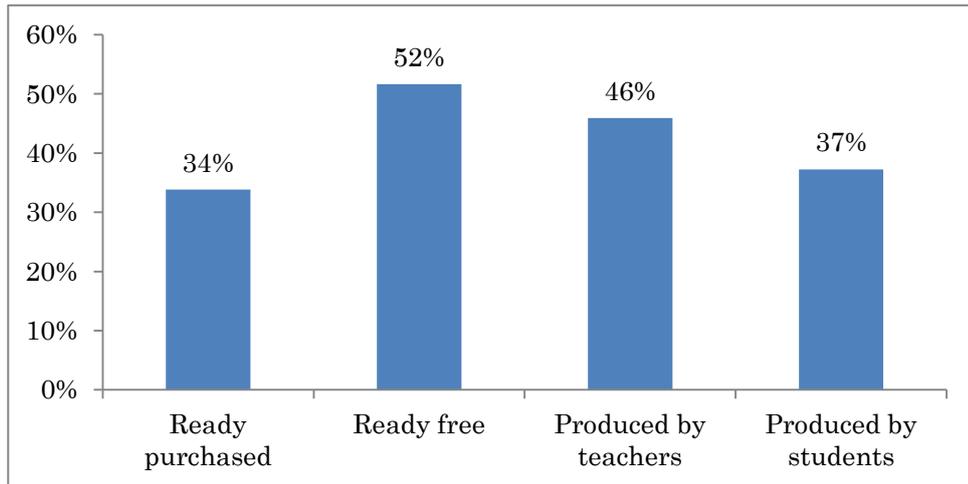


Figure (5.2.1): Percentage of schools that use software other than EduWave

**3) Internet**

Figure (5.3.1) shows that 85% of schools in Jordan are connected to the Internet.

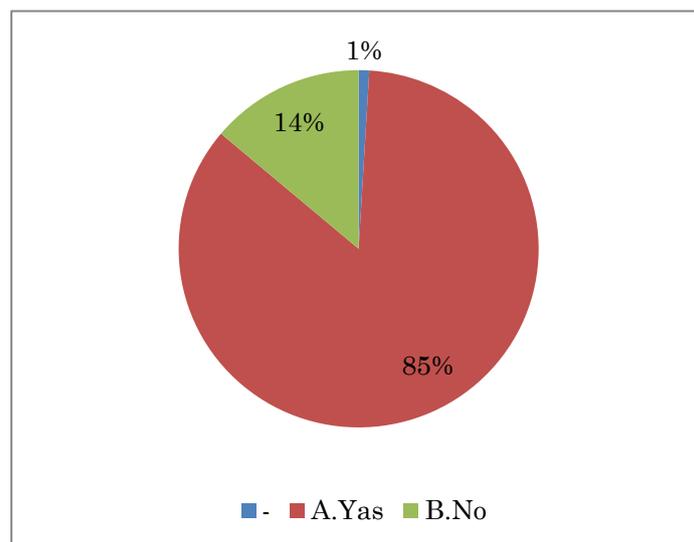


Figure (5.3.1): Percentage of schools that are connected to the Internet

As shown in figure (5.3.2), 85% of public schools have Internet connection while a higher percentage of Internet connection was in private schools (89%) and UNRWA schools (100%).

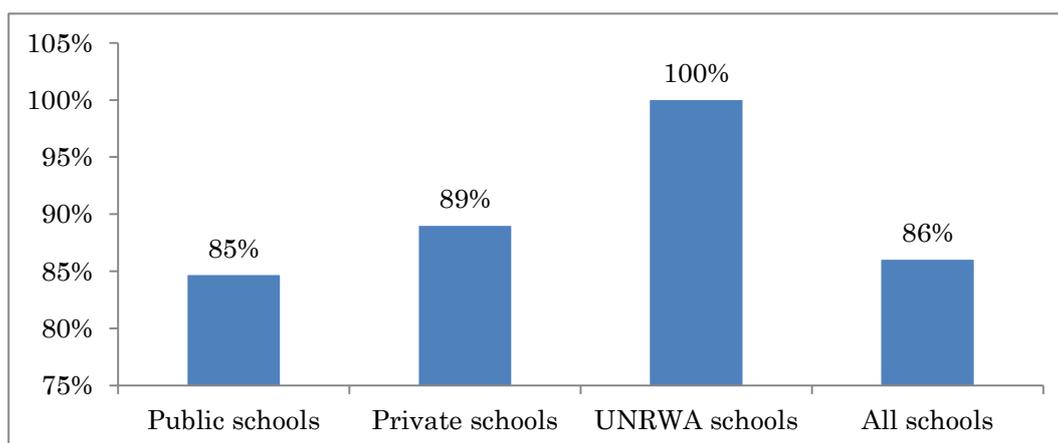


Figure (5.3.2): Percentage distribution of schools that have Internet connection by sector

There was a significant gap between schools in the city and those outside the city with 95% of urban schools having access to the Internet as against 74% of schools outside the city (see figure 5.3.3).

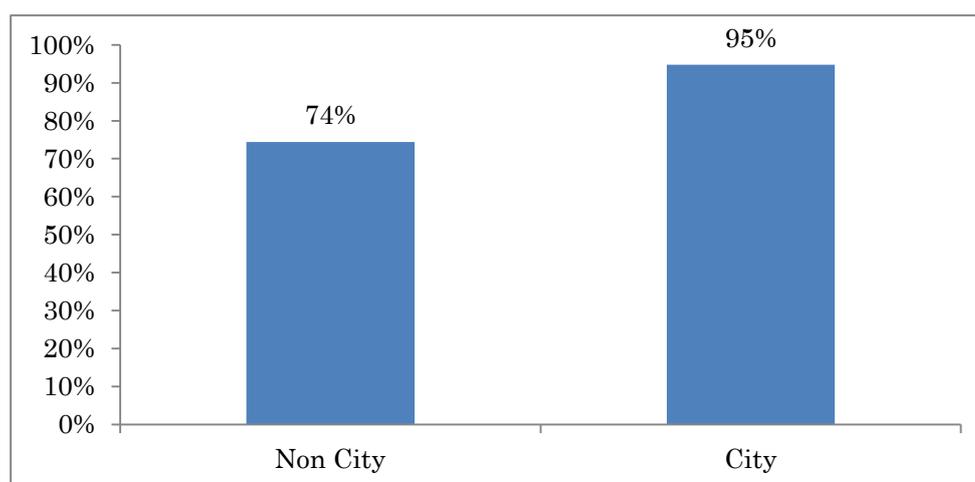


Figure (5.3.3): Percentage distribution of schools with Internet connection by geographical location

#### 4) Internet Connection Type

As shown in figure (5.4.1), 54% of schools have broadband Internet connection, while 26% of them are connected via narrowband and 15% use wireless connection.

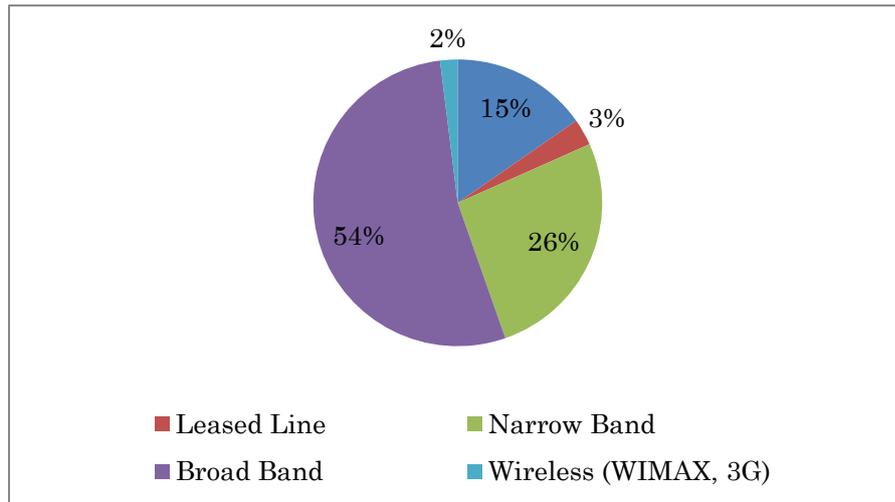


Figure (5.4.1): Percentage of schools with Internet access by connection type

As shown in figure (5.4.2), 86% of the schools connected to the Internet use the Internet for educational purposes and 74% use it for administrative purposes.

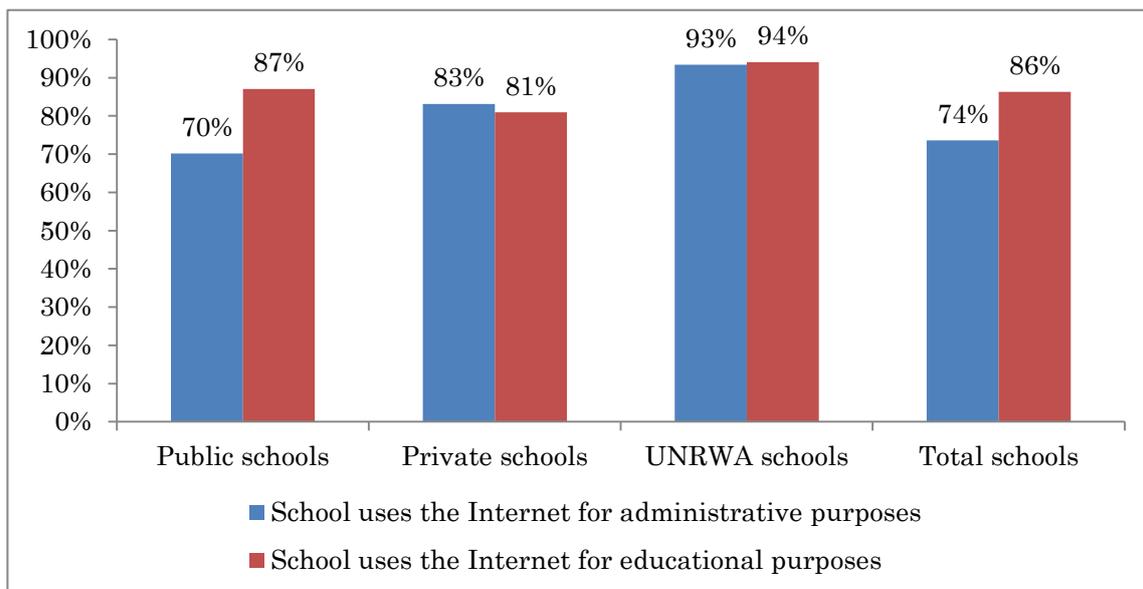


Figure (5.4.2): Percentage of schools with Internet access by usage purposes

The biggest challenge facing schools while using the Internet was the slow Internet connection and technical issues, with a total of 84% of schools reporting such issues as in figure (5.4.3), while 79% complained of the insufficient time available to use the Internet in schools.

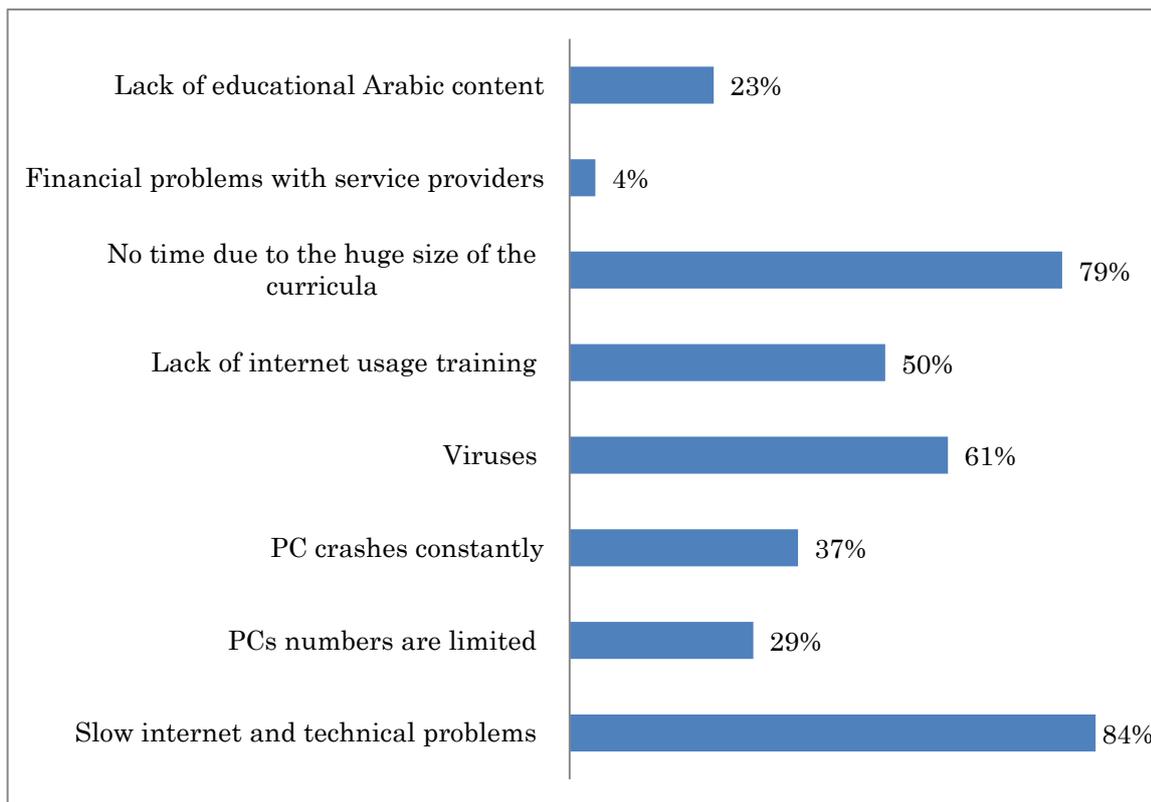


Figure (5.4.3): Percentage of schools connected to Internet by challenges related to Internet

Figure (5.4.4) shows the percentage distribution of the challenges facing schools by sector. The same method is applied here.

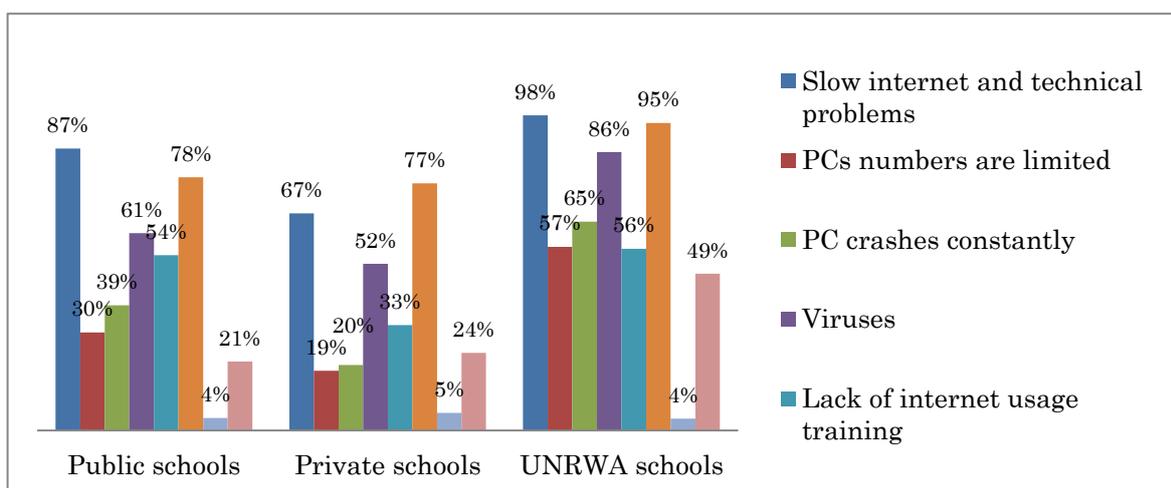


Figure (5.4.4): Percentage of schools connected to Internet by challenges related to Internet per sector

### 5) Website, webpage and blogs

A total of 16% of schools have a website (605 schools); 16% have a webpage that is accessible through the MoE website while 9% use blogs as figure (5.5.1) shows.

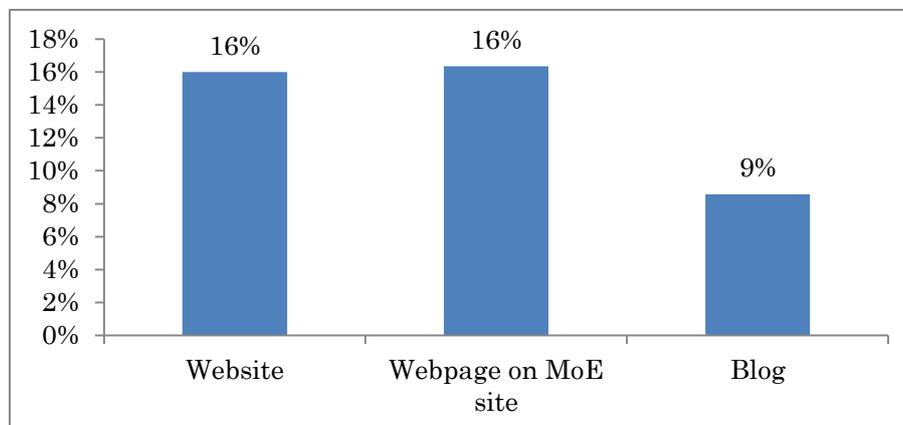


Figure (5.5.1): Percentage of schools connected to Internet and have (website, webpage and blog)

\*Calculated based on schools that have Internet.

Figure (5.5.2) shows that private schools have the highest percentage in terms of using websites, webpages, and blogs while UNRWA schools have the lowest.

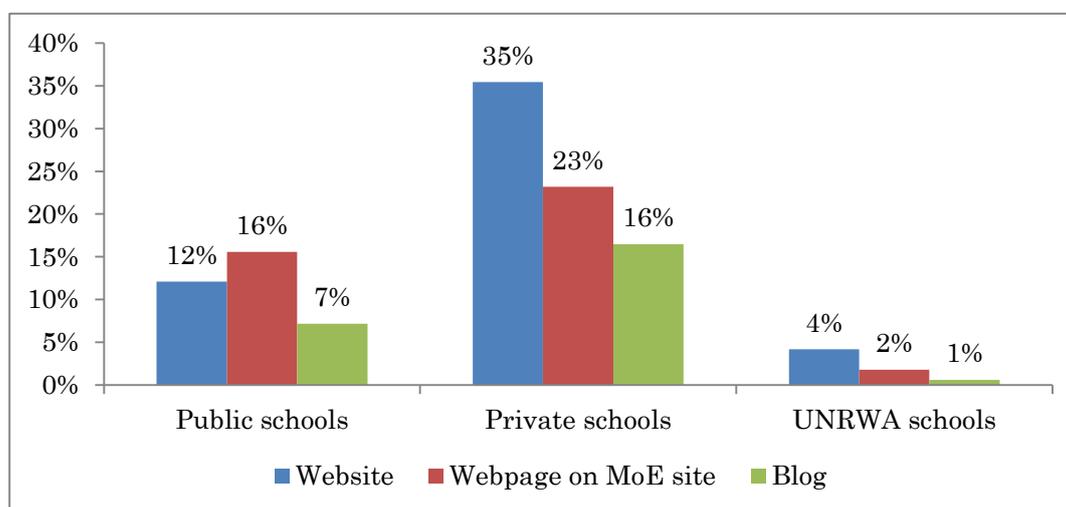


Figure (5.5.2): Percentage distribution of schools connected to Internet and have (website, webpage and blog) per sector

A total of 65% of schools use their Internet service to introduce and identify their schools as shown in the figure (5.5.3); 49% use it for academic and educational purposes and 39% use it for communication.

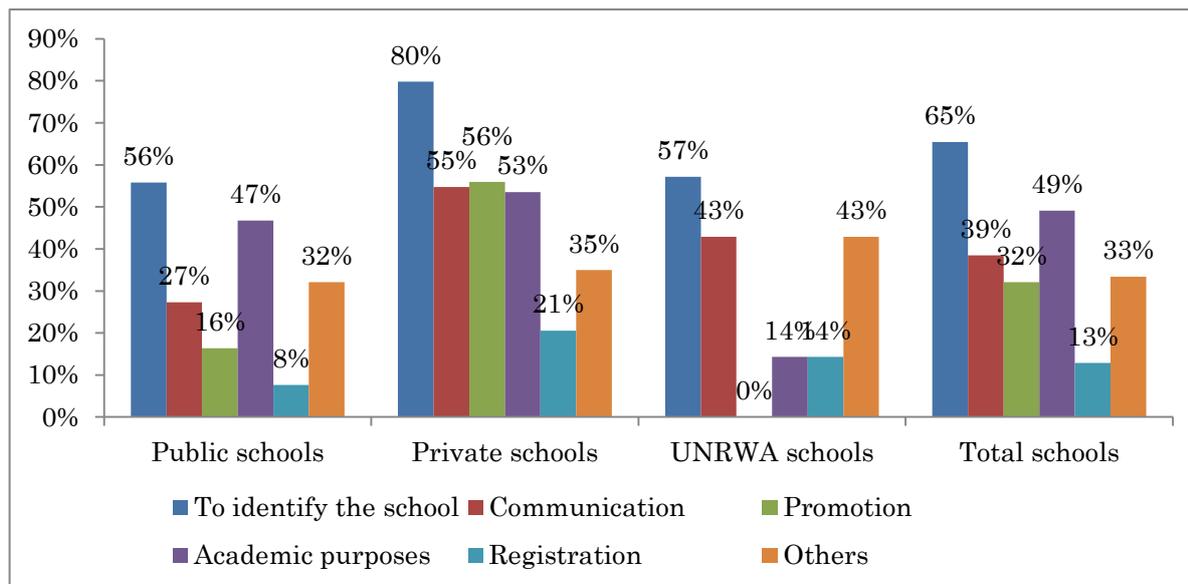


Figure (5.5.3): Percentage distributions of schools connected to Internet and have (website, webpage and blog) per sector and use purposes

### 6) E-mail

A total of 63% of schools have e-mail addresses with a government domain name (@moe.gov.jo) as shown in figure (5.6.1), while 23% of schools have e-mail addresses with their own domain names and 42% use personal e-mail accounts. A total of 72% of schools reported that they use e-mail accounts for work purposes.

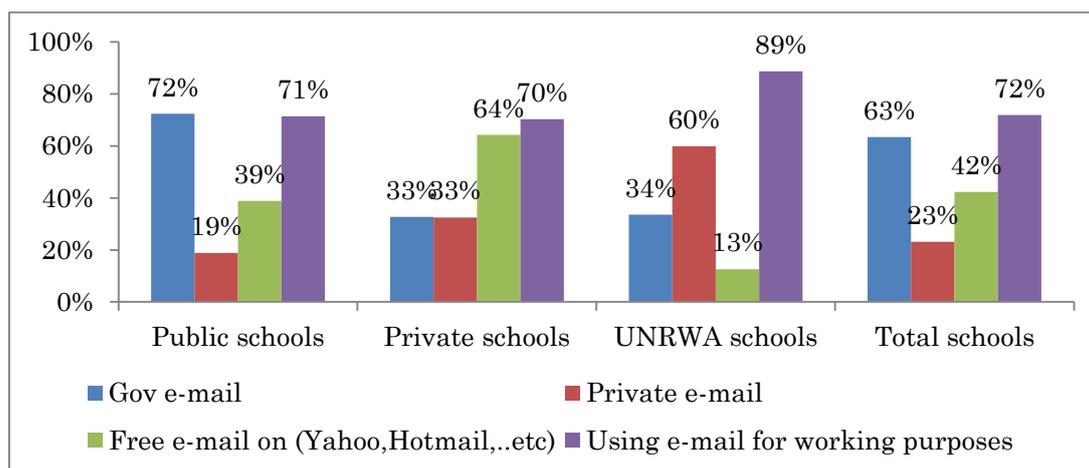


Figure (5.6.1): Percentage distribution of schools that have e-mail accounts by use purposes per sector

\*Calculated based on schools with Internet connection.

### 7) EduWave

Figure (5.7.1) shows that a total of 96% of schools (4243) reported that they can access EduWave and use it from school. 100% of UNRWA schools can access and use EduWave from school as against 95% in public schools.

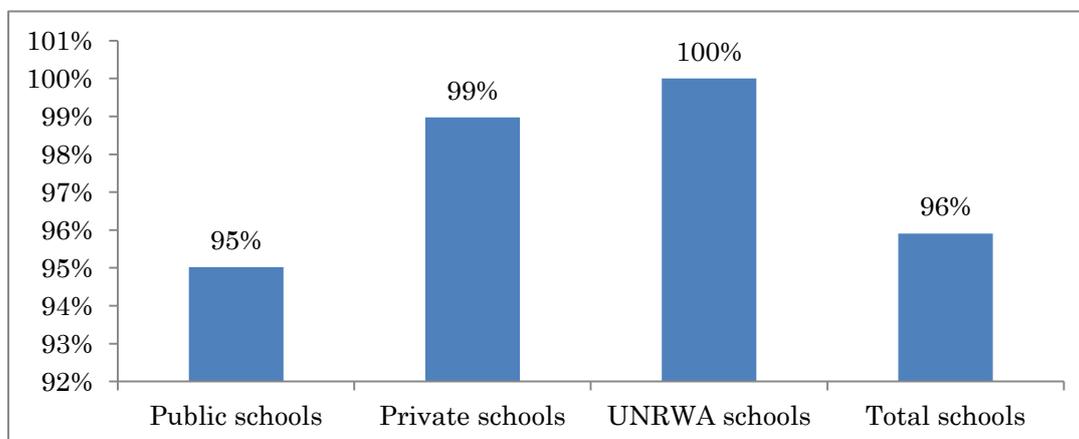


Figure (5.7.1): Percentage distribution of schools that can access and use EduWave from schools

Regarding the purpose of using EduWave; figure (5.7.2) shows that 97% of schools use it for recording student’s marks, 95% use it for entering administrative data, 70% use EduWave for e-mailing purposes and 69% for accessing e-content material.

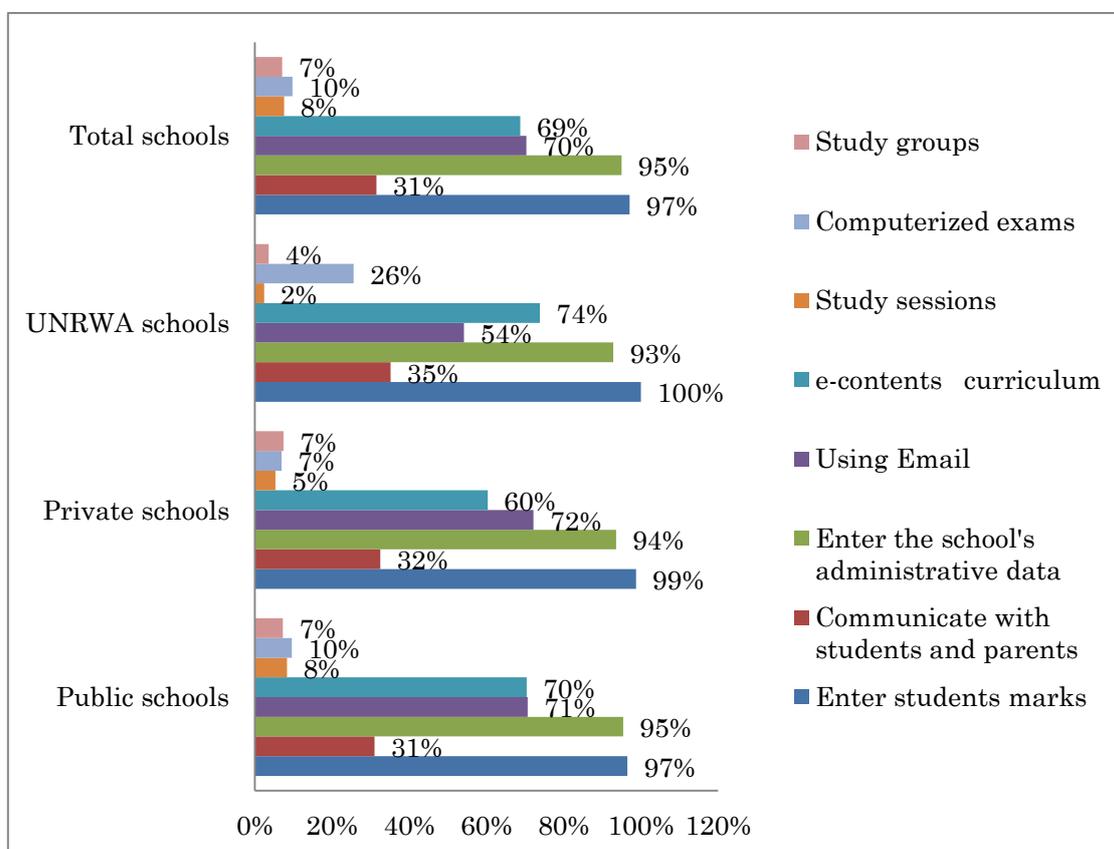


Figure (5.7.2): Percentage distribution of schools that can access and use EduWave from schools by purpose per sector

The common challenge facing schools while using EduWave as shown in figure (5.9.3) is the slow Internet connection. A total of 82% of schools reported this issue, followed by 52% of schools that complained about the lack of time available to use EduWave while 48% complained about technical problems in EduWave.

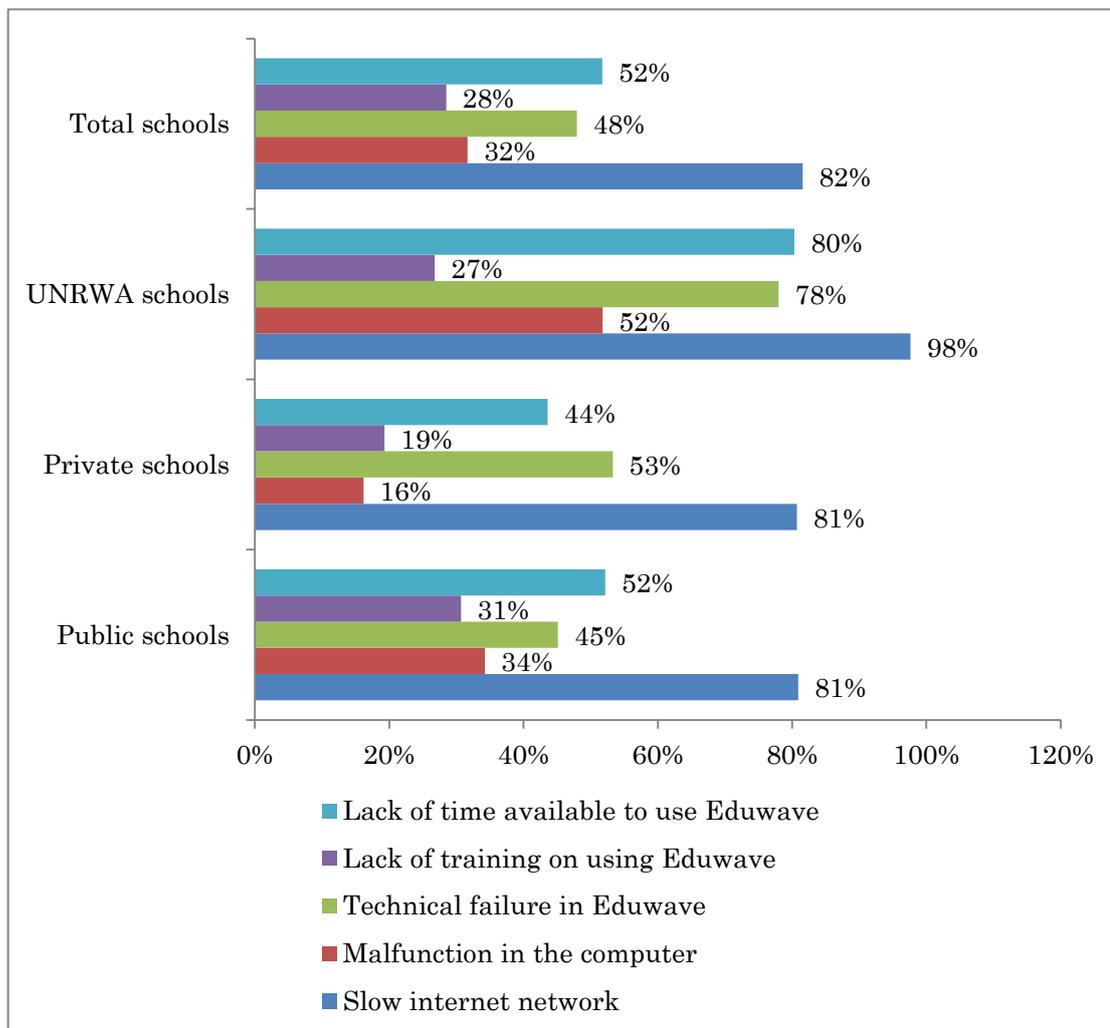


Figure (5.7.3): Percentage distribution of schools which uses EduWave by challenges per sector

**8) E-content:**

78% of the schools reported that they use the e-contents available on EduWave; the higher percentage was for the public schools with 79% and 73% for UNRWA schools, as shown in figure (5.8.1).

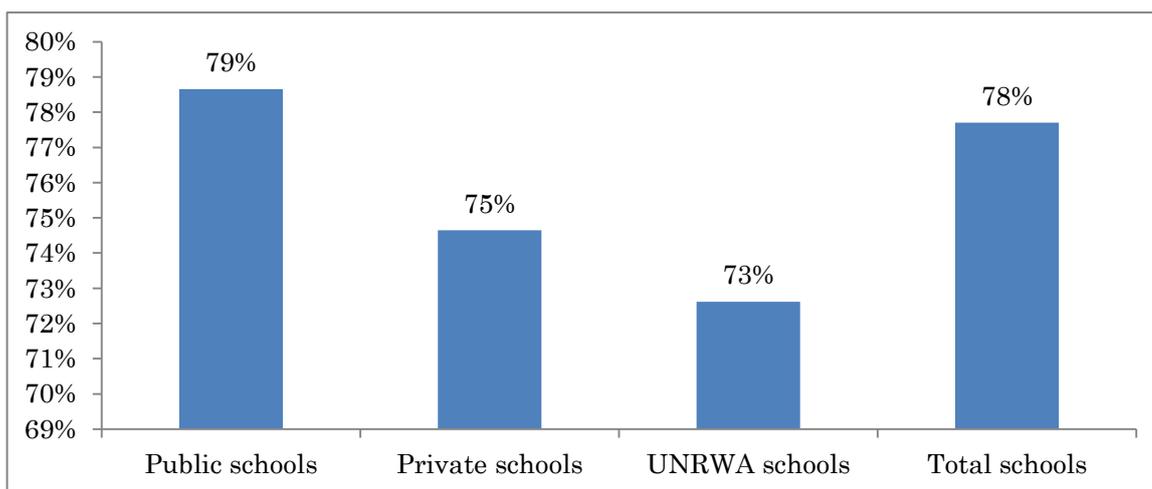


Figure (5.8.1): Percentage distribution of schools that use e-content

### 9) Educational Innovation Fund

Figure (5.9.1) shows that 5% of schools benefit from the Educational Innovation Fund, accounting for approximately 208 schools.

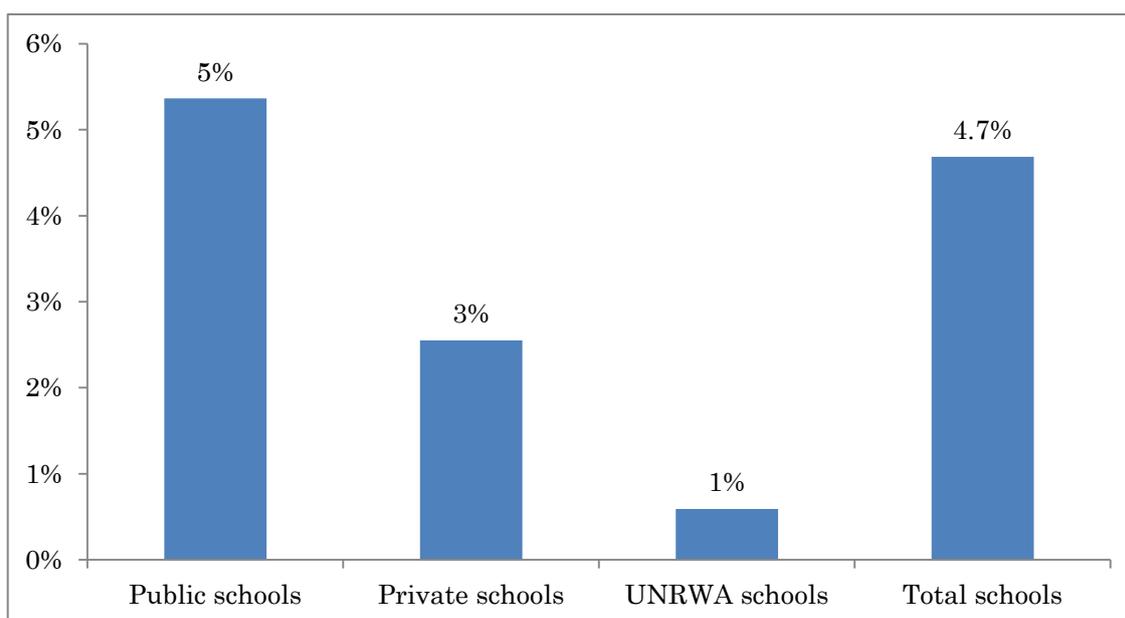


Figure (5.9.1): Percentage distribution of schools benefiting from the Educational Innovations Fund

### 10) Schools Participation in Collaborative Projects:

Around 9% of schools (371) participate in collaborative projects with other parties; 67% of those schools collaborate with local parties as shown in figure (5.10.1); 25% collaborate with Arab parties, while 23% work in partnership with foreign parties.

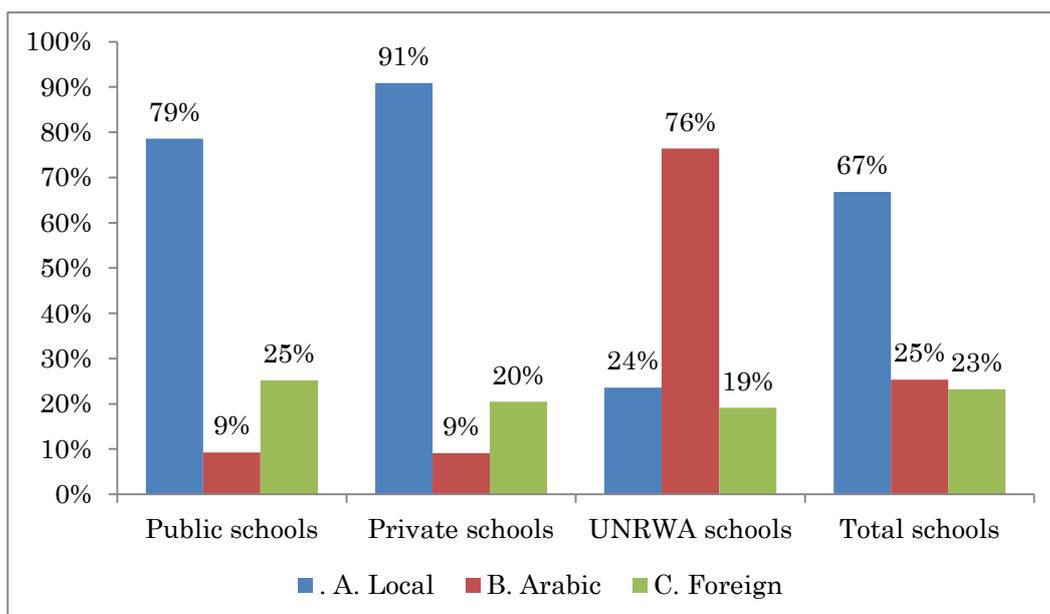


Figure (5.10.1): Percentage distribution of schools that collaborate with other parties to work on projects, by sector and party type

\*Calculated based on schools that collaborate with others in projects

## 11) Teachers

The total number of teachers in respondent schools was around 98000; 64% of them were males and 36% were females, as indicated in figure (5.11.1). Computer teachers accounted for around 4774 (4.8%) of the total number of teachers.

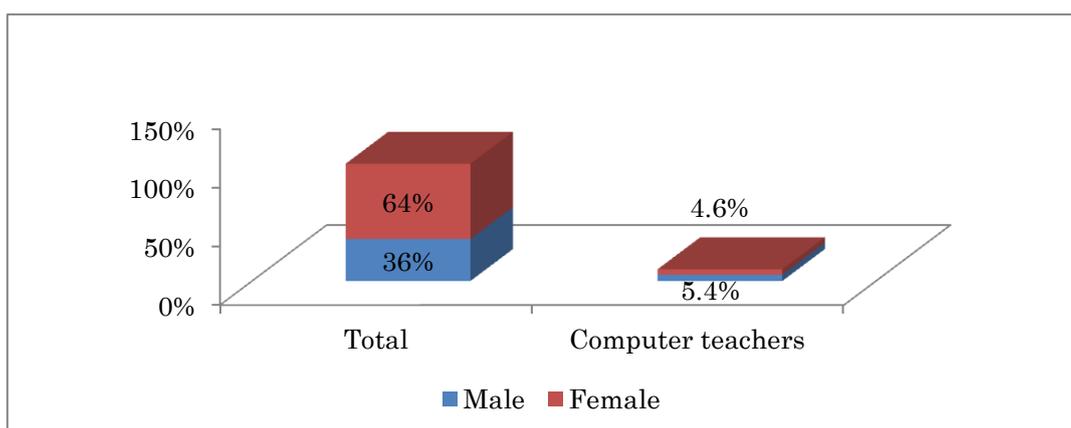


Figure (5.11.1): Percentage distribution of teachers and computer teachers by gender

### Teachers with Computers, Internet Access and E-mail Accounts:

A total of 77% of the teachers in respondent schools have computers at home; and they are distributed by gender as figure (5.11.2) shows. Regarding the percentage of teachers with Internet access from home, it was 42% for female teachers and

39% for male teachers; 66% of male teachers have e-mail accounts while only 48% of female teachers have e-mail accounts. Around 20% of teachers use their e-mail accounts for educational purposes.

The percentage of teachers using e-mail accounts on EduWave was slightly low, accounting for around 18% of the total number of teachers.

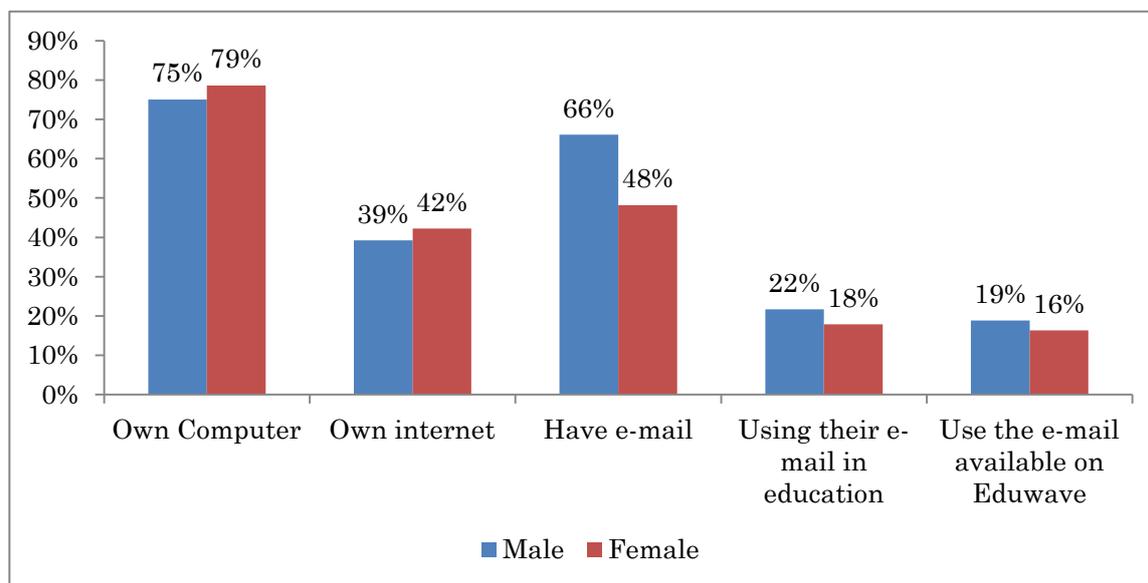


Figure (5.11.2): Percentage distribution of teachers who have computers, Internet and e-mail accounts by gender

On the distribution of teachers who have computers and Internet access at home by sector, figure (5.11.3) and figure (5.11.4) show that there is a gap between teachers in private and public schools; a total of 89% male teachers in private schools have computers while male teachers with computers accounted for 73% in public schools. Moreover, 72% of male teachers with Internet access in private schools, while they accounted for only 35% in public schools.

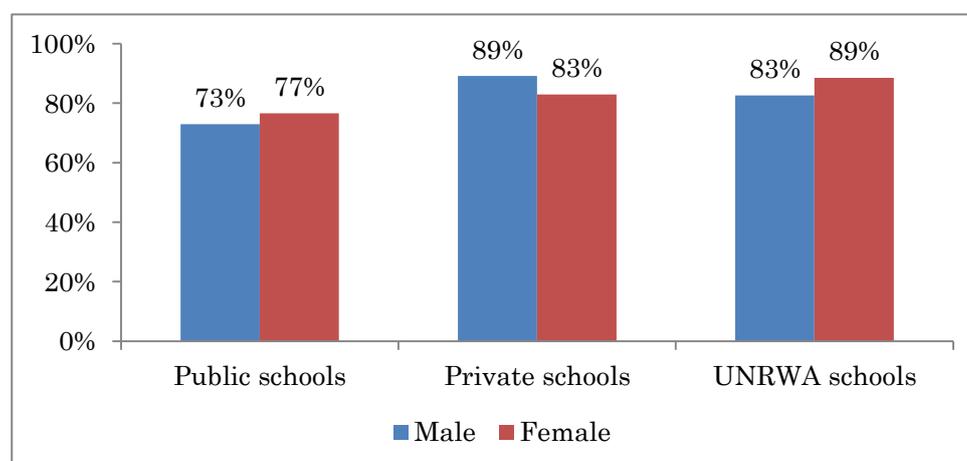


Figure (5.11.3): Percentage distribution of teachers who have computers by sector

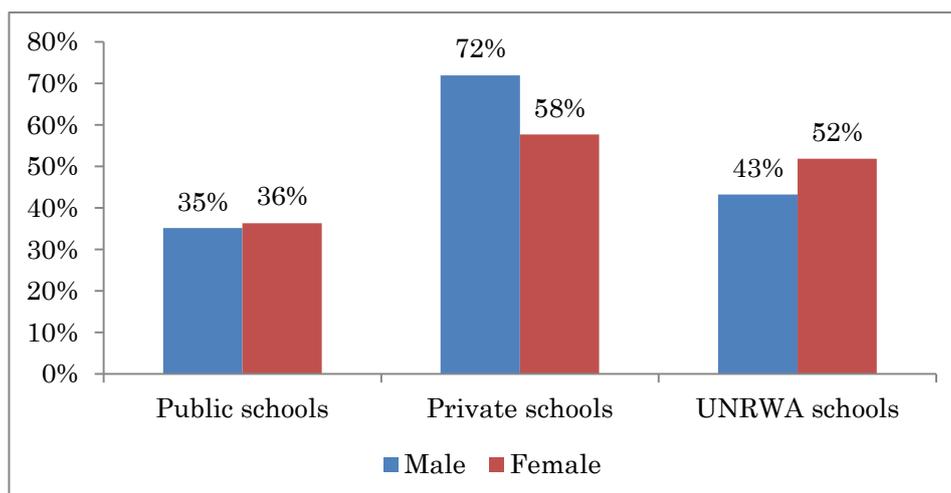


Figure (5.11.4): Percentage distribution of teachers who have Internet access by sector

### 12) E-Content on EduWave:

Figure (5.12.1) shows that female teachers in the public sector scored the highest percentage in terms of using e-content on EduWave (36%) while only 24% of male teachers in the same sector used e-content on EduWave.

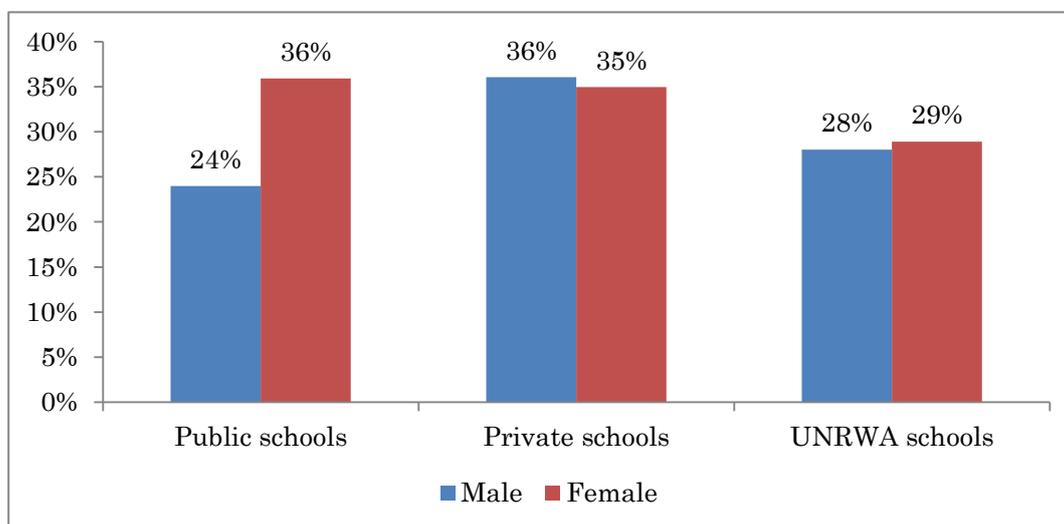


Figure (5.12.1): Percentage distribution of teachers who use e-content by gender and sector

### 13) Computer Teachers

Figure (5.13.1) illustrates the distribution of teachers who have computers and Internet access at home by sector. The figure shows that the highest percentage of computer teachers was in private schools with around 7% of total teachers, while it was around 4% in both public and UNRWA schools.

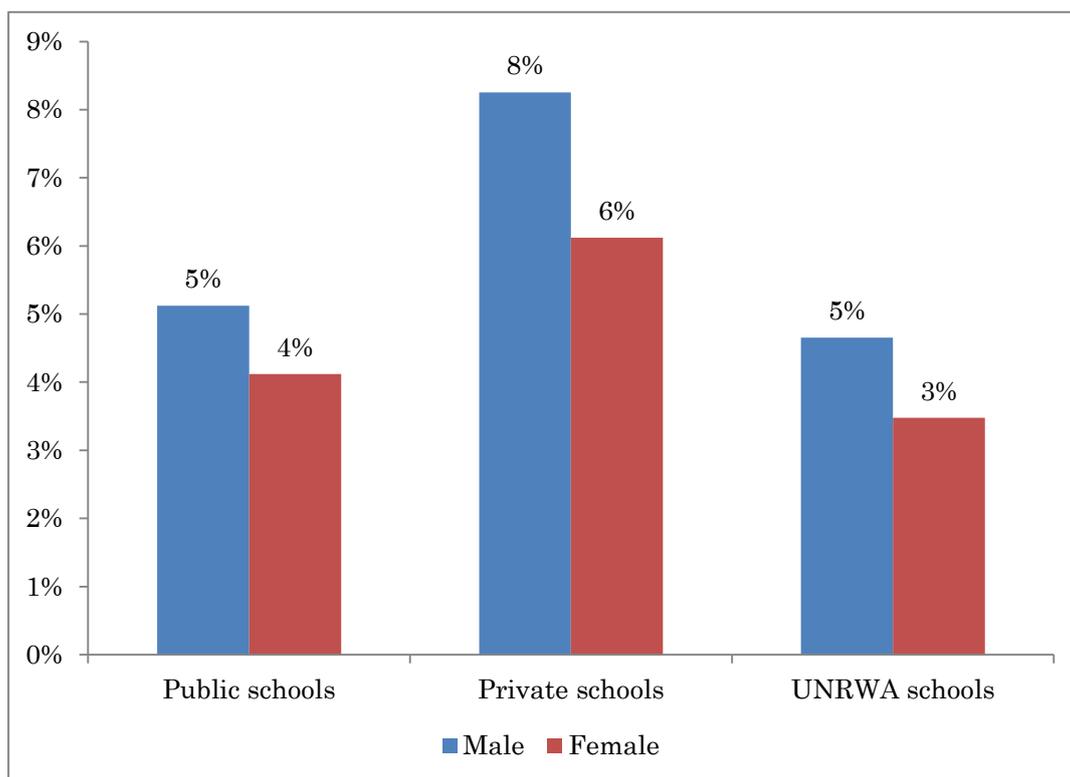


Figure (5.13.1): Percentage distribution of computer teachers by sector and gender

#### 14) Students:

More than 1.3 million students (50.5%) in the respondent schools (1.7 million students based on MoE statistics) were male students while female students accounted for 49.5%.

As figure (5.14.1) shows, 62% of the students use computers in schools. Around 41% of the students use the Internet in schools; around 58% have computers at home; and 29% have Internet access.

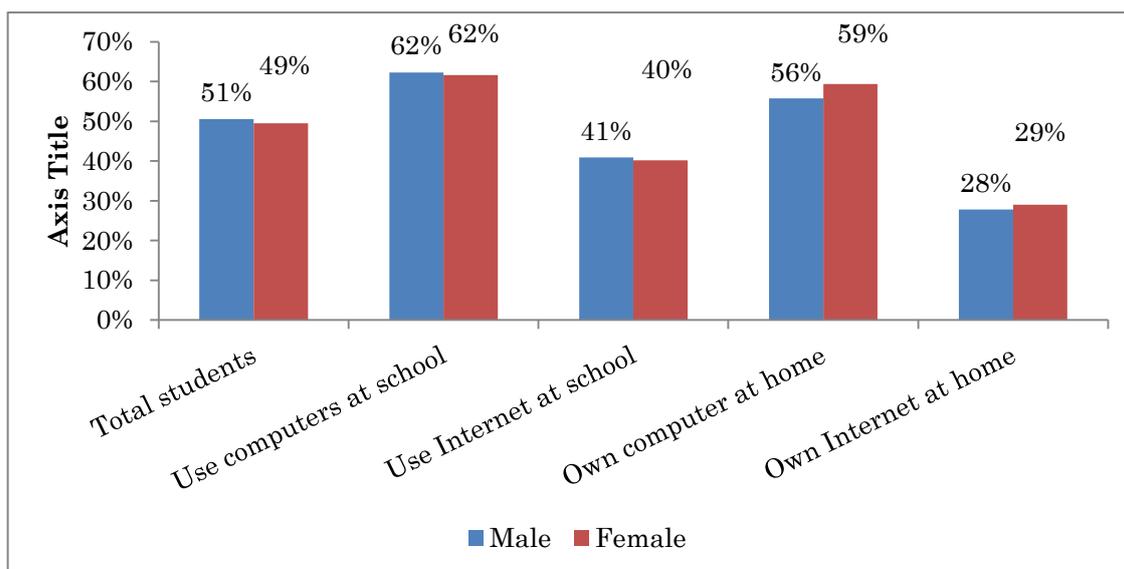


Figure (5.14.1): Percentage distribution of students by gender and different indicators

Figure (5.14.2) shows the percentage of students who use computers in schools by sector and gender. The highest percentage was for female students in private schools with a total of 90%; the lowest was for female students in UNRWA schools with 43%; while public schools scored 56% and 58% for male and female students respectively.

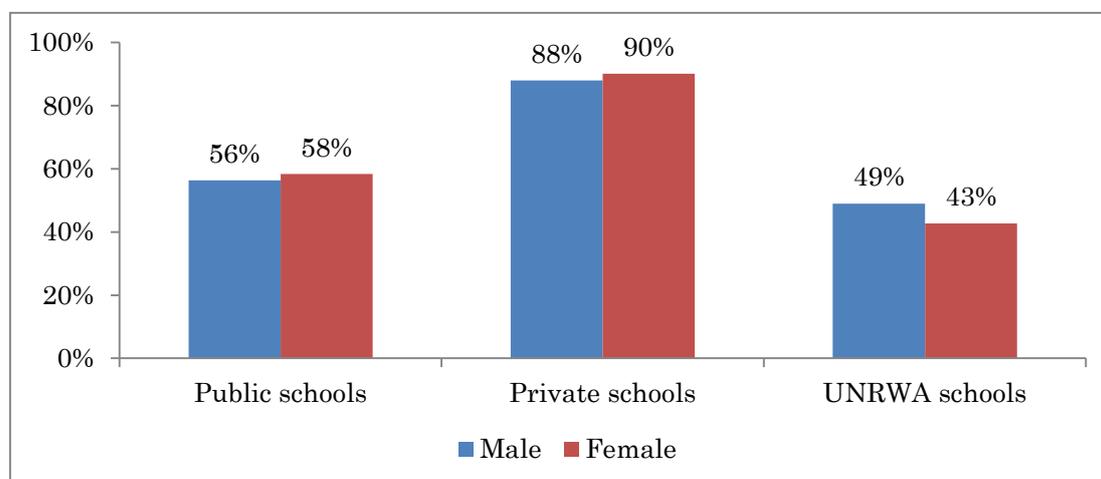


Figure (5.14.2): Percentage distribution of students who use computers by gender and sector

Figure (5.14.3) shows that the highest percentage of students who use the Internet in schools was for female students in private schools (63%), while the lowest percentage was for female students in public schools 36%.

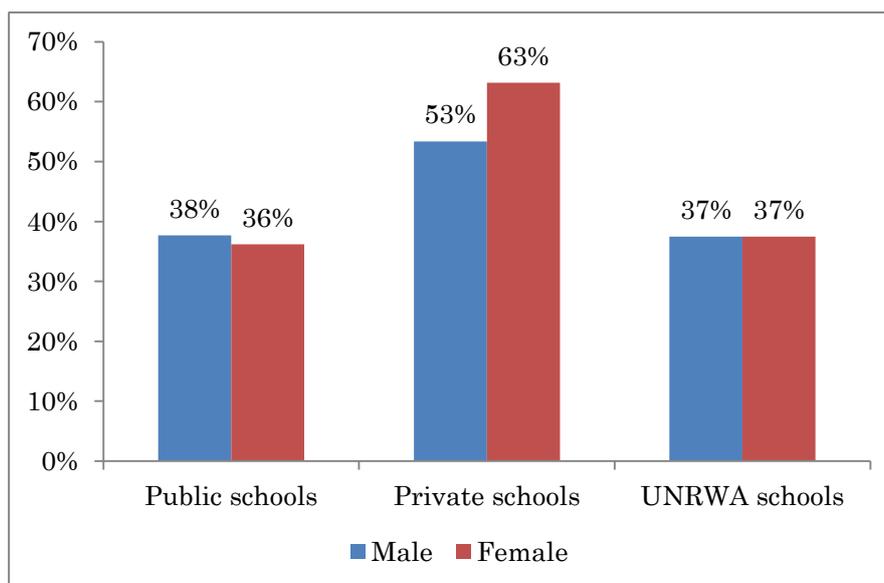


Figure (5.14.3): Percentage distribution of students who use Internet by gender and sector

According to figure (5.14.4) and figure (5.14.5), the highest percentage of students who have computers and Internet access at home was for students in private schools, and there was a clear gap especially in terms of Internet availability.

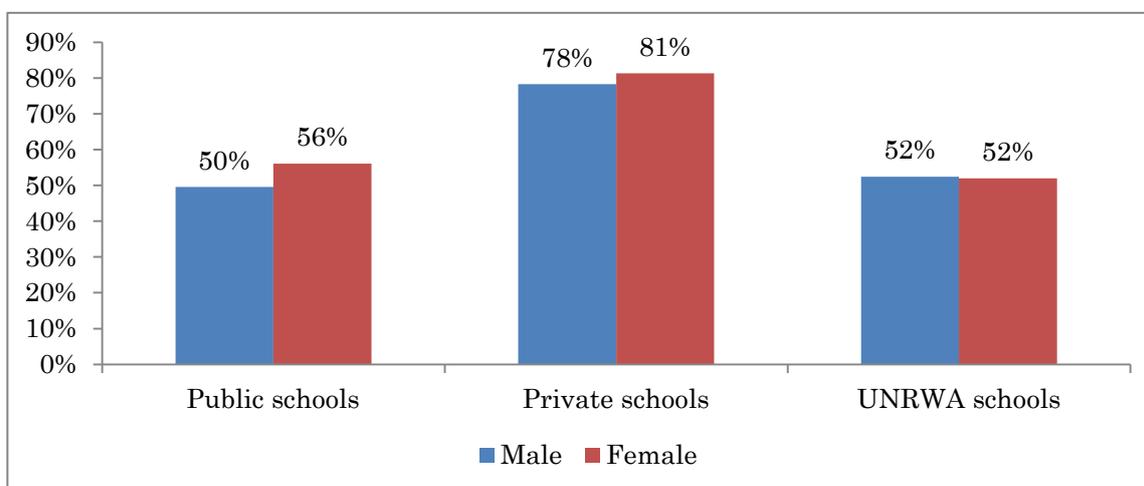


Figure (5.14.4): Percentage distribution of students who have computers by gender and sector

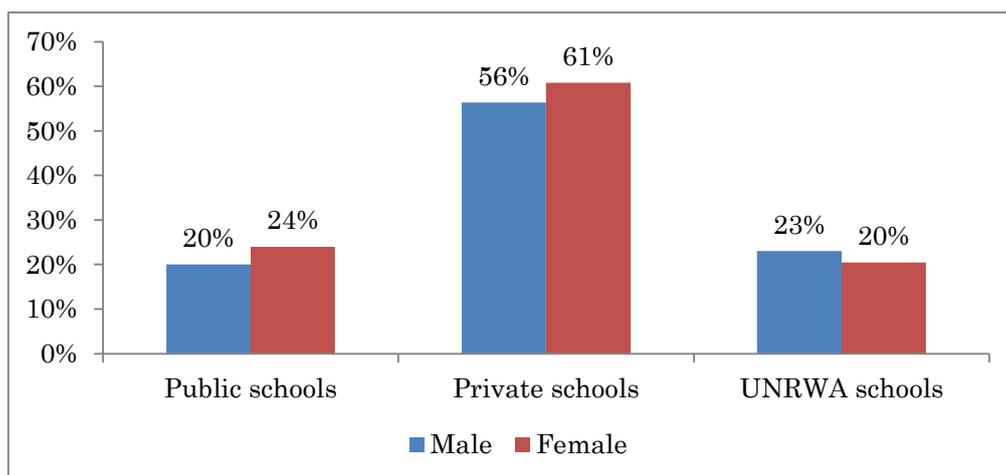


Figure (5.14.5): Percentage distribution of students who have Internet by gender and sector

### 15) Technical Support

The average number of visits by technical support teams was around 2.1 per month for all schools. The highest average was in Amman directorates (13.6 visits) while the lowest was in the Aqaba Directorate (1.03 visits).

Figure (5.15.1) details the time required to provide technical assistance based on sector. The figure shows that most public schools (39%) wait for over one week to receive technical support, while 54% of the private schools received the support within 24 hours.

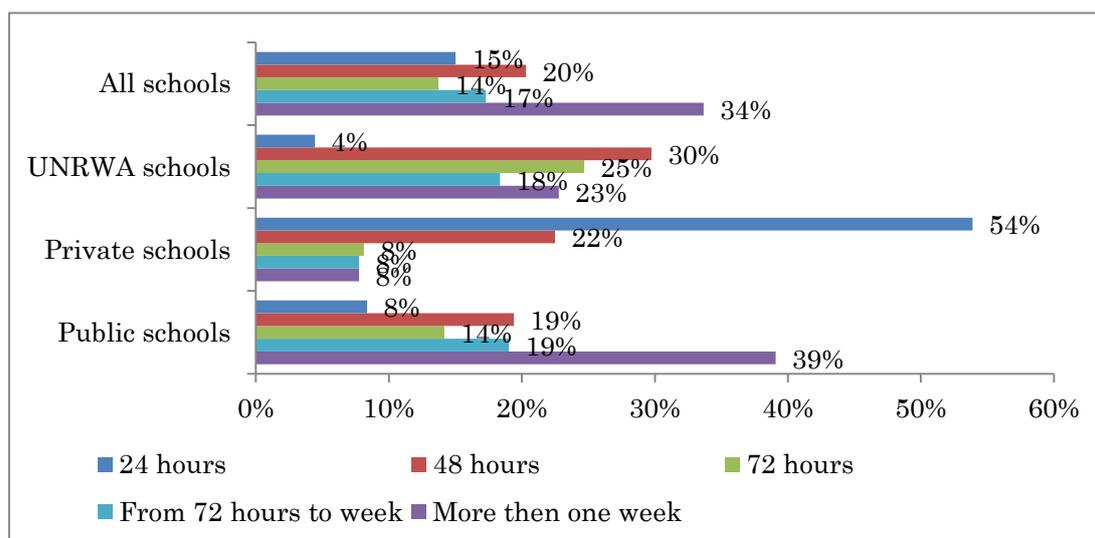


Figure (5.15.1): Percentage distribution of the time required to provide technical assistance per sector

### 16) Security Software

Most of the schools are concerned about security while using technology and the Internet. Some 80% of schools use antivirus software; 13% use firewall; while 6% filter the content by using special tools.

Around 240 schools do not use security tools or software. As shown in figure (5.16.1), the same trend is observed in the three sectors.

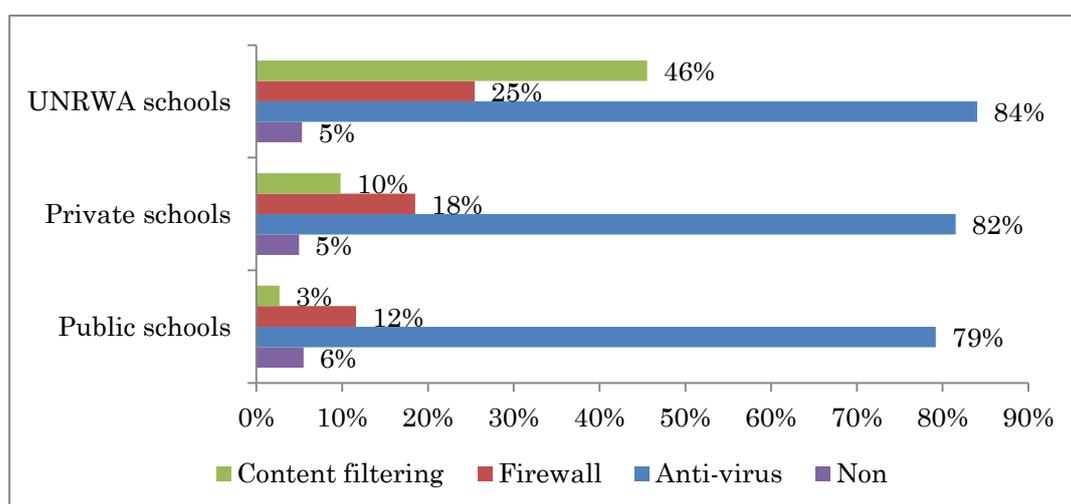


Figure (5.16.1): Percentage distribution of schools that uses security software by sector

As figure (5.16.2) shows, 47% of the schools have not updated the ICT hardware so far; 25% update it yearly. Private schools showed the highest interest in updating the hardware (about 58%) while more than half of public schools didn't update their ICT hardware.

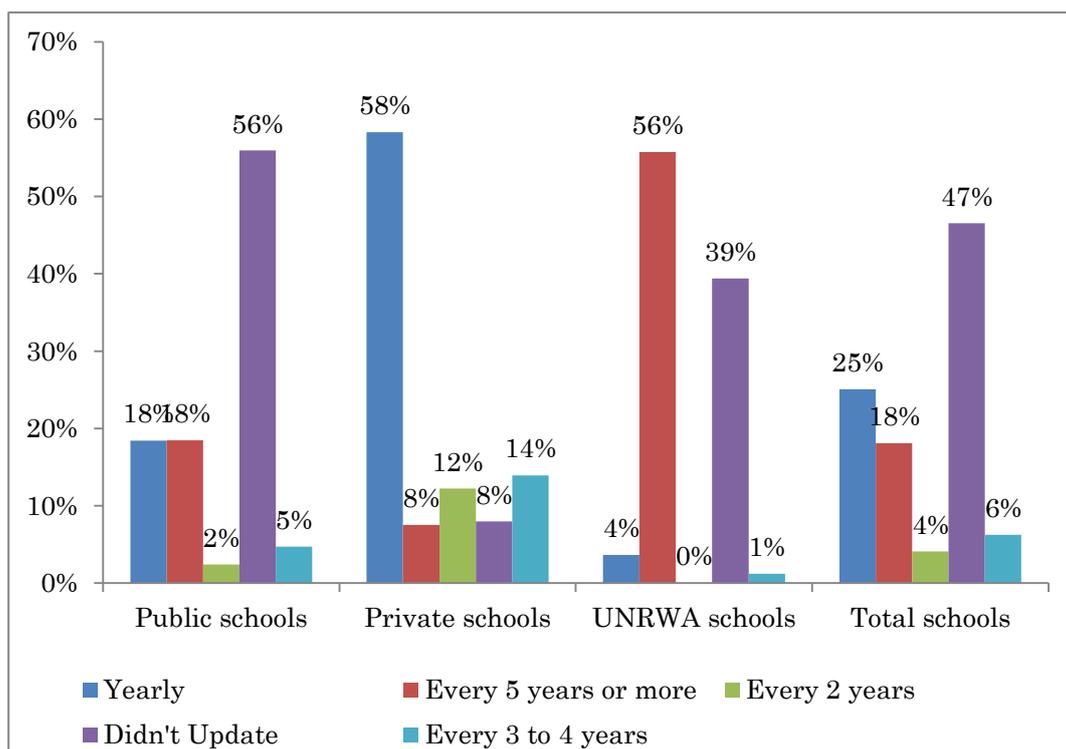


Figure (5.16.2): Percentage distribution of schools that update ICT hardware by sector

### 17) Local community

School infrastructure and facilities could be utilized to bridge the digital divide in the local community. In a bid to maximize this utilization, many initiatives and programs were launched in Jordan, one of which was the Knowledge Stations initiative.

Figure (5.17.1) shows that an average of 18 individuals benefit weekly from computer labs in schools, and the highest average was in private schools, with a total of 55 individuals, followed by public schools with 13 individuals benefiting from these labs.

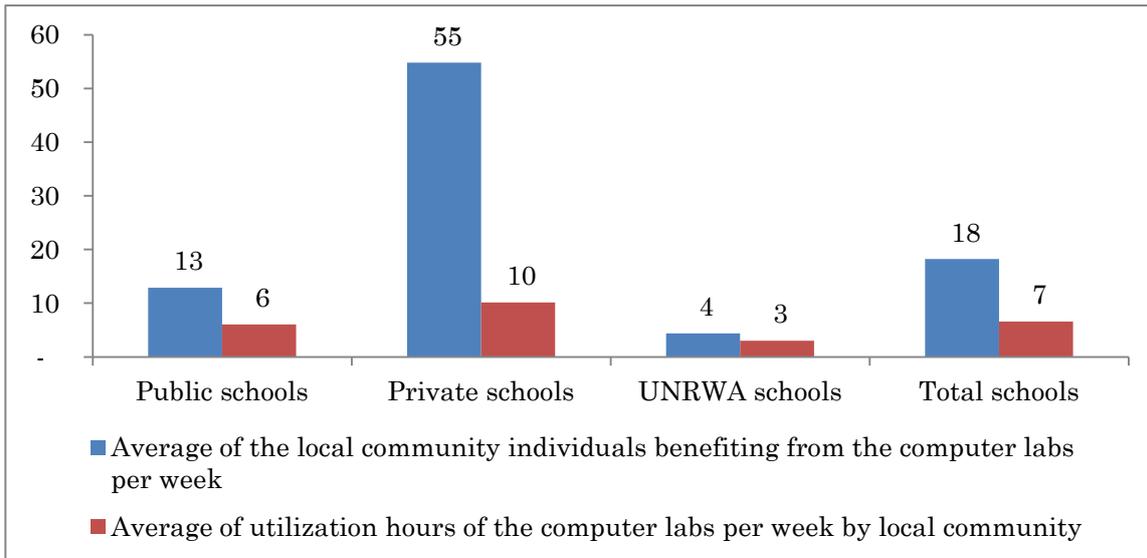


Figure (5.17.1): Average of individuals benefiting from computer labs by hour and sector

Around 5693 individuals attended ICT courses held in the schools' computer labs as shown in figure (5.17.2). Most of the individuals were females due to their flexibility about going to schools. Public schools offer local community frequent training courses and around 4690 individuals attended ICT courses there.

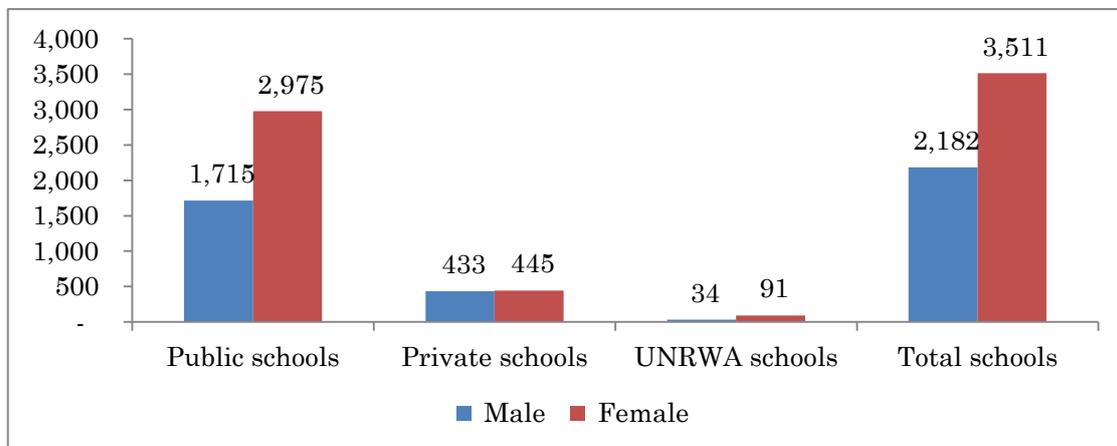


Figure (5.17.2): Distribution of local community individuals who attended ICT courses in school computer labs last year by gender and sector

### 18) Social Media Networking

Figure (5.18.1) shows that around 951 schools use social media networks on the Internet. The majority of these schools (53%) use Facebook; 6% of them use Twitter and 41% use other networks.

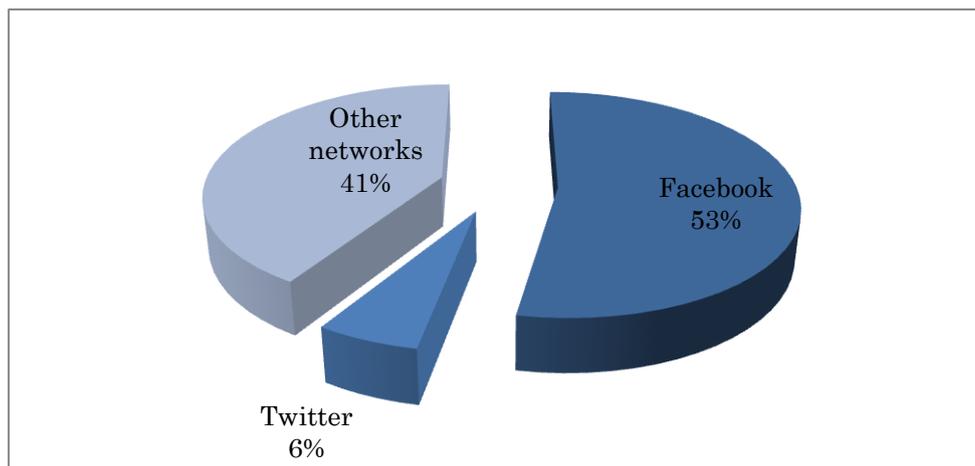


Figure (5.18.1): Percentages of social network utilization in schools

As shown in figure (5.18.2), private schools are more familiar with social network websites than public schools.

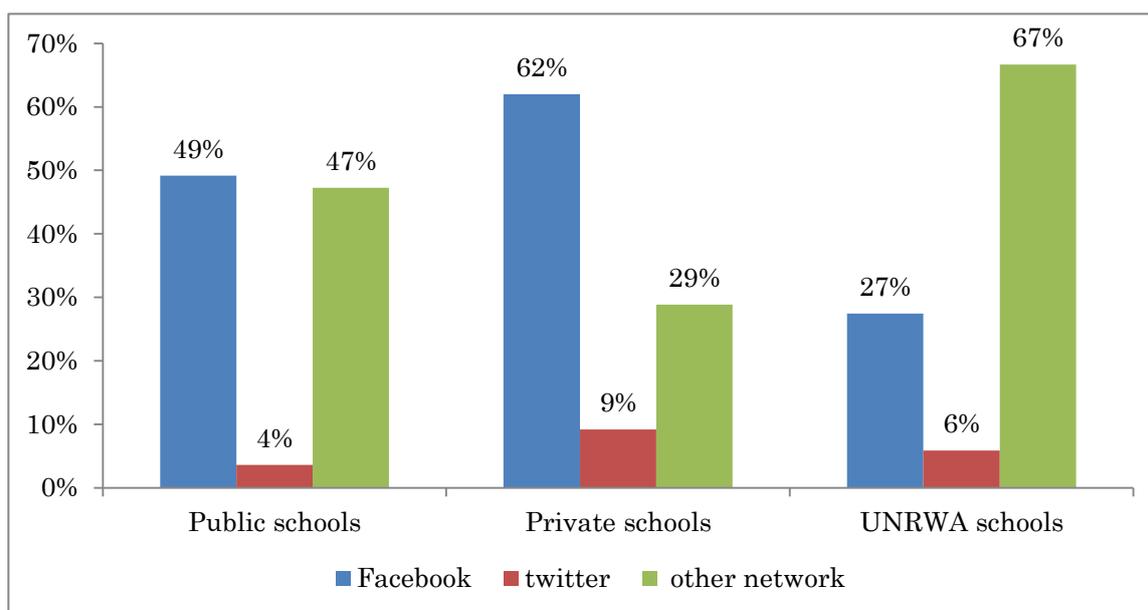


Figure (5.18.2): Percentages of schools communicating through social network websites by sector

\* Calculated based on schools that communicate through social media

## **Qualitative Research Findings:**

In an attempt to better understand the views of teachers, principals, students and parents, focus groups were deployed in three geographical areas in Jordan (North, Center and South) based on the qualitative research method. The focus group questions were grouped into eight themes as follows:

### **Theme 1: Satisfaction with ICT infrastructure in Schools of Jordan**

The points of view of the different recipients and stakeholders were very similar. Below are the main issues that participants raised:

- Computers in most schools are insufficient, do not meet demands, nor do they match the number of students.
- Computer labs in schools are way behind the needs, given that the labs are used for different subjects and purposes. This would create some conflict and difficulties in scheduling to give priority to computer classes.
- Some schools are suffering because they have old computers that experience frequent breakdowns.

### **Theme 2: Schools' Satisfaction with ICT Infrastructure**

Teachers, principals, parents, and students have agreed that ICT infrastructure efforts carried out by the MOE were good but need to be improved and developed in some aspects such as:

- Shortage of PCs compared to students' numbers in most classes.
- Shortage of computer labs in most schools, not to mention the priority of teaching IT subjects in these labs instead of other eLearning subjects.
- Some schools suffer from frequent technical breakdowns in computers, which affects the educational process.
- The lack of effective maintenance by the concerned service providers - especially in the South Region- where they suffer from bureaucracy and are dissatisfied with the mechanism used.
- Although most schools have Internet access, they still face network disconnections.
- Some schools complain about the inadequate number of computer lab technicians, while others complain - especially in the South Region – that substitute computer teachers do not settle in respective schools, which reflects negatively on the conditions of PCs and labs in general.

### **Theme 3: Actual ICT Implementation at Schools**

Some annual school plans include procedures related to ICT implementation in education. Nevertheless, this is not actually being implemented as planned.

The actual implementation of ICT at schools goes as follows:

- Some schools use computer lab timetable forms and distribute lab times among classes. PCs are used to run educational CDs and carry out enrichment learning activities.
- Many teachers, especially those who hold ICDL or ICT Diploma, have the necessary skills to integrate technology in education, which enhances the learning process.
- Most schools use ICT extensively for administrative purposes.
- Some students use certain websites to simplify and explain some school subjects. For example, they surf English grammar and other websites that target 12th grade students.
- Some students realize that underachievement in the English language hinders Internet surfing which forces them to visit the Arabic websites. Thanks to technology, students are improving their English attainment levels with time and by practice.
- Teachers should bear in mind that some students cannot surf the Internet at home, nor can they use the computer labs after school, which should not affect their results.
- Parents mainly surf the Internet to help their children in their research papers, and to access certain educational, religious, scientific and entertainment websites.

As for the implementation of the e-learning system, “EduWave” responses show the following:

- Principals and parents perceived the EduWave as an excellent medium of interaction with targeted groups if implemented properly.
- The vast majority of teachers and principals use EduWave for administrative reasons, especially in recording marks, students’ inter-school transfers, entering data for students and teachers, and initiating pilot tests. Schools also benefit from the system in retrieving stored data such as annual plans. Some schools use the system in creating accounts for teachers and parents to follow their children's achievements.
- Most principals rely on overloaded computer lab technicians to perform their own tasks, which affects the progress of work.
- Many students are ignorant about using EduWave to access their accounts and at the same time they do not know their passwords. While some schools in the South Region referred to their students and parents' illiteracy about using EduWave.

- Some students merely use EduWave to check their marks and school hours, while others use it to benefit from the available resources to compensate for absence days.
- Teachers themselves rarely use the e-content curricula, due to lack of training and for administrative issues. Moreover, most supervisors do not evaluate or emphasize the significance of e-classes run by teachers.
- Science, math, and physics are the most frequently subjects activated via EduWave.
- Some parents usually log on to EduWave to follow up their children's achievements.

#### **Theme 4: Trends Toward Using ICT in Education**

Principals, teachers, parents and students who took part in the discussions showed a positive tendency toward using ICT in learning:

- Some teachers and school principals stressed the feasibility of implementing ICT in education for both teachers and students as it enable students to continually do sustainable research.
- According to principals and teachers, students have greatly benefited from technology as it has facilitated communication between internal and external environments. Technology enables students to act more freely and go beyond the boundaries of traditional pedagogue.
- Another advantage of using ICT is that it has broadened students' overall knowledge, saved time and connected students to the real world. It has also helped students to be knowledgeable rather than being passive recipients.
- ICT can play the roles of a support and facilitation. Teachers can rely on ICT as an effective means of keeping teachers well informed and in touch with colleagues.
- Some principals and teachers believe that ICT has played a significant role in administrative aspects. ICT has been applied with ease and effectiveness to carry out administrative tasks such as activating the school e-mail accounts.
- Most students stressed that parents are supportive of using the Internet from home, depending on their capabilities. Parents feel it is necessary to obtain ICT tools, taking into consideration issues like parental guidance and organizing times for reasonable use of ICT.
- Students believe that computers with Internet connection do connect them to the world. On the other hand, students who cannot afford to have Internet access feel isolated and embarrassed, as they cannot keep abreast with technology advances. Such students usually avoid any discussion related to technology.

- Some parents are cautious about using ICT in teaching. They complain that ICT has caused their children to be lazy because they can obtain knowledge without much effort and mental activity.
- Most parents fear the consequences of abusing the Internet. Children are susceptible to harm caused by accessing immoral sites.
- Some parents complain that their children have become unsociable as a result of being addicted to social networking websites such as *Facebook*.
- Financially, it is unanimously agreed that using ICT and networking at home means extra expenditure; more money is to be spent on purchasing and repairing computers, and on updating, buying and replacing hardware, software and accessories, let alone the costly Internet bills and fees.
- Some students point out that the Internet can be harmful in the absence of parent/teacher guidance and monitoring. It can be a waste of time and a major source of distraction from studying. To avoid such negative impacts, students suggest that schools should intensify the use of Internet in schools with sustainable guidance and monitoring by teachers.
- Some students indicate that using technology does not necessarily mean abandoning hardcopy books, which will continue to be a handy resource when doing research papers.

### **Theme 5: Impact of Implementing ICT on Educational Stakeholders:**

#### **Impact of ICT on Students:**

- The majority of teachers and parents think that ICT helps in shaping students' characters. Students' interaction with technology improves their academic performance. ICT helps students focus on some difficult concepts and learn skills such as language acquisition.
- Some teachers believe that knowledge acquisition is not related to technological capabilities. Not a single study has confirmed that technology increases students' knowledge and attainment levels. ICT is a double-edged weapon. It widens the gap between students and reading books, controls their thinking, and enhances online social relations at the expense of real life and direct human relations. Besides, technology has negatively affected speaking and reading skills. This is true when we see students focus on entertainment rather than educational aspects. Some other parents go beyond that when they talk about health effects; they say that sitting in front of computers for long times does affect their children's health in general.
- Students also emphasized that the availability of computers connected to the Internet has made them persistently regular Internet users, with a daily dosage of 6 hours. This in turn had a negative impact on their knowledge acquisition and

social relationships. On the other hand, having become familiar with technology made students capable of organizing and managing their times properly. Thanks to technology, some students said that their acquisition of knowledge improved. As we mentioned earlier, students believed that ICT is a double-edged weapon, but on the brighter side, it has made research and access to information much easier and given them the opportunity to demonstrate their potential energy and present information in different creative ways. In addition, ICT fosters communication and builds social relations. On the darker side, ITC is a waste of time and can be harmful when misused.

### **Impact of ICT on Teachers**

- The majority of principals and teachers indicated that technology has helped teachers consider the learners' individual differences, changed their instruction strategies, and motivated them to use ICT more frequently. Other teachers, however, considered it as an extra burden on them.

### **Impact of ICT on School and community relations**

- ICT has profoundly contributed to boosting school and community relations. The resultant influence shows that school has become a hub for consolidating and strengthening family connections, especially when parents communicate with schools to obtain EduWave usernames and passwords in order to access their children's marks.
- Some schools interacted with the local community and held informative and awareness meetings and workshops for mothers, using data show projectors. In addition, mothers enrolled in courses to reduce computer illiteracy. Some local community members join these courses to log on to the Internet and access personal e-mail accounts.

### **Theme 6: Teachers and Principals' Professional Development**

Several principals and teachers provided positive feedback on the training courses that are organized by the MOE (ICDL, INTL, WORLD LINKS). These courses accentuate the importance of ICT as a means of improving income and end products of the learning process. Teachers have developed new strategies related to communication with students and class management through technology. Moreover, the IT higher diploma program enriches teachers' skills and capabilities to apply IT as an effective teaching methodology.

- The majority of teachers complained that the timing of courses was inconvenient because the training courses usually started after 3:00 PM.
- Some teachers pointed out that some trainers were not qualified to deliver these courses, and that they stick to theory and abridge the courses, which negatively affects the performance of recipients.
- Several principals indicated that old teachers refuse to participate in these courses since they resist change and fear the use of ICT. Hence, principals had to exhort teachers and exerted all efforts to encourage them to take part in these courses.
- Some teachers indicated that they attend these courses only to ensure receiving annual increment, without paying much attention to the effective transfer of knowledge to students.
- Some teachers are keen to join courses such as computer maintenance, EduWave, networks, ICIE, Visual Basic, Adobe, Flash and audio-visual recording to assist in web design and to publish the students' production.
- Some students believed that when unskillful principals and teachers lack the proper skill to use ICT, or are not skillful enough to use it, they would stick to teacher-centered class management. Nonetheless, other students collectively agreed that both teachers and principals work cooperatively to exert efforts to utilize the available equipment in accordance with the school schedules. Some teachers keep abreast of advances in technology, but when equipment is not available at school, teachers are forced to rely on their laptops to carry out classroom activities.

### **Theme 7: Challenges and Difficulties Facing Implementation of ICT**

Some teachers and students highlighted the following challenges:

- Insufficient number of computers, computer labs, and lab chairs, in addition to the inequitable distribution of laboratory equipment and having too old computers
- Inefficient maintenance works and the need to repair computers when they are out of order; it becomes more complicated when we talk about the routine of reporting technical failures and prolonged maintenance.
- Slow Internet connection and lack of Internet service for many teachers at home.

- Shortage of computer lab technicians.
- Inexperienced computer lab technicians and teachers' inability to employ technology in education.
- Lack of knowledge about EduWave and the e-content by some teachers and students.
- Unavailability of e-content on subjects such as Islamic and Civic Education
- The continuous pressure on teachers, particularly computer teachers who are frequently under more pressure because they need to enter data and marks and be in charge of laboratory works at the same time. Besides, some teachers have negative attitudes when using technology. The huge volume of school curricula adds to this burden.
- Supply issues and the fact that certain people are held responsible for equipment, utility and hardware would hinder end users from optimally benefiting from technology.
- Some students complain that some parents have misconceptions about the role of computer in education. Another prevailing misconception is that computers are there for entertainment purposes and that computers are too expensive.
- According to students, the weekly computer classes are not enough to learn practical skills. Hence, the demand to increase the number of computer classes.

Parents who participated in the focus groups noted the following challenges:

- Most parents complained about the inadequate number of computers at home. Each child wishes to have a computer of his/her own. Parents have to manage with the available computers at home and regulate and organize utilization by family members.
- Using technology at home is costly, due to high prices of computers, and home Internet service costs much higher, particularly for low-income families.
- It is essential to meet the needs of parents to attend Internet and computer training courses offered by the MoE or the local community.

### **Theme 8: Success Stories about Use of Technology at Schools**

Participants have recounted several success stories related to using technology.

#### **Teachers' success stories:**

Some creative accomplishments by teachers include the following:

- Recording classroom activities and repeatedly presenting them to students via computers and data show projectors, which would save time and effort for teachers.
- Some school subjects are presented to students by using computers. (Computer modeling).

- A teacher pointed out that she had taught science classes via Messenger to 12 students. It was agreed to communicate with students for 1 hour a day to explain certain topics and answer questions interactively.
- Another teacher claimed that she had designed an abridged ICDL curriculum to early grade students (1 -5) and embarked on teaching it.
- Some teachers referred to success stories related to using technology to sustain assessment strategies. A teacher designed an e-test about Jordan's history to 15 students via EduWave. Another said he used a software program for students to have pre-tests.
- A school principal highlighted that technology assists in performing interactive activities such as the free medical day and safe school environment. Many short films and activities are displayed via audio-visual aids and technology can be used in some school projects. A teacher showed that a workshop on how to embroider Jordanian traditional head scarves were held, recorded and uploaded on the MoE website. Other media like photographing the mushroom growth and soap industry, and storing the video material on CDs to display them to students later.
- A school principal pointed out that he had designed a website where he played the role of a moderator. That site aimed to give students the opportunity to express their opinions freely.

### **Students' Success Stories:**

- A student participated in the robot competition. He designed his own website to assist his colleagues in difficult school assignments and hard subjects. A low-achieving student was involved in the competition to boost his self-confidence and level of performance.
- Several students repaired out-of-order computers in their schools, which helped a lot to increase the number of computers operating in laboratories and lowered the number of students sharing computers.
- Some students expressed interest in designing e-content lessons, which helped elucidate classes and review the material smoothly through soft copy.
- Some students created a mini e-channel to welcome visitors of the website and to explain in detail how they have contributed to school activities.
- Another student created a forum on the website, receiving, reviewing, screening and monitoring members' contributions and articles. This way, the student gained Para-cognitive skills enabling him/her to tackle issues and debates on the website.

## RECOMMENDATIONS

A national event was organized in February 2012 to share the findings with the different stakeholders as well as to finalize the recommendations of the study. Based on the findings of the study, the recommendations were grouped into four categories: multi stakeholder partnerships, ICT infrastructure, EduWave, and professional development.

This chapter consists of a summary of the results and recommendations

### Summary of Study Findings:

The main findings of the study are as follows:

1. The results showed that 69% of the respondent schools have their own premises, while 29% of the school buildings are rented.
2. The survey showed that 11% respondent schools applied the double-shift system, and the number of double-shift schools were the highest in Zarqa First Directorate and Amman Third Directorate. Whereas 89% of respondent schools in Jordan apply the one-shift system, which is a very high percentage.
3. A total of 76% of Jordanian schools have at least one landline phone, with UNRWA schools on top of the scale. It was found out that 98% of UNRWA schools have at least one landline phone, while private and public schools with at least one landline phone accounted for 92% and 71% respectively.
4. The total number of computers available in schools is around 95,750 distributed as follows: 97% of them are desktop PCs (approximately 92713) whereas the number of laptops is 3037. These computers are distributed among the MoE, in which the Private Education Directorate came first, followed by the Irbid Third Directorate and Amman First Directorate respectively.
5. A total of 99% of the respondent schools have computers (laptops or desktop PCs) which are used for multiple purposes. The rates by sector were roughly the same; 99.45%, 98.7 and 98.5% for UNRWA, private and public sectors respectively.
6. The ratio of computers per student in Jordanian schools was 14.4:1, and it was 14.3:1 in schools that have computers. The highest ratio by sector was in UNRWA schools (28.8: 1). Schools that have computers had the same ratio. In the public sector, the ratio was 14.2:1, and this was the same ratio for schools that have computers as well. The private sector had a ratio of 12.1:1 and schools that have computers had a ratio of 11.9:1.
7. A total of 85% of schools have at least one computer lab; UNRWA schools ranked first with a total rate of 96%, followed by 94% for private schools and 83% for public schools.
8. UNRWA schools accounted for the highest number of schools with one or two printers, totaling 99%, next came public schools with a total of 96%. Only 10% of

Jordanian schools were found to have smart boards whereas private schools with one smart board or more were the highest, amounting to 16% of the total schools. Scanners were used by a total of 55% of schools in the kingdom, mostly found in public schools. Data show equipment was used by 58% of schools in Jordan, with UNRWA schools scoring the highest rate among the three sectors.

9. A total of 62% of respondent schools use educational software other than the ones available on EduWave. Some 34% of the schools answered that these software utilities were purchased from the market, while 51% of the schools said they used free software -- 46% of which are prepared by teachers and 37% by students.
10. The Internet coverage rate in schools was 86%. By sector, the rate was 89% in UNRWA schools while the lowest rate was in public schools (85%).
11. Broadband Internet service was available in all sectors; amounting to 93% in UNRWA schools, 61 % in public schools, and 60% in private schools. Narrowband Internet service came next, with the highest rate being in public schools. As for leased lines and wireless Internet service, the rates were negligible, with the highest being 5% in public schools, while only 9% of schools used the 3G WiMAX service.
12. Slow Internet connection was the major challenge that hinders the use of Internet at schools, in addition to technical failure, and the insufficient time to finish overloaded curricula. A total of 84% of schools complained about the former while 79% about the latter. Finally, the financial challenges related to the Internet Service Provider /ISP came last with only 4% of schools reporting this as a challenge.
13. The results showed that 13.6% of the total number of schools in the kingdom have websites, amounting to 605 schools, and that 16% of schools have Internet connection. As for schools with web pages on the MoE website, 14 % percent of the schools said they had web pages, accounting for 16.3% of schools that have Internet connection. The rate of schools which have pages with student/teachers blogs is still not high, not exceeding 7.3% of the total number of schools and 8.6% of the total number schools with Internet access.
14. A total of 54% of the respondent schools have e-mail accounts with government domain names; accounting for 63% of schools with Internet connection. Meanwhile, some 23% of the total number of schools with Internet access said they private e-mail accounts.
15. Some 96% of the respondent schools said they have EduWave, accounting for 4243 schools. The rates by sector were high, accounting for 100%, 99%, 95% in UNRWA, private, and public schools respectively.
16. Using EduWave in schools accounted for 82% of the challenges facing schools, 52% were related to slow connection, 48% were related to time availability to use the EduWave, while the challenges related to technical failure and errors came last.

17. Some 78% of the total number of schools use the e-content available on EduWave. By sector, the use of e-content on EduWave was at its highest in government schools, with a rate of 79%, whereas UNRWA schools had the lowest rate (73%).
18. The number of teachers in the respondent schools was estimated at 98000 teachers; 64% were female teachers and 36% were male teachers.
19. The results showed that 77% of teachers in the respondent schools have computers at home, 41% of them have Internet access, 57% have private e-mail accounts, and 18% use e-mail accounts on EduWave for educational purposes.
20. Approximately 31% of teachers use the EduWave e-content available.
21. The rate of female teachers was the highest in public schools, amounting to 36% of total teachers, while the lowest rate of female teachers was in UNRWA schools, with 29% of total teachers. As for male teachers, the highest rate was in private schools, amounting to 36% of total teachers in private schools, while the lowest rate was in public schools, amounting to 24% of total teachers in the same sector.
22. A total of 57% of students in public schools use computers in their schools, 89% and 46% in private and UNRWA respectively.
23. Some 53% of students in public schools have computers at home, 22% of whom have Internet access, while these percentages were respectively 80% and 59% for students in private schools and 52% and 22% for students in UNRWA schools.
24. With regard to the average time needed to respond to technical support requests, the “more than one week” response time was the highest in schools, accounting for 43% of responses, while “48 hours” accounted for 20% of the response times. The private sector clearly took the lead in the time required to respond to technical support requests. A total of 54% of private schools scored a response time of 24 hours. For UNRWA schools, the “48 hours” response time was the highest, accounting for 30% of response times in the respondent UNRWA schools.
25. A total of 3542 schools said they have anti-virus software, accounting for 80% of the total number of schools; and 593 schools (13%) indicated that they have firewall software. Meanwhile, 248 schools (6%) responded that they have content screening software. It is noteworthy that the rate of schools that do not have security software did not exceed 5% (240 schools).
26. With regard to updating computers and its accessories, the majority of respondent schools (41%) said they do not usually do the updates. Only 22% of the schools update annually while 16% do the updates every 5 years.
27. Private schools have the highest weekly average of computer labs users, amounting to 55 people, while in the government sector it is 13 and in UNRWA schools it is 4 people only.

28. In 2011, the number of employees who had training courses on ICT in computer labs was estimated at 4690 female trainees from the government sector, 878 from the private sector, and 125 from UNRWA.
29. A total of 504 schools said they use social networking sites such as Facebook as a means of communication at schools, accounting for 11% of the respondent schools; some 54 respondent schools said they use Twitter, accounting for 1.3%; while 391 schools indicated that they use other social networking sites.

### **Study Recommendations by the Themes:**

#### **Theme 1: Multi-partnerships among schools, local community, public and private sector, NGOs and individuals**

1. Activating the role of Knowledge Stations throughout the kingdom to instill the ICT culture among individuals.
2. Ensuring the sustainability and scalability of the projects resulting from partnerships between private and public sectors.
3. Giving priority to monitoring and evaluating current projects and disseminating successful ones instead of launching new projects.
4. Eliminating and overcoming challenges and obstacles by setting appropriate cooperation and coordination mechanisms among stakeholders. Each partner should ensure full commitment to play a role in finding solutions, speeding up procedures and making relevant decisions. (Some of the issues include Internet speed, signal strength, reliability of equipment... etc.).
5. It is vital to attract and engage the private sector in developing school technological environment, particularly for less fortunate schools and adopt the "Madrasati" and JEI initiatives as models.
6. It is recommended to raise awareness among parents regarding the safe use of the Internet; using informative bulletins and the MOE homepage.
7. Promoting and expanding the concept of community service in schools by training parents and community members on computer and Internet skills, and by opening schools for students during afterschool hours and summer holidays.
8. Launching a Jordanian satellite channel dedicated for education.

#### **Theme 2 : ICT Infrastructure**

1. Finding effective and radical solutions to the problem of slow Internet connection in schools.

2. Following up with the assigned committee (members from MoE, MoCIT, and JEI) who are in charge of examining slow Internet connections in schools, and conforming to their technical recommendations that aim to end such problems.
3. Working with determination to boost the broadband agreed upon with the National Information Technology Center (NITC) to (300MB/s), instead of (150 MB/s) so as to increase the Internet speed.
4. Finding solutions to the old filtration system that weakens the Internet and affects the speed, either by updating or replacing it.
5. All concerned parties and school supervising authorities should set an action plan to continually update and enhance computers and its peripherals.
6. Looking for more effective and sustainable mechanisms to carry out maintenance of computers at schools, and under the supervision of the MoE.
7. Creating specific criteria for computer labs. This includes size, area, security, lighting, cleanliness, organization and installment of equipment; and continually ensuring the implementation of these criteria.
8. Activating the “Laptop per Student/Teacher Initiative” and applying modern specifications and convenient conditions.
9. Providing special laptops suitable for early graders and for competitive prices.
10. Providing low price home Internet services, especially to teachers and students.
11. Effectively activating the role of e-mails as a means of communication between teachers and students.
12. Effectively enhancing the use of government e-mail addresses for MoE and on all levels: ministry center, directorates and schools.
13. Finding ways to spread the use of smart boards.
14. Providing extra computer labs at schools, ones equipped with data show projectors to facilitate using the e-content curricula.
15. Setting specific mechanisms to provide schools with computers based on the number of students.
16. Intensifying field visits to school computer labs by the MoE employees to ensure the optimal use of these labs.

### **Theme 3 : E-Learning Portal (EduWave)**

1. Taking firm procedures to activate EduWave through school supervisory authorities.
2. Enhancing and boosting the role of supervisors to strengthen and support the use of EduWave by all teachers.
3. Providing schools with e-content by creating an offline copy for each school to overcome slow Internet issues.
4. Encouraging and extending the utilization of EduWave by launching initiatives such as “EduWave Best User Award.”

5. Engaging UNRWA and Military Education Directorate in EduWave orientation and training programs.
6. Activating the Short Maze system to give the necessary technical support related to EduWave.
7. Updating the EduWave continuously and ensuring regular maintenance to avoid frequent technical problems.
8. Providing sufficient time for teachers to use EduWave effectively.
9. Sounding out the opinions of students and teachers on issues like integrating technology in education and other related challenges through surveys posted on the MoE website and EduWave.

#### **Theme 4 : Professional Development**

1. Raising the principals' awareness about the importance of a school environment that supports the implementation of technology in education.
2. Adopting a clear strategy on the employment of technology in classrooms.
3. Monitoring teachers and assessing their methods in applying technology in classrooms, and developing a control and accountability system.
4. Highlighting success stories of schools that use technology intensively and motivating students and teachers who take initiatives of using ICT in education, giving awards for the best and most creative products.
5. Encouraging the Peer Support Initiative to enhance knowledge communities within schools and expand the use of technology in education.
6. Continuously organizing training courses for teachers, lab technicians, and newly hired teachers in particular, to acquaint them with the latest technology in the education field.
7. Providing schools with sufficient numbers of lab technicians.
8. Teaching computer subject starting from first graders in public schools.
9. Activating online and computer-based testing (CBT) rather than paper-based testing (PBT) because this can help students in their university study.

In general, the majority of stakeholders have recommended conducting regular and specialized surveys to reflect the students' and teachers' perspectives on the implementation of ICT in education.