Technology and the Classroom:

Computer Education in Jordanian Public Schools

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Submitted in partial fulfillment of the requirements for Jordan: Modernization and Social Change, SIT Study Abroad, Spring, 2007
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Date: May 15th, 2008
Abstract

This study was concerned with the state of computer education classes in public schools outside of Amman. The acquisition of computer skills and knowledge is currently very important for Jordanian students in order to enter a university after graduation and for finding a well-paying job in the Gulf States or in Jordan itself. The researcher visited two public schools and interviewed school teachers, administrators, and Ministry of Education officials in order to determine the major obstacles facing computer education in these environments. A questionnaire was also administered to students of the 9th grade at both schools to determine the extent of their computer usage as well as their opinions about computer education at their schools. Finally, student test grades in computer classes were analyzed to measure student’s performance in computer tasks. It was found that the schools suffered from computer hardware shortages to varying degrees as well as internet connection problems. The Ministry’s top-down control of most aspects of the educational system was concluded to be impairing the capacity for teachers to best instruct their students. The training available for computer teachers was determined to be inadequate as were their opportunities to communicate with the Ministry of Education. Students were found to have good access to computers outside of school but less access to internet, and they performed poorly on computer tests. A major component of this research is a list of practical suggestions for the improvement of computer education in public schools which appear at the end of this report along with suggestions for future research.

Topic Codes: 201 Education: General; 202 Education: Administration; 227 Sociology of Education; 229 Teacher Training; 230 Technology.
I. Introduction

The idea for this research was initially founded as a result of listening to various guest lecturers from the School for International Training’s (SIT) “Jordan: Modernization and Social Change” program for American students studying abroad in Amman. As one of the students on this program, the researcher was struck by a paradox in the thematic content of these lectures. While many of the lecturers cited education as one of the most important factors for Jordan’s modernization and future success, not a single lecture chose education as its primary theme. Therefore, the shortage of information about Jordanian education in this program, however disappointing, presented an opportunity for further study as part of SIT’s Independent Research Project which each student is required to complete.

Countries often look to their educational system as one of the main factors that will determine their future prospects. This focus is logical simply because the qualities of a country’s youth are shaped by the education available in the nation’s schools. Within education, the concept of “modernization” for schools is often linked to their implementation of new technologies, especially computers. Since computers are a constantly evolving field, a school’s use of computer technology has become a popular way to determine if the school is “up-to-date” and forward-looking. This focus on technology as a way to judge a school’s modernity and progress is not found only in the Jordanian educational system, but in schools across the globe, including those in the United States.

At the Ministry of Education in Jordan, it is widely known that the computer education program is facing numerous problems, especially in schools outside of Amman which have historically received less attention than schools within the capital. However, given the size of the issue, there have been relatively few efforts made to document or research these problems to a significant degree. Most research into computer education in Jordan is also Arabic-language research which has yet to be translated into other languages and is therefore inaccessible to many interested readers. The current research sought to identify the main problems facing computer education in Jordanian public schools outside of Amman as well as to provide suggestions for its improvement. The researcher wanted to provide a potentially unique perspective on these issues.
given his background in American psychological research and his first-hand experience with the public education system in the United States. Additionally, there is hope that more English-language research into Jordan’s computer education system will increase the attention paid to this important issue, demonstrate that there is interest in the subject and therefore encourage the translation of existing research, and also encourage future studies by researchers of all backgrounds.

This remainder of this report is organized into seven sections. Section (II) provides background information on the Jordanian educational system in general and specific information on computer education courses in public schools. Section (III) comprises the literature review for the research and establishes a theoretical framework used to interpret the research’s findings. Section (IV) describes in detail the methodology of this study including some of the problems faced as a result of the field research. Section (V) provides the results and analysis of a Questionnaire administered to students as part of the research as well as analysis of student test grades in their computer classes. Section (VI) provides suggestions for the improvement of the computer education system and the related justifications for these ideas. Section (VII) concludes this report with a discussion of its overall findings as well as suggestions for future research. This section is followed by a bibliography and then appendices in Section (VIII) which includes the documentation used for this study. A separate set of appendices is included on the CD attached to this report which features photography conducted as part of the research.
II. Background

In order to understand the context in which the research was conducted, it is necessary to provide background information on the basics of the Jordanian educational system and how the computer education courses are designed. The following is a brief introduction to Jordan’s educational system and the challenges of the information age in Jordan:

Educational development in Jordan accelerated rapidly in 1970 following the implementation of a plan to create human capital for the future of the state. Evidence of Jordan’s success in education has not been difficult to find. The literacy has risen from 33% in 1961 to around 87% in 1999. Similarly, the percentage of the population with formal education rose from 52% in 1979 up to 85% in 2004. Today, compared to its neighbors, Jordan spends a relatively high amount of its GDP (5.72%) on education, approximately 1% above the average, trailing Saudi Arabia, Syria, and Yemen.

In public schools, grades 1 through 10 follow a curriculum which includes Islamic education, Arabic, English, math, science, social studies, civic education, vocational education, arts education, physical education, and computer education. Grades 11 and 12 constitute the secondary stage, where students are divided up among different career tracks such as medicine, law, or IT depending on their test scores on standardized exams. Co-educational schools exist in Jordan up until around the fourth grade. However, for the 9th grade, which the current research focused on, the male and female students are separated into boys’ schools and girls’ schools.

In terms of structure, the educational system is very top-heavy. Specifically, all Jordanian schools follow a standard national curriculum, meaning all schools use the same

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2 Ibid.
3 Ibid.
4 Benard, Cheryl. "Fixing What's Wrong-and Buildong on What's Right-With Middle East Education." SAIS Review 26, no. 2 (Summer-Fall 2006), 36.
5 El-Sheikh Hasan, Omar H. "Improving the Quality of Learning: Global Education as a Vehicle for School Reform." Theory into Practice 39, no. 2 (Spring 2000), 98.
6 Al-Khaldi, “Educational Attainment Jordan’s Population”. 
textbooks and the same state-determined grading procedures\textsuperscript{7} with only a few exceptions. The curriculum for each subject is detailed in formal documents sent to the schools by Jordan’s Ministry of Education\textsuperscript{8}. Teachers also will receive training in use of curriculum materials to make sure Ministry’s guidelines are followed\textsuperscript{9}.

The design of computer education courses in Jordanian public schools demonstrates many of the trends mentioned above. Students begin computer education classes in 7\textsuperscript{th} grade and continue through to the end of the secondary stages\textsuperscript{10}. Specifically, this research focused on the 9\textsuperscript{th} grade in public schools and the following information reflects their experience in particular, although much of the information applies to all grades who receive computer education. Students have two computer classes each school week, and each class is 45 minutes long\textsuperscript{11}. Classes are usually held in a school’s computer lab. The curriculum for any computer subject is often divided into two fields, theoretical material and practical material. Theoretical material is usually learned through writing exercises and lectures, while practical material always involves the student sitting at an actual computer to practice the lesson\textsuperscript{12}. Programs students learn include Microsoft Office (Word, Excel, PowerPoint, and Access), programming languages such as Quick Basic, Visual Basic, and FrontPage, as well as Adobe Photoshop CS2. Students also learn about more general concepts such as computer networking, modems, and use of the Windows operating system.

As in other subjects, the Ministry of Education exerts a significant level of control over the computer education curriculum. This curriculum plan is outlined in full detail in a handbook distributed to each teacher. Teachers are not only required to teach all the material in the handbook, but are required to teach it in the style outlined in the literature\textsuperscript{13}, which gives teachers very little control over their lesson plans. Additionally, the quality of the computer labs is almost fully determined by the Ministry of Education. Public schools lack an official budget

\textsuperscript{8} El-Sheikh Hasan, “Improving Quality of Learning”, 98.
\textsuperscript{9} Ibid., 98.
\textsuperscript{10} Shaheen, Rami Omar, interview by Ketan Gajria. \textit{Um Al-Hiran Computer Supervisor Interview} (May 1, 2007).
\textsuperscript{11} Awad, Ahmad, interview by Ketan Gajria. \textit{Al-Juwaideh Computer Teacher Interview} (April 23, 2007); Ismael, Iyad Mohammed, interview by Ketan Gajria. \textit{Um Al-Hiran Computer Teacher Interview} (May 2, 2007).
\textsuperscript{12} Ismael, \textit{Um-Al Hiran Computer Teacher}.
\textsuperscript{13} Awad, \textit{Al-Juwaideh Computer Teacher}. 
for their computer education departments\textsuperscript{14} and therefore cannot choose where to focus funding for computer technology. Instead, schools receive all computer hardware and most of their software directly from the Ministry\textsuperscript{15}. Therefore, aside from the amount of floor space, the quality of a school’s computer lab is wholly determined by the type of equipment the Ministry decides to distribute to a school.

Jordan’s goals for Information and Communication Technology (ICT) are outlined in a plan known as the “REACH” initiative. The acronym refers to the focuses of the plan which include “Regulatory Framework”, “Enabling Environment and Infrastructure”, “Advancement of National IT Programs”, “Capital and Finance”, and “Human Resource Development.”\textsuperscript{16} The REACH plan exists as a continuously updated document that has primarily introduced a “marriage between the private and public sectors” in Jordan\textsuperscript{17}. Specific policies resulting from this cooperation have included the drive to develop and IT Industry Association in Jordan, the streamlining of customs procedures, relaxing of labor laws, the passing of electronic commerce (e-commerce) legislation, and the government providing industry with access to high speed communication lines\textsuperscript{18}. In spite of these plans and in spite of the fact that King Abdullah II is reported to be “greatly committed to improving the ICT sector in Jordan”\textsuperscript{19}, the country’s electronic infrastructure is still in need of improvement. Internet access for Jordanians has traditionally been expensive due to the expense of local phone calls, although the government made a point of ending Jordan Telecom’s monopoly over such services in 2004 in order to encourage local competition and lower costs\textsuperscript{20}. Nonetheless, only several years ago, the cost of a PC was equivalent to 80% of an average Jordanian’s salary. Since then the computer assembly market has been trying to expand in efforts to increase production and in turn lower costs. Nonetheless these barriers to home ownership of an internet-capable PC have resulted in the slow growth of e-commerce in Jordan, which is still virtually non-existent to this day. Jordanians

\textsuperscript{14} Abdllghani, Zahar, interview by Ketan Gajria. \textit{Al-Juwaideh Administrator Interview} (April 23, 2007); Interview by Ketan Gajria. \textit{Anonymous Interview} (April 22, 2007); Shaheen, Um Al-Hiran Computer Supervisor.
\textsuperscript{15} Abdllghani, \textit{Al-Juwaideh Administrator Interview}.
\textsuperscript{17} Ibid.
\textsuperscript{18} Ibid.
\textsuperscript{19} Ibid.
\textsuperscript{20} Ibid.
have conventionally been more inclined to drive to a local store as opposed to shopping online and paying shipping costs. 

The Jordanian government itself instituted an “E-Government program” several years ago to “computerize” various government branches and put them on the web, although the success of the program has depended average citizens having online capability in order to access this information. Currently, the Ministry of Education is accessible online with its own website and ability to be contacted by email. However, the current research found problems with this type of communication, which will be discussed later on in this paper. The government has also struggled with legal problems stemming from technology. Although the government has passed laws protecting software copyrights and electronic transactions, the country’s high rate of piracy makes these laws difficult to enforce. Indeed, pirated electronic material is available most popular shopping areas in Amman. In the case of DVDs, established stores that sell pirated material are allowed to co-exist right alongside legitimate businesses in all parts of the city and pirated DVDs are usually available concurrent with a film’s theatrical release in the country’s cinemas.

Jordan also faces issues with its workforce in the technological field. It is true that technology-related higher education is fairly desirable, although medicine and engineering are still the most desirable fields. However, Jordan’s best technological professionals are often lured away from the country by higher-paying jobs in the Gulf, as well as by lucrative opportunities in Europe and the United States.

Jordan’s computer education efforts therefore exist in a country that is struggling to meet the expectations of a rapidly developing ICT culture. Jordan’s reliance on foreign investment and efforts to strengthen ties with “Western” nations such as the United States likely only increase these types of pressures for computerization as a means of “modernization.” This environment is also the context in which the current research was conducted and must be appreciated in order to understand the conclusions that this research imparts.

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21 Ibid.
22 Ibid.
III. Rationale

Studies analyzing the implementation of computer technology in schools and the use of computers by children were consulted to construct a theoretical framework for this research. Unfortunately there is a shortage of accessible English-language literature available on computer education in Jordan. For this reason, implementation studies from “Western” countries including the United Kingdom, the United States, and Canada formed the backbone of this literature review. While there are certainly cross-cultural differences in computer education in schools, this review focused on the universal difficulties schools face when asked to implement new technology. However, it must be noted that the researcher’s personal background is with computer education in the United States, and certain biases exist based on the pros and cons of the American public education system. However, this difference in background provide this literature review as well as the research itself with a potentially different perspective on ideas for Jordan’s computer education system. Some of the implementation studies are from several years ago. However, this is merely the result of the fact that many of the schools in the studies began their implementation efforts earlier than Jordanian public schools have and there are lessons to learn from the issues that those schools originally faced.

The first article consulted was a 1998 study\(^{26}\) by Mary Bryson and Suzanne De Castell on the failures of an effort to implement new technologies in 12 elementary schools in British Columbia. The authors noted that in the province there was pressure for schools to appear to be the “cutting-edge” of reform efforts\(^{27}\) as well as the constant use of hyperbole by the Ministry of Education in regards to how computers would change not only the educational experience, but society itself\(^{28}\). Assumptions included the idea that change was synonymous with progress and that new technology had inherently more educational value than old technology\(^{29}\) and as a result “computer literacy” became a goal for teaching students\(^{30}\). Where computer supervisors saw the new technology as absolutely necessary, teachers were more cautious or saw the technology as


\(^{27}\) Ibid., 543.

\(^{28}\) Ibid., 543, 546.

\(^{29}\) Ibid., 545.

\(^{30}\) Ibid., 547.
simply another teaching tool\textsuperscript{31}. Overall, there was not enough emphasis on how the technology could be pedagogically useful\textsuperscript{32}. In fact, teachers were the individuals most likely blamed when implementation efforts failed and were singled out as those most resistant to change\textsuperscript{33}. In truth however, teachers had little experience with the new technology at the time of implementation and were also the individuals who had the most time taken away from them due to implementation efforts\textsuperscript{34}. This research recognizes the concerns cited in the study and agrees with most of its points. In the opinion of the researcher, the most important aspect of computer technology in school is how computers can improve learning rather than the use of computers for the sake of appearing “modern” or up-to-date. At the same time, computer implementation in schools is more unavoidable than preventable and school staff should find ways to streamline the process of bringing computers into the classroom and maximize the benefits of the situation rather than try to stop the process altogether. This research recognizes that computers do have significant benefits to offer classrooms and teachers including, but not limited to, improved organization of and access to information as well as creating an exciting environment for students.

The study also noted that during the implementation period, the school staff members who had the most computer knowledge experienced the most additional pressure to explain the new technology to others and to be able to handle any problems that arose with it\textsuperscript{35}. The researchers found that the greater the amount of technology being implemented, the greater the need for on-site technical support\textsuperscript{36}. In regards to these issues, this research supports the Ministry’s decision to assign computer supervisors to its public schools to act as on-site technicians and support the computer teachers who must instruct the classes. When teachers are burdened with technological problems there is invariably a negative effect on the students’ education. As such, having dedicated computer supervisors should mean computer teachers have more freedom to focus on the teaching itself.

\textsuperscript{31} Ibid, 548.
\textsuperscript{32} Ibid, 552.
\textsuperscript{33} Ibid, 544-545.
\textsuperscript{34} Bryson and De Castell, “New Technologies and Cultural Ecology”, 559.
\textsuperscript{35} Ibid, 559.
\textsuperscript{36} Ibid, 550.
A 1996 article\(^\text{37}\) by Deborah Armstrong, Ruth Davis, and Gary Young explored the integration of technology at Middle Schools and High Schools in the United States and described several problems that school staff faced as a result of these processes. The authors noted that many current teachers in the surveyed schools had been educated in a time period when computers were not common and therefore found the new technology unfamiliar and intimidating\(^\text{38}\). Because of this, it was often easier for teachers to ignore and avoid the new technology rather than learn how to use it\(^\text{39}\). However, it was noted that better results could be obtained if school administrators created an environment supportive of adult learning and continuing professional development so that teachers were encouraged to master the new technology\(^\text{40}\). A study with similar conclusions was conducted by Donn Ritchie in 1996\(^\text{41}\) about the role of school administrators in the implementation of new technology in schools. Ritchie argued that administrators play a vital role in the implementation of technology\(^\text{42}\), that they need to encourage teachers to get training and that administrators themselves should be technologically competent in order to lead by example\(^\text{43}\). This research agrees with the suggestion that schools create a welcoming environment for implementing technology as well as one that encourages teachers to develop their skills with computers. This is preferable to environments where teachers are simply pressured to adjust without a sincere concern for how intimidated teachers can become as a result of these changes. In particular, the researcher also strongly agreed with Ritchie’s suggestion that schools be sensitive to the varying socio-economic status (SES) among students and how this reflects their access to technology at home. While the current research was unable to measure the SES of its participants, it is important to remember that while some students can leave school and return to a home with capabilities equal or exceeding those of the average computer in the school’s lab, for many students the computer lab is the only location available for them to practice their computer skills. As such, teachers need to


\(^{38}\) Ibid, 81.

\(^{39}\) Ibid, 82.

\(^{40}\) Ibid, 87.

\(^{41}\) Ibid, 87.

\(^{42}\) Ibid, 43.

\(^{43}\) Ibid, 49.
be sensitive to the fact that their students’ varying backgrounds will often result in different abilities and paces of learning in computer classes.

A 1997 study by Neil Selwyn dealt with the difficulties in identifying the factors that define a student who is “skilled” in computers. The researcher in particular agrees with Selwyn’s statement that computer “expertise” cannot be defined as a specific aggregation of computer skills since computers as a field are always changing and skills that are useful today may not be useful in the future. More specifically, Jordanian students should not just be instructed in various programs, but also taught how to use the functions of a computer to teach oneself new skills and to find information that one does not already know. For example, understanding how to use internet searches can allow a student to teach himself new information (whether it is finding facts or instructions about how to use a program) when a teacher is unavailable. Although these types of skills are vital, the researcher is not necessarily advocating transforming the educational system towards an environment of predominantly independent learning by students with teachers acting as resource managers. This concept, as outlined by Peter Twining in a 2002 article on conceptualizations of computer use, is at this point too ambitious for the Ministry of Education to consider, regardless of whether it would be a positive development or not. The Ministry should instead focus on the immediate concerns of implementing computer education and making sure students are learning adequate skills for the future.

The final set of concerns for this research is outlined in a 2001 article by Keri Facer, John Furlong, and Ruth Furlong, and Rosamund Sutherland entitled “Constructing the Child Computer User.” The authors expressed reservations about societal changes brought on by the information age including assumptions that children are naturally inclined to use computers, the romanticizing of stories about children being able to teach their parents about computers rather than vice versa, and constructing children as future competitors and workers in an information society. The researcher parts with the authors in the belief that there will be a need for future

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45 Selwyn, “Assessing Students’ Ability”, 53.
workers to be comfortable, although not necessarily adept, with computer technology in order to obtain the best jobs, regardless of whether or not society had in the past pushed them into this position. At the same time, the authors’ points are well taken in that the Ministry of Education cannot design its curriculum assuming all children are naturally inclined to understand computer technology. Furthermore, educators at all levels from the Ministers of Education to the teachers at the schools have to see through the hype that surrounds the implementation of technology in schools. As explained before, the implementation itself is not an inherent improvement of the educational system. Although there is certainly a “wow factor” that accompanies the arrival of new technology, educators must remain focused on the question, “how can this technology help students learn?” With that question in mind, Jordan’s educational system can move forward and begin obtaining the benefits of new technology in its schools.
IV. Method

From the outset, the research design called for the use of two public schools for gathering information on computer education. To investigate the issues surrounding computer education, it was essential to choose one school experiencing serious problems with computer teaching and one school that was more “average”, that is, having some problems but being more representative of a typical school. Both schools had to be for boys only. Since the researcher performing the work was male, it was predicted that fewer problems would be encountered in a school environment where cross-gender issues were absent. The research also focused on schools outside of Amman as those within the city are known to get more attention from the Ministry and therefore do not demonstrate many of the most serious issues facing computer education. These requirements were addressed to the research advisors from the Ministry and used to determine which schools should be the site of the research. The Al-Juwaideh school was chosen as a school that was having many problems with computer education and the Um Al-Hiran school was chosen as a school that was more “middle-of-the-pack” in comparison to other schools in Jordan. Both schools have a majority of Palestinian students. Although discrimination against Palestinians in the educational system is surely a major issue, it was considered beyond the scope of the current research.

Al-Juwaideh is a public school for grades 1-12 in the district of Amman the Third. Al-Juwaideh itself is a low-income area outside of Wahdat and has a poor reputation as being full of problems and troublemakers. The school is located just down the street from a notorious prison and is perched on a hillside which is covered with trash and empty trailers. Although the building is run-down, many of its walls are decorated with colorful artwork which lends a sense of spirit to the otherwise dreary concrete architecture. Some classrooms, including the computer lab and the main office, are located inside the three-story main building. Classrooms outside the main building are placed in long rows in adjacent buildings in a set-up which offers little or no sound isolation for each small classroom. The school environment is both lively and very noisy, especially since the recess areas are located right in the middle of the school grounds, adjacent both to classrooms in the main building and those outside it.
Um Al-Hiran is a second public school in Amman the Third. It is located near Kuzayat Al-Idrubi, a short distance from the UNRWA building. Um Al-Hiran has a slightly larger number of students than Al-Juwaideh, even though fewer grades attend the school. Although the school’s facilities are not particularly impressive, the school has much more open space than Juwaideh, which is useful for preventing crowding and lending (slightly) more of a peaceful sense to the school environment. All classrooms are in the single main building and recess activities are held in the courtyard in front of the school. The school administration offices are easily located on the ground floor near the entrance, along with both of the school’s computer labs.

To investigate issues with computer education, it was clear that teachers and school administrators would have to be consulted to obtain first-hand knowledge of how computers are taught. As these individuals are always adults, one-on-one interviews were the best option for research. However, to get a more complete idea of how computer education works, the opinions of students had to be heard as well. The decision was made to focus on the 9th grade at each of the schools, primarily on the advice of the research advisors for the project from the Ministry of Education. The 9th grade is an age group that has already been involved in computer education for two years at school (classes in computers begin in 7th grade) but isn’t focused on the testing that comes in the secondary stage that determines which career path each student will follow. Since most students in the 9th grade are under 18 years of age, an unobtrusive data collection method had to be chosen (even with the presence of consent forms). Interviews were deemed too personal in light of consent issues, resulting in the choice to use an anonymous questionnaire that did not require excessively personal information about the student. The Questionnaire fit into the research design as a way to judge computer usage by students as well as obtain their opinions about computer education at their school. However, there was a hidden benefit to the Questionnaire in that it allowed the researcher to evaluate statements made by the teachers in their interviews. The defining example of this was at Al-Juwaideh. In the interviews at the school, the researcher proposed a plan to improve computer education whereby the school computer lab could be kept open after school. This plan was met with a criticism that students were not interested in such a plan. The researcher was then able to insert an item into the Questionnaire to evaluate student interest in the plan he had proposed. This plan will be explained further in the “Suggestions” section of the paper, but through the Questionnaire it
became clear that student opinions and teachers’ assumptions about those opinions differed in some respects.

Several items on the Questionnaire were inspired by a questionnaire entitled “Questions about Technology and Education” designed by Roger Blumberg of Brown University in 1999. His questionnaire was administered to American high school students in a mathematics course to seek information about their computer usage practices. Specifically, Blumberg’s items investigating what types of computers students had access to at home (personal or private, connected to the internet or not) were adapted for the current Questionnaire.

The research also involved two interviews with officials from the Ministry of Education. The goals of these interviews were to establish a context for the feasibility of the research’s suggestions for computer education as well as to get a better understanding of the Ministry’s goals for Jordan’s educational future. Unfortunately, the process of finding the right individuals was rather convoluted, and special letters of permission had to be obtained to visit other buildings within the same Ministry complex. The researcher was shuttled around three different offices before locating officials who were willing to answer the desired questions. One interview was conducted in person and one was conducted through email. Unfortunately, the individual interviewed through email failed to answer many of the interview questions at all and answered several others to an unsatisfactory degree. Follow-up emails to this interview were not responded to. Given more time, it would have been very helpful to obtain interviews from more knowledgeable individuals within the Ministry who could have given more complete answers. As it stands, the Ministry’s participation in the research interviews is disappointing, especially since these interviews were designed as part of determining how best to make suggestions for the improvement of computer education.

The final method of research was an analysis of student grades. At Al-Juwaideh, the researcher was given access to computer science test grades for students in the 9th grade. The analysis of these marks and their implications will be discussed in the “Results” section of this paper.

The research design called for two schools to be investigated as it allowed for a comparison to be made between schools within the limited time period of approximately two to two and a half weeks for field research. Originally the research plan had budgeted three weeks for field research and thereby a week and a half at each school. Unfortunately, obtaining permission from the Ministry of Education to visit its schools took longer than anticipated. When the research was first explained to individuals from the Ministry, full-cooperation was assured and the researcher was told that visitations of the schools could happen within a day or two of beginning the process. However, the department at the Ministry that grants permission for such visitation requested a thorough description of each part of the research plan including an official letter of permission from the School for International Training, the interview questions to be used, and the questionnaire items. Furthermore, these requests were somewhat vague and necessitated several endeavors by the researcher before all requirements were satisfied. It is unclear exactly where the troubles at this stage arose. It is possible that the researcher’s identity as an American student prompted some caution at the level of the Ministry. Even if that was not the case, it became clear that the Ministry of Education suffered from many of the drawbacks of a large bureaucracy in that extensive paperwork and the consultation of many different individuals was required for the granting of permission. Eventually, a letter of permission signed by one of the Ministers was obtained for the research which should have allowed visitation at Al-Juwaideh and Um Al-Hiran. Unfortunately, the first draft of the letter was addressed to the wrong school district and the body of the letter lacked a specific mention of Al-Juwaideh or Um Al-Hiran. Because of this mistake, the director of the Al-Juwaideh school (the first school visited) refused to allow research to begin and research was delayed for a day in order to clarify the permission that the Ministry of Education had granted. This entire permission process occupied a little over a week of the research period, thus limiting the time available to visit the schools and collect data.

Aside from the difficulties experienced in the first day at Al-Juwaideh, the conducting of research at both Al-Juwaideh and Um Al-Hiran was never unmanageable. At Al-Juwaideh, the researcher was all but assigned the use of the school’s English teacher for interpretation and his availability was never a barrier to the gathering of information. The researcher was given access to any and all school buildings and given the permission to interview any of the school staff (with the consent of the individual), distribute the prepared Questionnaire, as well as to
photograph any part of the school grounds. In general, the school administration granted all
permissions requested and remained completely hands-off in all research matters. The students
were never officially informed of the researcher’s purpose or presence, although both were
obvious enough to the students, so much so that it indicated that the school likely rarely, if ever
had visitors of this nature. In retrospect, a mass statement to the students, however difficult,
would have proved helpful so that the researcher might not have been prompted with a large
number of questions from the students, which often was the case. Students within the classes
targeted for research were cooperative to a degree, but issues such as obtaining parental consent
and proper participation in the Questionnaire required considerable effort and supervision from
the researcher and the interpreter. Students’ behavior was occasionally a problem. Issues
included a lack of attention when certain aspects of the research were being explained to them
and also one confirmed case of student attempting the complete the questionnaire twice (this
second submission was disregarded and the data was not recorded). In spite of the difficulties,
the researcher was given as much time as he needed with the students and the questionnaire data
was collected successfully.

At Um Al-Hiran, the researcher again received cooperation from the school’s
administration. The researcher had the help of two English teachers for any extended
interpretation needs (such as interviews) and was never limited by language issues. Permission
was given for interviews with school staff as well as administering of the Questionnaire. The
researcher had access to all of the school’s computer facilities and the ability to photograph any
part of the school. In general, students were better behaved at Um Al-Hiran and more
cooperative with instructions for the Questionnaire. The 9th grade teachers were also actively
helpful in making sure the Questionnaire and the related consent forms were distributed correctly
and to as many students as possible. The research process at Um Al-Hiran was at times more
straightforward than the experience at Al-Juwaideh, partly due to greater preparation as a result
of experience at Al-Juwaideh and partly due to the school atmosphere. However, the research
took a longer time to complete and fewer individuals were interviewed due to unpredictable
circumstances. From the week budgeted for Um Al-Hiran, two days of research at the school
were obstructed due to the school’s schedule. One day was a Jordanian holiday and public
schools were not in session. The other day was a celebration at the school in honor of the “Vote
for Petra” contest taking place then in which Jordan’s Petra ruins are in competition for being
named one of the new “Seven Wonders of the World.” Due to the celebration day, much of the 9th grade was absent from school thus preventing the administering of the Questionnaire or related consent forms. Certain other events such as teacher illness prevented additional interviewing. However, Questionnaire data was gathered successfully and the interviews that did take place were very beneficial in uncovering the issues facing computer education at the school.

**Participants**

**Al-Juwaideh Interviews**

Three individuals were interviewed from Al-Juwaideh. These individuals were the Computer Supervisor, the Computer Teacher, and one Administrator whose primary job responsibility was to keep the log of attendance for the school’s students and teachers. Each interviewee was male. The first two individuals were chosen as they were the two teachers at the school who were directly involved with the computer education department. The Supervisor was a trained technician who worked in the school’s computer laboratory while the teacher was responsible for the lecturing to and testing the students. Both interacted with the students in the computer lab on a daily basis and were familiar with the computer classes as well as the computer equipment itself. The school Administrator was chosen to obtain the perspective of an individual with a better understanding of the “bigger-picture” including how the school is run and the school’s relationship with the Ministry of Education.

Each interview was conducted in Arabic with the assistance of an interpreter and was voice recorded. Neither the Computer Supervisor nor the Computer Teacher had any significant English-language capability and while the Administrator understood simple English, his capability was limited and was clearly more comfortable speaking in Arabic. The interpreter used was the English-language teacher at the school, who had the best grasp of the language of any of the employees at Al-Juwaideh. Nonetheless, he was not fluent and often interview questions would have to be rephrased to him or repeated or re-explained before he could understand them. A second complication of using this interpreter was his weakness in interpretation techniques. First of all, he would sometimes fail to provide many of the details of the interviewee’s answers, especially after extended responses. For example, he would
sometimes translate a very long response from the interviewee into just a few sentences, at which point the researcher pressed him for a better explanation. Although the researcher’s knowledge of Arabic was limited, he would often catch parts of the interviewee’s response that the interpreter failed to mention, necessitating a confrontation with the interpreter about what might be left out. Secondly, the interpreter would sometimes answer parts of the questions himself from his own experience either in addition to or in place of the interviewee’s response. Occasionally this would prove to be helpful in matters of general knowledge and background information to help clarify the question to be asked. However, there was more than one occasion when the interpreter had to be explicitly ordered to direct the question to the interviewee rather than allow the interpreter to answer it himself. In general, the inability to get all the details was more of an issue than the interpreter’s extra input. Since the interviews were voice-recorded, upon playback it was possible to separate the interpreter’s comments from the interviewee’s and transcribe accordingly. Although professional interpretation may have provided better results in some areas, the use of the English-language teacher for interpretation may still have been the better option overall. First of all, using a teacher from the school provided the interviewees with an interpreter that they knew and trusted thus encouraging more honest answers as well as allowing as much time as was needed for each interview. Secondly this interpreter was available at no cost, which is an important factor given the high costs of many interpretation services in relation to the budget for this study.

No complications were detected due to the use of the voice recorder. It was stressed that interviewees could opt to remain anonymous and they were not suspicious of the methods. However, many questions had to be repeated several times to the interviewees in order to get a complete answer to the question. It is unclear if these difficulties were more often a result of the interpretation process or misunderstandings from the interviewees themselves. Nonetheless, all interviewees were patient and there was ample time to repeat most questions until they were completely understood and answered. The interviews themselves were conducted in the school library, the school computer lab, and in a private office on school grounds. The library proved to be the best location due to the lack of interruptions. The lab and even the office were noisier environments which did not affect the interviewee’s responses, but did result in one or two interruptions which disrupted the interview process for a short period of time. In general, finding an empty space at the school was always difficult and there was no nearby location where the
interviews could be conducted, especially since the interviews were conducted during work hours, meaning the interviewee might have to take a break to perform his job duties. However, this type of break only occurred once and did not affect the effectiveness of the interview.

Al-Juwaideh Questionnaire

The Questionnaire (see Appendix A) was administered to students in the 9th grade at Al-Juwaideh. The 9th grade is split into two classes, one of 46 students and one of 45 for a total of 91 students. 75 participants completed the Questionnaire, with the remainder not participating likely due to absence, despite the fact that the Questionnaire was offered on two consecutive days. No issues were reported regarding students not being able to participate due to issues with written consent, leaving absence from the classroom as the only known barrier to participation. Nonetheless, given the disorganization of the testing environment, this turnout was higher-than-expected and likely representative of the class as a whole. Being a boys’ school, all participants were male students with ages ranging from 14 to 17 (M=15, SD = 0.48). These participants were not explicitly rewarded for their participation in the Questionnaire although it was stressed that the purpose of the Questionnaire was to help improve computer education at their school.

Um Al-Hiran Interviews

Interviews at Um Al-Hiran were conducted with the school’s Computer Supervisor and the school’s Computer Teacher for grades 7-9. These individuals were chosen for their direct involvement with computer education at the school. The Computer Supervisor was a technician and engineer responsible for keeping the PCs in working-order as well as communicating with the school’s directorate on computer matters including requests for technical support. However, the Computer Supervisor was not responsible for instructing any of the courses, which was the job of the Computer Teacher. Both individuals had extensive knowledge of the computer capabilities at the school, student capabilities with computers, and interaction with the Ministry of Education. Both individuals were male.

All interviews were voice-recorded with the permission of the interviewees and no issues were detected in relation to the use of voice-recording. The Computer Supervisor had some limited English capability and chose to answer questions in English as well as Arabic. Since an
interpreter was present, the Supervisor was encouraged to answer in Arabic when he had trouble finding the correct words in English. The interview with the Computer Teacher was conducted mostly in Arabic with the help of an interpreter.

Two interpreters were used at Um Al-Hiran, one for each interview. For the interview with the Computer Supervisor, the senior English teacher was used for interpretation. This teacher’s capability in English was very good and questions rarely had to be explained multiple times by the researcher. Nonetheless, like at Al-Juwaideh, there were some troubles with the interpreter providing his own commentary on certain questions. However, the researcher was able to stress the need for the interviewee to answer in situations where the interviewee’s response was being suppressed. The use of voice-recording technology also allowed excessive interpreter commentary to be noted in the final transcription of the interview. For the interview with the Computer Teacher, the junior English teacher was used for interpretation as the senior teacher was unavailable. This junior teacher’s English capability was more limited and one question in particular had to be discarded because of the teacher’s inability to understand several key words and the researcher’s inability to translate them satisfactorily in Arabic. However, this interpreter had a decent language capability and furthermore always allowed the interviewee’s answer to take precedence over his own opinions. Overall, both interpreters were effective for the purposes of the study.

The interviews were conducted in each of the school’s computer labs when classes were not present. These locations provided adequate privacy and interruptions were kept to a minimum. Background noise was also limited and presented no serious problem to the use of the voice-recording technology.

Um Al-Hiran Questionnaire

The Questionnaire (see Appendix B) was administered to students in the three classes of the 9th grade at Um Al-Hiran. The 9th grade has approximately 128 students and 113 students completed the Questionnaire. The remaining number of students may have been absent from class on the day the Questionnaire was distributed. Like Al-Juwaideh, this level of participation was more than satisfactory given how difficult it can be to locate students in the school’s environment, as students are sometimes wandering the halls and not always in their classes.
Participants were male students aged 14 to 18 (M=15, SD = 0.65). Participants were not explicitly rewarded for their participation.

**Materials**

**Al-Juwaideh Questionnaire**

The Questionnaire was anonymous and completely in Arabic. The first page asked for students to give their age for demographic purposes and their class as a check that they were in the desired grade (9th). The first section of the Questionnaire presented a series of six “Yes” or “No” questions for students to answer. These questions were designed to discover if students had access to a computer outside of school, if students had access to a computer with internet inside and outside of school, if students were satisfied with the quality of computer education at their school, if students thought they would attain computer literacy by the time they graduated, and finally if students would be interested in using their school’s computer lab after school if given the option. The fifth question, regarding computer literacy was on retrospect considered to be poorly worded and the results were disregarded. This question was reworded for use on the Um Al-Hiran Questionnaire. The sixth question, regarding after-school use of the computer lab, was inserted to gauge interest for a suggestion for improving computer education at Al-Juwaideh, which will be discussed the “Suggestions” section.

The second page of the Questionnaire consisted of a series of four statements regarding computers. Students were asked to rate their level of agreement with each statement based on a five-level Likert scale next to each question. This scale was made up of the following levels of agreement: Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree. The statements (translated into English) were as follows:

1) The quality of computer education at my school is good.

2) The quality of computer hardware at my school is good.

3) The quality of computer software at my school is good.

4) Obtaining computer education is necessary for jobs after graduation.
For the “hardware” and “software” questions, examples were given of each type of equipment to clarify the question. In general, although rating agreement on a Likert scale is a common method of evaluation in American questionnaires, it seemed to be less familiar to the Jordanian students at Al-Juwaideh. In some cases students had to get clarification about the directions for this section and some of the effectiveness of this type of rating system may have been limited by student’s lack of familiarity with it. Future research may be improved by consultation with Psychological researchers in Jordan about what types of questionnaire items are more familiar or more easily explained to Jordanian youth. However, given the time limitations of the current research, the decision to use American-style questionnaire items was the only option.

The third page of the Questionnaire was dedicated to written questions. The first question was explicitly directed to students who had reported having access to a computer outside of school in the first part of the Questionnaire. The question asked them to report the number of hours per week that they used this computer. The second question asked these same students whether this computer was their private computer or a shared computer of some type. The third question asked students for any suggestions of theirs for improving computer education at their school.

The Um Al-Hiran Questionnaire

This Questionnaire was identical to the Al-Juwaideh Questionnaire except for the fifth “Yes” or “No” question regarding computer literacy. This question was reworded for better clarity.
V. Results

Questionnaire Results

First, it was found that a vast majority of students at both schools had access to a computer outside of school. At Al-Juwaideh, 84% of students had access to a computer outside of school. The percentage was even higher at Um Al-Hiran, where more than 96% of students reported having access to a computer outside of school. Um Al-Hiran also had a greater percentage of students being able to use the internet outside of school (73%) compared to Al-Juwaideh (52%). Furthermore, for students with access to a computer outside of school, the average number of hours that a student used a computer outside of school was much higher at Um Al-Hiran (8.4 hours) than at Al-Juwaideh (4.8 hours). Finally, when looking only at students with access to computers outside of school, students at Um Al-Hiran were more likely to have personal, non-shared computers (38% of students) than students at Al-Juwaideh (27% of students).

Analysis was run on students’ answers to find more specifics about student computer usage outside of school. At Al-Juwaideh, students with personal computers used the internet, on average, more than twice as much as students with shared computers (7.5 hours versus 3.6 hours). However, there was less of a difference for computer usage between students with internet outside of school (M = 4.7 hours) and students who had access to computers but without internet outside of school (M = 4.9 hours). At Um Al-Hiran, no significant difference in computer usage was found between students with personal computers outside of schools and students who used shared computers outside of school (M = 8.5 hours for both groups). Furthermore, the average number of computer usage hours was slightly higher for students with access to computers without internet outside of school (M = 9.9 hours) than for students with access to computers with internet outside of school (M = 8.0 hours).

These numbers from the Questionnaire suggest that the computer experience outside of school is, on average, better for a student from Um Al-Hiran than it is for a student from Al-Juwaideh. Um Al-Hiran students have, in general, more and better (more personal) access to
computers outside of school and are using them more often. It is unclear how much these differences can be attributed to socio-economic status. Certainly having a personal computer is more expensive than using a shared computer (whether in a family home or at a public location such as a library or internet café) and a family’s bills will be higher the more a computer and/or the internet is used. Future research would benefit by taking these possible differences into account and trying to determine how much a factor they play in a student’s access to computers. However, for the purposes of this study, there was insufficient time and resources to investigate the SES of students at either school. Regardless, it seems that outside of school, the average student at Um Al-Hiran has the upper-hand in terms of computer usage.

The second section of the Questionnaire asked students to rate their level of agreement with various statements related to computer education. Two statements were similarly worded, “the quality of the hardware/software at my school is good”, thus the only difference between the two being the word “hardware” versus “software.” At both schools, students in general agreed that the quality of the software was good (M = 4.0 at Al-Juwaideh, M = 3.9 at Um Al-Hiran). The similarity in agreement between the two schools is not surprising as the computers are running mostly the same programs including Microsoft Office, Adobe Photoshop CS2, Visual Basic, and Quick Basic. However, at Al-Juwaideh, as compared to their agreement with the software statement, students agreed to a significantly lower extent (M = 3.3, \( p < 0.001 \)) that the quality of their hardware was good. This difference suggests that students see a clear difference between the quality of the software at their school and the quality of the hardware at their school. This realization is sound, because although the software available at Al-Juwaideh is relatively modern, the hardware available (Pentium 3s, poor keyboards and mice) is outdated. Again, the specifics regarding these software and hardware issues will be dealt with later in the paper, but it is important to note that students are aware of the varying quality of the computer materials available to them. Students at Um Al-Hiran agreed with the statement about having good hardware to a greater degree than the students at Al-Juwaideh (M = 3.6 at Um Al-Hiran). Nonetheless, at Um Al-Hiran their agreement about that statement was to a lesser extent compared to their agreement about the software being of good quality.

Another statement on the Questionnaire was as follows: “The quality of computer education at my school is good.” Students at both Al-Juwaideh (M = 4.0) and Um Al-Hiran (M =
3.9) agreed with this statement. Since “computer education” was not explicitly defined in the Questionnaire, students could have been evaluating any combination of the quality of the hardware or software, the programs taught, the quality of the teaching, and other factors that influence computer education in public schools. Nonetheless, the similarity in agreement between the two schools was somewhat ironic given the apparent differences between the computer education programs at the two schools. These differences will be described in more detail and analyzed in the next section. However, in short, the program at Um Al-Hiran seemed to be considerably superior to the program at Al-Juwaideh. It is unclear whether the similarity in ratings is due to a lack of context for students to compare their program to others, due to there being differences in areas that are hard to quantify such as teaching quality, or students’ misunderstanding of the quality of education they are receiving.

One area where students and teachers agreed almost completely was regarding the importance of computer education after graduation from high school. In the Questionnaire, students were asked to rate their agreement with the statement, “I consider obtaining computer education to be necessary for finding jobs after I graduate.” Students at Al-Juwaideh agreed strongly with this statement (M = 4.5) as well as students at Um Al-Hiran (M = 4.5). In fact, across the board, students agreed with this statement more than any other statement on the Questionnaire. Similarly, in interviews with administrators, computer teachers, and computer supervisors, all interviewees except one reported that computer education was very important for finding jobs after graduation. According to the Computer Teacher at Um Al-Hiran, whenever there is an announcement for a job (such as in the newspaper) computer training and experience is always listed as a requirement. This teacher was not the only individual interviewed who mentioned this point and furthermore it seems that in addition to newspaper ads often mentioning the need for computer skills, language-capability in English is usually mentioned as a second requirement. In terms of computer skills, companies are specifically looking for familiarity with the Windows operating system, applications from Microsoft Office such as Word, PowerPoint, and Excel, and companies that deal directly with computers in their work are

50 Ismael, Um Al-Hiran Computer Teacher.
51 Anonymous Interview.
52 Ibid.
looking for programming languages like Visual Basic and C++\textsuperscript{53}. The Computer Teacher at Al-Juwaideh had a similar opinion, saying that in order to find a good job, students needed to be skilled in both hardware and software but also in general computer skills such as typing\textsuperscript{54}. He also added that having the skills of a computer technician were always beneficial, especially the ability to fix a computer at a workplace\textsuperscript{55}. The Administrator at Al-Juwaideh agreed that it was “necessary” to have computer knowledge and seconded the recommendation for knowing how to type\textsuperscript{56}. The only dissenting individual on these points was the Computer Supervisor from Um Al-Hiran, who stated that computer training was not “useful to work in the market.”\textsuperscript{57} While he is certainly correct in his statement, one would hope that students hold higher goals for future jobs and therefore see the need to learn computers in order to obtain a better paying job than the average market can offer.

All interviewees agreed that computer education was very important for going to a university after graduation. According to the Computer Teacher at Al-Juwaideh, Jordanian universities assume that students already have basic computer skills including proficiency in Microsoft Office and basic programming knowledge in programs like Quick Basic\textsuperscript{58}. Although programming is taught at the universities, programming classes are begun at a more advanced level than high school courses, thus requiring students to have some aptitude upon entrance to the university\textsuperscript{59}. The Um Al-Hiran Computer Supervisor held similar opinions, mentioning Microsoft Word, Excel, and PowerPoint, as well as programming capabilities in FrontPage and Visual Basic as the skills needed for success in college\textsuperscript{60}. The Administrator at Al-Juwaideh in fact saw public school computer education as an introduction that should be finished at the university level\textsuperscript{61}. In spite of these endorsements, it must be mentioned that the required computer skills for universities differs based on a student’s major\textsuperscript{62}, and it is not necessary for every student to be fluent as a programmer. Nonetheless, in the interview with the Computer

\textsuperscript{53} Ismael, \textit{Um Al-Hiran Computer Teacher}.
\textsuperscript{54} Awad, \textit{Al-Juwaideh Computer Teacher}.
\textsuperscript{55} Ibid.
\textsuperscript{56} Abdllghani, \textit{Al-Juwaideh Administrator Interview}.
\textsuperscript{57} Shaheen, \textit{Um Al-Hiran Computer Supervisor}.
\textsuperscript{58} Awad, \textit{Al-Juwaideh Computer Teacher}.
\textsuperscript{59} Ibid.
\textsuperscript{60} Shaheen, \textit{Um Al-Hiran Computer Supervisor}.
\textsuperscript{61} Abdllghani, \textit{Al-Juwaideh Administrator Interview}.
\textsuperscript{62} Anonymous Interview.
Teacher at Um Al-Hiran, the interpreter interjected specifically to mention that at the university, computers are used in all fields as an “education technology”, including areas such as English, science, mathematics, and medicine. Clearly, computer knowledge is a must for studies at universities in Jordan.

The final section of the Questionnaire asked students to provide suggestions for the improvement of computer education at their school. Despite the differences between the schools, the suggestions by Al-Juwaideh and Um Al-Hiran students were often surprisingly similar. At Al-Juwaideh, the most common suggestions were to have more computers, newer hardware, new computer programs to study, more hours/classes for using the computer, a larger computer lab, and more opportunities to use the internet. There were many specific requests to get a new computer teacher as well. At Um Al-Hiran students most often requested better hardware, more opportunities to use the internet, more computers and more time to use them, new programs, more computer classes, and also more “professional” teaching. In regards to better hardware, many students specifically requested the replacement of ball-mice with optical mice as well as better keyboards. Um Al-Hiran students also desired the use of computers for teaching non-computer science classes, a proposal that will be discussed in “Suggestions” section in relation to the مدارس إستكشفية plan. Two of the most interesting suggestions from students were to have computer classes to instruct students how to use the internet (including searching and how to use the internet to do research for reports) and to be educated in how a computer actually works using the various parts inside of it. The first idea is considered more in-depth in the “Suggestions” section of the paper. The second suggestion is also a potentially excellent idea for a class, but as described in the introduction, the Ministry currently forbids school staff to open up any of its computers for any reason, thus barring this type of instruction. This obstacle will also be discussed later on in the “Suggestions” section.

Examining these student responses, it is also evident that both students and teachers are largely in agreement about what many of the major problems are for computer education in their schools. Like the students, teachers and school staff cited the small number of computers, poor quality of computers, small size of the computer lab(s), and slow speed of the internet as among the biggest problems. In observing computer classes at both schools, these issues were frequently evident. In every computer class, the shortage of computers meant that two or three students
were assigned to each computer (see Appendices G and H on attached CD for pictures), severely limiting the amount of practice each student had on the machine. At Al-Juwaideh in particular, the size of the lab is especially small and students are packed into the crowded room and have very little space to move around. In testing the internet at Um Al-Hiran, the researcher noted that loading the webpage for Google’s “Gmail” service took several minutes, far longer than what is reasonable in comparison to any other internet service. This type of internet service is also actually a significant improvement in relation to the school’s capabilities from the previous year. Only months ago, the school had no direct connection to the internet and was forced to call the central server location every time it needed to open an internet connection. The school’s Computer Supervisor explained that if students needed to look at a certain website at school, the call would be made to request the internet, followed by as much as a month of waiting before the connection could be opened. Nonetheless, although the school is always connected now, the connection is very weak and frankly, frustrating to use. Each of these issues significantly limits what can be accomplished in the relatively short 45 minute class periods for computer education courses.

**Student Computer Testing**

Student testing in 9th grade computer classes is one of the few areas of teaching where the teacher himself is in charge of designing the methods as opposed to the Ministry. At both Um Al-Hiran and Al-Juwaideh, the teacher is responsible for writing the tests administered to students, despite the fact that the computer curriculum is the same at all public schools. The Ministry does not provide standardized testing until the secondary level, which is the period when students put on different tracks of study (medicine, IT, law, etc) based on their test scores.

At both schools, testing is divided into two categories, “theoretical” and “practical.” Theoretical testing is usually a written exam that requires students to recall information from computer class lectures. Practical testing is administered to a student on the computer, requiring him to be able to demonstrate computer skills in a more realistic testing environment. At Um Al-

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63 Shaheen, *Um Al-Hiran Computer Supervisor.*

64 Ibid.


Hiran, teachers also have access to a program called “NetOp” which allows the teacher, using his computer, to see the screen of any one of his students, or vice-versa, allowing the teacher to both demonstrate “practical” computer skills and to see if the student can replicate his demonstration on his own\textsuperscript{67}. Because of this interaction and real-world applicability, students at Um Al-Hiran perform better on and are more interested in practical testing than they are in the rote-memorization that characterizes the theoretical component\textsuperscript{68}.

Testing for the 9\textsuperscript{th} grade at Al-Juwaideh is divided into four exams. The first two exams each have two parts, one part theoretical and one part practical. The third exam and the final exam have only one section each. A student’s final testing grade is determined by an average of these four tests. Access was provided to the grades for each of these exams, and the results for the final grades from most recent semester were as follows:

\begin{center}
\begin{figure}
\centering
\includegraphics[width=\textwidth]{chart.png}
\caption{Al-Juwaideh Student Grades for Computer Tests}
\end{figure}
\end{center}

\begin{itemize}
\item<51: 47 (رسوب)
\item 51-70: 27 (مقبول)
\item 71-80: 9 (جيد)
\item 81-90: 4 (جيد جداً)
\item 91-100: 2 (ممتاز)
\end{itemize}

\textsuperscript{67} Ismael, \textit{Um Al-Hiran Computer Teacher}.
\textsuperscript{68} Ibid.
As indicated on the graph, Al-Juwaideh students are performing very poorly on tests in their computer classes. 53% of the students received a grade below 51, which indicates that they are failing. 30% of the students received a grade between 51 and 70, which is "مقبول", or “acceptable.” 10% of students received a grade between 71 and 80, which is “جيد”, or “good.” Approximately 5% of students received a grade between 81 and 90 meaning “جيد جداً”, or very good. Just 2% of students received a grade over 90, which is a mark of “ممتاز”, meaning “excellent.” It is worth noting that in Middle Eastern education, teachers are often reluctant to hand out grades of “excellent” to many students, and reserve such a mark only for the best students. In spite of this, the grades at Al-Juwaideh are uniformly low by any standards, especially with more than half of the students receiving failing grades. Furthermore, of the failing grades, most are in the low-40s (less than 45 out of 100). Other factors such as participation and attendance may factor into the final grade for these students, but in terms of testing of computer knowledge, Al-Juwaideh students are not faring well. The poor grades of students were reflected in comments by their teachers, who characterized students as more interested in obtaining good marks than learning the material well. As indicated by student scores, one cannot achieve the former without the latter.

The implications of these low marks, however, are not as clear-cut as the marks themselves. It is estimated that approximately 5% of students who graduate from Al-Juwaideh continue on to the university level. It may then seem that the other 95% of students are caught in a dire situation. First of all, the education at Al-Juwaideh does not prepare them with enough computer knowledge for obtaining a good job, partly because the curriculum is an introduction to be finished at the university and partly because students don’t seem to learn it well enough anyway. At the same time, their inability to enter college means students cannot pursue this education further, and must make do with what is learned at Al-Juwaideh. However, according to the administration, the 95% who are unable to enter college do not just fail the entrance exams in computer subjects. Instead, most of these students fail in many areas, including the Arabic language. Therefore, while computer education and training could potentially help Al-Juwaideh students find jobs, it is necessary for the school to first improve its general education.

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69 Awad, Al-Juwaideh Computer Teacher.
70 Abdllghani, Al-Juwaideh Administrator Interview.
71 Ibid.
Computer education is only useful if students already have the required skills in their own language and other basic areas and advanced computer learning can only be pursued if students can demonstrate their proficiency in the core subjects. Therefore, while computer education is certainly important for obtaining quality jobs, school systems must focus on ensuring their core curriculum is strong before investing effort in computer education. If this curriculum is already strong, schools must remember not to neglect the basic subjects in favor of computer education.

At Um Al-Hiran, access was given to marks for students in the 9th grade. However, at the time the research was conducted, the only test administered to students had been one theoretical test on network hardware, wireless networking, and network protocol. No practical test had yet been administered and no grades were available from the most recent completed semester. The grades for the theoretical test appear below:

Although it is clear that Um Al-Hiran students did poorly on this exam, conclusions about student aptitude cannot be made to the same extent as they were with the grades from Al-Juwaideh. The grades are only for one exam and students will have more opportunities to
improve their final mark. Nonetheless, given the weighting of the grades towards failing, one might fear that students are not benefitting enough from computer education classes at Um Al-Hiran as well.
VI. Suggestions

Taking into account the information gathered through interviews and observation at the various research locations, the following suggestions are provided for the improvement of computer education in public schools in Jordan. These suggestions ordered for coherence (some suggestions require explanations present in others) rather than for importance. There are 12 suggestions in total, and are as follows:

1: Expansion of مدارس إستكشافية

The مدارس إستكشافية (“Discovery Schools”) program is a new initiative in Jordan to “computerize” several aspects of public education to a greater degree. As explained by Ministry officials working on this project, the مدارس إستكشافية program is currently being implemented in 103 schools in Jordan. Schools participating in the program are called “Discovery Schools”, although it is unclear how the Ministry has chosen which schools can become “Discovery Schools.” In these schools, five subjects are taught to students with the aid of computers, including Arabic, English, mathematics, science, and computer science. Instead of being taught in a computer lab, teachers for these subjects are provided with individual laptops and projectors called “DataShow” for their classrooms, allowing for electronic presentations as a means of instruction. This type instruction is congruent with the suggestions made by students on their Questionnaire responses for more classes to be taught with computers. The Administrator at Al-Juwaideh was also very supportive of this idea, explaining that if a student learns through a DataShow presentation, the ideas will “stay in the student’s mind.”

It is the researcher’s recommendation that this program continue to be expanded as the Ministry is planning, but with reservations about the goals of the initiative. First, of the 103 “Discovery Schools”, 100 are located inside Amman and just three are located outside of the

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72 Abdulhabi, Raga, interview by Ketan Gajria. Ministry Coordinator Interview (May 6, 2007).
73 Ibid.
74 Ibid.
75 Abdllghani, Al-Juwaideh Administrator Interview.
city. While it is true that most of Jordan’s population is located within Amman, the implementation of this program is biased towards city schools in a manner that cannot be explained by Amman’s population density. In general, schools within Amman have historically gotten more attention than those outside of the city, and the choosing of “Discovery Schools” so far has only continued this disparity. This bias means that a school like Al-Juwaideh would, as in the words of the school’s English teacher, be last in line for receiving the benefits of this program, even though the school needs more help than most public schools.

Secondly, while teaching using PowerPoint presentations can certainly be effective, it in of itself is not a solution to the issues Jordanian education is facing. Teachers must be instructed in how to best use such technology, using DataShow presentations when they are the most effective means of getting information across to students rather than solely for the sake of using a machine in the classroom. Indeed, if teachers are unable to take advantage of the technology provided to them, then the plan itself is just “window-dressing” to give the appearance that Jordanian schools are modern and on the “cutting-edge.” Electronic presentations do not automatically improve the quality of teaching or education that a student receives, and the Ministry should not be content to just provide technology for its schools without a real effort to figure out how technology can improve the learning experience. The providing of laptops for each teacher is potentially more beneficial in that, if trained on the machines, teachers could make lesson plans more easily more effectively, benefits that would be evident in the classroom itself. Computers are effective tools for organizing large amounts of information, and hopefully teachers could use the benefits of computers to enhance their ability to teach courses.

These warnings are largely concurrent with those described in the Bryson and De Castell and the Armstrong, Davis, and Young articles from the “Rationale” section. Not only must there be a focus on how to use computers where they improve education, but the Ministry must make sure that implementation stages of this plan in a given school will not tie teachers down and prevent them from instructing their students. The Ministry must also realize that many teachers may find these changes intimidating and that administrators should be encouraged to create a positive environment for the programs implementation.

76 Abdulhabi, Ministry Coordinator Interview.
Finally, it is recommended that the Ministry do a better job of informing its teachers about the plans and timeline for the implementation of مدارس إستكشفائية. Most teachers at both schools had little idea of what مدارس إستكشفائية was beyond the basics and none had received any literature about the program nor did they have an idea of when it was to be implemented in their schools. Given the cost and the ambition of the مدارس إستكشفائية, the Ministry should make a better effort at keeping its teachers informed of the plan’s progress.

2: On-Site Control of Internet Servers

One inconsistency across computer labs in Jordanian public schools is who is in control of the internet server for the school’s internet usages. For example, at Um Al-Hiran, a separate computer exists in one of the labs for the internet server, giving the computer supervisor complete control over that server. This control, with the assistance of NetOp, allows the supervisor to see what any student is using the internet for and allows him to lock the internet and/or limit the types of websites that students are allowed to visit\textsuperscript{77}. At other schools, such as those part of the مدارس إستكشفائية program, the servers are linked directly to the Queen Rania Center and cannot be controlled by the school’s computer supervisor\textsuperscript{78}. In the case of Al-Juwaideh, the Ministry controls the server and the Computer Supervisor is essentially powerless. Giving the Supervisor control would allow him to block certain non-educational websites thus saving limited bandwidth for more educational uses by the students\textsuperscript{79}. While the Ministry is far removed from the internet situation at Al-Juwaideh, the Computer Supervisor is much more familiar with student internet usage and would be able to optimize the usage and make adjustments as necessary, all without involving the Ministry. In fact, at Um Al-Hiran, the Computer Supervisor reported that he rarely had to take control of the server to make any changes\textsuperscript{80}. Although student internet usage at Um Al-Hiran might be slightly more inclined towards educational websites, it is more likely that school control of the server is working as a deterrent against improper or non-educational internet usage.

3: Use of Computer Lab During Breaks and After School

\textsuperscript{77} Shaheen, Um Al-Hiran Computer Supervisor.
\textsuperscript{78} Shaheen, Um Al-Hiran Computer Supervisor.
\textsuperscript{79} Anonymous Interview.
\textsuperscript{80} Shaheen, Um Al-Hiran Computer Supervisor.
As described earlier, some of the most common complaints about the computer education system in Jordan are the shortage of computers and the limited amount of time allotted for their usage in school. These complaints are not unfounded of course, as the number of computers at both schools necessitates that multiple students work at each computer station. One of the easiest and cheapest ways to effectively “multiply” the number of computers at a given school is not to buy more machines, but instead to expand the number of hours they can be used during the day. Specifically, schools should consider opening their computer labs to students during break periods when school is in session and also for a period of time after classes have ended. At both Al-Juwaideh and Um Al-Hiran, there are entire class periods when both the computer lab is empty and students have break periods\(^81\). During these times, students who are having trouble in their computer classes and advanced students who desire more practice could, with the teacher’s permission, use the computer lab to practice or receive extra help from the instructors. This use of the lab was in fact specifically endorsed by the Computer Teacher at Um Al-Hiran, who explained with all sincerity how he wished he had the authority to bring promising students into the lab during break hours or when a student’s regular teacher was absent and to sit down with them to help them explore their “hobbies” with computers\(^82\).

Secondly, the school lab could be kept open for two hours at the end of classes to allow students to come use it under the supervision of a school employee. Students would have to sign up at least a day in advance for use of the lab so that any lab supervisor would have ample notice about the need to stay after school. This sign up process could be designed by each individual school as to determine the method of signing up (for example, on a sheet in the lab), the appropriate number of spots available in the lab, deadlines for signing up, and any other rules necessary for implementation of such a plan. Furthermore, sign-ups could limit the number of spots so that there is a maximum of one student for each computer, allowing students to have more individual practice and attention that is unavailable in the crowded classes that are taught during the school day. If a plan like this became extremely popular, sign-ups could also limit students to using the lab no more than once every two (or more, as appropriate) days, so that every student would get a chance to use the lab in this setting. This sign up process could also easily be applied to the use of computer labs during breaks. At Al-Juwaideh, students are

\(^{81}\) Awad, Al-Juwaideh Computer Teacher.
\(^{82}\) Ismael, Um Al-Hiran Computer Teacher.
currently allowed to use the computer lab during breaks when there is no class present. The Computer Teacher however explained that students are wary of coming into the lab as they might walk in on a class. The sign-up process easily solves this problem as a sign up sheet could list the lab’s available times, thus encouraging students to come use the otherwise empty lab.

When this plan was presented to teachers at Al-Juwaideh (where such a plan is needed the most), reaction was surprisingly negative, but for reasons that are, in fact, entirely surmountable. One issue brought up by the administration at Al-Juwaideh was that there would be no one to supervise such an after school program because no part-time pay was available for the teachers. In regards to this issue, the Ministry of Education has the option to either offer part time pay to computer supervisors and teachers to work for another two hours or to hire a new supervisor just for this type of program. Although having a teacher in the lab is most preferable, the minimum requirement would be to hire an individual with basic knowledge of a computer who could turn off the machines and handle minor issues that might come up with the computers in the after-school period. As for part time pay for teachers, it is reasonable to assume that many teachers would be interested simply because so many already take second jobs for the after-school period such as driving a taxi. Whatever the Ministry’s choice would be in the situation, this issue is not a major obstacle to implementation of an after-school plan. On the contrary, even if the Ministry had to hire a new teacher for each school for this type of program, the cost would still be much lower than building a new lab in each school in order to give students more opportunities to use computers. An after-school program is instead a way to maximize the usage of the computers a school already has and to potentially improve a student’s educational experience considerably.

It would be a reasonable concern to wonder whether students coming to use the lab after school would want to use the lab for academic, educational, and other reasonable uses, or whether they would simply go online to play games. This concern is the reason why the suggestion to give schools control over their internet servers is so important. For the period of the after school program (or all day, at the discretion of the school), the computer supervisor of a

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83 Awad, Al-Juwaideh Computer Teacher.
84 Abdllghani, Al-Juwaideh Administrator Interview.
school should lock websites with no educational value such as those offering online gaming. Secondly, the after-school supervisor should also walk around to student’s computers at intervals to ensure the computers are being used correctly. This is not to say that only strict educational websites should be allowed. Students need to be granted some latitude to search what the internet has to offer and to explore their interests on it, so long as the material they are looking at is reasonably appropriate. Of course, the specifying of what is “appropriate” would be up to the schools and/or the Ministry of Education to define. In any case, this type of concern is surmountable and should not deter schools from trying out an after-school program.

A second issue mentioned by the administration and the Computer Teacher is that students would not be interested in such a program. In some ways this is a reasonable assumption given that a majority of students have access to computers outside of school. However, in reality, many of these computers outside of school may lack the educational software students learn in school such as newer versions of Microsoft Office and probably lack programs such as Adobe Photoshop CS2, Visual Basic, and Quick Basic which are not necessary purchases for a home computer. Regardless, the researcher was able to add an item to the Questionnaire to test whether students really were uninterested in this type of program. As it turned out, over 73% of students at Al-Juwaideh responded that they were interested in the idea. At Um Al-Hiran, over 68% of students responded with interest. Many students from both schools also specifically requested the implementation of such a program in the “Comments” section of the Questionnaire. The level of interest at Um Al-Hiran may have been lower due to the more extensive internet opportunities for these students outside of school, although overall interest was considerably high. Nonetheless, this type of survey could be improved and adapted in order to judge interest at the rest of Amman’s public schools. The Ministry of Education as well as individual schools can then use this type of data to determine if this type of after-school program is desirable. This type of plan, like that of الإستكشفية مدارس، can also be implemented in pilot schools to start and expanded based upon the success and the lessons from these initial programs.

85 Awad, Al-Juwaideh Computer Teacher; Abdllghani, Al-Juwaideh Administrator Interview.
The third and most difficult issue to solve is the apparent problem reported by Al-Juwaideh staff that the parents of students would not see the usefulness of such a program\textsuperscript{86}. This is certainly a possibility, and overcoming this issue would be the responsibility of the Ministry of Education. If an after-school program was being considered for a given school, the Ministry and the school administration should work together on an effort to demonstrate the benefits of such a program to the families of students. There is little doubt that the Ministry understands the importance of computer education for Jordan’s future, and if a publicity campaign is required to convince parents of the importance of computers, this should taken into consideration and developed. If parents are made aware of how important computer training is for their children’s future, it is likely that the parents would support an initiative to improve computer teaching at their local schools.

This type of after-school program also has the added benefit of bringing a local school closer to the idea of a community center for education. In their current states, public schools are empty soon after the bell rings for the end of classes. Everyone including the teachers and students leave, meaning that a place of learning only exists in a community during business hours. In other words, the school of a town is only important during a limited time period from 7:30 AM to 2:00 PM. Having an open school after regular hours in a given area would increase the ability of a school to educate the youth of the community and hopefully increase the importance of such an institution in the eyes of the community’s residents. It is the opinion of the researcher that in the future, Jordan will be able to benefit from schools occupying a more significant social function in their communities. The implementation of a computer after school program would certainly be at least a small step in this direction.

The final positive aspect of this type of program is that in examining the current rules, the Ministry of Education harbors no significant opposition to an after-school program. A Ministry official consulted about this plan explained that “there are no rules for forbidding schools to [stay] open, but they have to get the permission from their directorate or the Ministry in some cases.\textsuperscript{87}” Instead, from the official’s perspective, the only issue is that there were currently no “incentives” for teachers to stay after hours\textsuperscript{88}. However, as mentioned earlier, if part time pay

\begin{footnotesize}
\begin{enumerate}
\item Awad, Al-Juwaideh Computer Teacher.
\item Ibid.
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were offered to teachers or new staff were hired, the issue of supervision for students would be solved.

4: More Parity in the Supplying of Hardware to Schools

As described in the paper’s “Background” section, public schools do not receive any funding from the Ministry of Education for their computer labs. Instead, schools can only rely on the actual equipment delivered to them. Theoretically, since funding is irrelevant, how rich or poor a community is should have no effect on the quality of its school’s computer lab, whose hardware is determined solely by the Ministry itself. Given these rules, it was surprising to see how much the computer equipment differed between the computer labs at Um Al-Hiran and Al-Juwaideh. At Um Al-Hiran, the school’s old computer lab is equipped with twenty-one Pentium 3 computers running Windows and Office 2000. These are the computers that the students and teachers complain about the most in terms of computers being slow or breaking down. However, in 2005, the school received an additional 18 computers. These machines were brand-new Acer Pentium 4s running Windows XP and Office 2003. These computers are powerful machines which can handle any programs in the curriculum and are the preferred workstations for any intensive offline work.

Just a few months before the start of the research, Al-Juwaideh had just four computers, and these were only for use by the teachers, meaning students had no access to computers at school. The machines Al-Juwaideh recently received are 22 computers running Windows 2000. These computers, despite being received well after the 2005 date of Um Al-Hiran’s new Pentium 4s, are nearly identical to the oldest and most troublesome computers at Um Al-Hiran. It is unclear why Al-Juwaideh, after waiting so long to receive computers for its students, in the end received used and outdated machines that are vastly inferior to computers Um Al-Hiran received approximately two years ago. Regardless of the reasoning, it is undeniable that Al-Juwaideh has been treated unfairly by the Ministry and poorly supplied. If the Ministry of Education is truly interested in maintaining the top-down control of its schools, it has the responsibility to make a

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89 Ismael, *Um Al-Hiran Computer Teacher.*
90 *Anonymous Interview.*
better effort to treat the schools that depend on it in a more equitable manner. Although unconfirmed by the research, there is the possibility that the Ministry sees the computer education department at Al-Juwaideh as either a low priority or a lost-cause all together. If this is in fact the case, the Ministry must realize that undersupplying such a school only creates a self-fulfilling prophecy, meaning computer education at Al-Juwaideh will certainly never succeed. If this is not the case and the Ministry views Al-Juwaideh as priority school in need of help, then more must be done to supply the school with equipment equal to that of the equipment given to other public schools inside and around Amman.

5: Rearrangement of Schedule for Computer Classes

Students in the 9th grade at both Um Al-Hiran and Al-Juwaideh have two 45 minute computer classes per week. At Um Al-Hiran, these classes are scheduled back to back as essentially one integrated session. However, at Al-Juwaideh the first class takes place on Sunday and the second class takes place on Tuesday. This first class is theoretical and includes a lecture from the teacher that explains a certain computer concept. The second class is practical, intended to give students time to practice what was learned in the lecture. Unfortunately, due to the day of break between the two classes, students often forget what was learned in the lecture and perform poorly in the practice session\(^\text{91}\).

It is the recommendation of this research that schools be allowed and are encouraged to rearrange class schedules to place computer lectures and practice sessions closer to together if such a step is deemed necessary. According to Ministry of Education rules, schools must first get permission their Directorate before making scheduling changes\(^\text{92}\). This permission should therefore be granted upon a school’s request. Rearranging the schedule so computer classes are closer together is a relatively simple way to maximize the effectiveness of the limited time teachers have with students without requiring students to stay in school longer than usual.

6: More Teacher Control over the Curriculum

As explained in the “Background” section, the curriculum for computer education comes directly from the Ministry of Education in the form of a book which provides rules on what

\(^\text{91}\) Awad, Al-Juwaideh Computer Teacher.
\(^\text{92}\) Haj-Hussein, Ministry of Education Official.
material should be taught as well as how to teach it. While such a book may be a way for the Ministry to require a certain standard for computer education in its public schools, this level of Ministry control in practice is excessive and hurts teacher creativity. During interviews with the computer supervisors and teachers, there was an overriding sense of powerlessness felt by these individuals. Some interviewees, when asked how computer education could be improved without involving the Ministry, responded that they had “no ability to do anything” as any changes required Ministry approval\(^3\), while others simply stated that they had no ideas whatsoever\(^4\). These responses and the general demeanor of interviewees when talking about the Ministry indicated that these educators felt suffocated by the Ministry’s need to plan their jobs down to every last detail and to prevent them from implementing new ideas without explicit permission. Again, although ensuring certain standards is a positive goal, individual teachers often have a better understanding of their students’ capabilities and challenges than the Ministry of Education does. While the Ministry and its employees are relatively removed from the various schools it supervises, teachers are interacting with their students on a daily basis and should be the most qualified to evaluate specific student needs outside of Jordan’s general goals for computer education. At the same time, these teachers are in theory barred from changing the subjects they teach in any significant way.

Despite all the rules from the Ministry, both of the teachers interviewed had found ways to improve on the Ministry’s education plan while trying to work within its guidelines. At Al-Juwaideh, the Computer Teacher reported that when there is time, he tries to give students extra lessons not found in the Ministry’s handbook. For example, he teaches students early on about useful keyboard commands such as “Ctrl-C” and “Ctrl-V” for copy and paste, both of which are used all the time and yet are absent from the Ministry’s handbook for teaching\(^5\). Nonetheless, the teacher reported that he would like to move through the curriculum faster and change the arrangement of teaching certain subjects as the Ministry’s handbook is organized strictly from the easiest concept to the most difficult\(^6\) and therefore does not always group topics that could effectively be taught together. At Um Al-Hiran, the teacher expressed even more defiance when questioned about how he might improve the Ministry’s curriculum. The teacher made statements

\(^3\) Anonymous Interview.
\(^4\) Awad, Al-Juwaideh Computer Teacher.
\(^5\) Awad, Al-Juwaideh Computer Teacher.
\(^6\) Ibid.
such as “we are not afraid of the Ministry” and said that he changes his style of teaching if he thinks it will reach students more effectively. He also tries, like the teacher at Al-Juwaideh, to give students extra lessons not found in the handbook and mentioned how he moved the theoretical class into the lab so that the normal writing activities could be transferred onto computer applications. These types of creative thinking, in the opinion of the researcher, should not just be tolerated by the Ministry but instead encouraged. When teachers are able to tailor their lesson plans to the students they are familiar with, there is a greater potential for students to learn. Furthermore, encouraging teacher creativity has the potential to improve Jordan’s educational system by leaps and bounds over time not only by helping students but by letting teachers grow as educators and broaden their skills as well. Specifically, when teachers have input on their lesson plans it gives them a sense of ownership and responsibility for their work, which in turn encourages teachers to put in more effort as the education is dependent on them and not solely on the Ministry. Furthermore, allowing teachers to have input on the curriculum does not negate the Ministry handbook as a teaching tool. Instead, the Ministry handbook could be seen as a guide for teachers rather than a set of orders and teachers would be responsible for ensuring that students understand all of the book’s concepts. There has to be an allowance however for teachers do develop more of their own style, meaning teachers should have input on what methods should be used to teach the concepts to students, the arrangement of the material, and other changes made at the teacher’s discretion in the interest of the improving the course and the student’s experience.

Already, there are signs that the Ministry is interested in relaxing its iron-grip on the educational system. Recently, computer teachers and supervisors have been allowed to install programs unlicensed by the Ministry on school computers if their usage is meant to benefit students and to help them learn. The Computer Supervisor at Um Al-Hiran mentioned that several of his friends had developed educational software and that has the ability to install these programs on the school’s computers if he decides to do so. He also noted that teachers can now design their own websites and use their own PowerPoint presentations in class, and that while

97 Isamel, Um Al-Hiran Computer Teacher.
98 Ibid.
99 Shaheen, Um Al-Hiran Computer Supervisor.
these allowances don’t mean teachers can design their own curriculum, they are still a step in the right direction\(^{100}\).

### 7: Improve Training Courses for Teachers

One of the most direct ways to broaden computer teachers’ skills is to offer training programs through the Ministry of Education. Currently, the Ministry offers free, basic training courses for its computer teachers. These courses include ICDL, CCNA, MCSE/MCSA, and A+ Computer Maintenance, as well as special courses for specific tasks. ICDL, or the International Computer Driving License, is an entry level computer certification that indicates proficiency in basic IT concepts, using a computer to manage files (as with Windows Explorer), word processing (Microsoft Word), spreadsheets (Microsoft Excel), databases (Microsoft Access), presentations (Microsoft PowerPoint), and information and communication (Internet Explorer, Outlook, etc.)\(^{101}\). CCNA, or Cisco Certified Network Associate, is a course that teaches how to install, configure, and operate various types of networks including wireless area networks (WANs) and local area networks (LANs)\(^{102}\). MCSA, or Microsoft Certified Systems Administrators, is a training course for administering network and systems environments based on Microsoft Windows operating systems\(^{103}\). MCSE, or Microsoft Certified Systems Engineer, is a course for training a teacher to be able to design and implement an infrastructure solution that is based on the Windows operating system and Microsoft Windows Server System software\(^{104}\). Examples of more specific training courses mentioned in interviews included a simple course entitled “E-Learning” that instructs teachers how to use the Ministry of Education website to submit student grades and access Ministry news, as well as a two-day training course to instruct computer supervisors how work switches on the school modem\(^{105}\).

\(^{100}\) Ibid.  
\(^{104}\) Microsoft Corporation, *Available Microsoft Certificates.*  
\(^{105}\) Awad, Al-Juwaideh Computer Teacher; Shaheen, Um Al-Hiran Computer Supervisor.
The usefulness of these courses varies from teacher to teacher. Most of the individuals interviewed had received their ICDL and CCNA training privately and therefore were not required to take any of the Ministry training courses. One individual who did take ICDL through the Ministry course was the Computer Teacher at Um Al-Hiran, who described the training as of “medium” quality. One of the main problems with the Ministry training is that nothing is offered beyond the basic courses. Most of the teachers and supervisors complained that the Ministry of Education currently did not offer any course advanced enough for them to benefit from. Both computer teachers interviewed noted that computers are a constantly-changing field, and that the burden was on the teachers themselves to keep their computer skills and knowledge up-to-date. It is therefore recommended that the Ministry make an effort to either offer more advanced computer courses in-house or to offer to pay for private training courses in advanced subjects. Effective computer teachers are not just trained educators, but also individuals who are knowledgeable in their field. Such training options would also be another way to increase teacher morale and commitment to their work with the knowledge that the Ministry is interested in helping them develop their own computer skills.

Although advanced training courses are a recommended improvement to the Ministry’s training program, one required element is that if the Ministry introduces a new computer class for students, it must make sure that teachers are trained and qualified to instruct the new course. An example of where this didn’t happen was when the Ministry first decided to start teaching Adobe Photoshop as program in computer classes for the first level of the secondary stage (the equivalent of the 11th grade in the United States). When this decision was made, the Ministry neglected to offer teachers training in how to use or how to teach Photoshop and as a result many computer teachers in public schools were unqualified to instruct a course that they were required to teach. Then, if a teacher did not have prior knowledge of Photoshop and wanted to have an idea about what he was teaching, he would have had to have paid for private training out of his own pocket. This type of situation is unacceptable. There should be little argument that if the Ministry of Education wants its teachers to offer students a new course, it is the Ministry’s

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106 Anonymous Interview; Shaheen, Um Al-Hiran Computer Supervisor.
107 Ismael, Um Al-Hiran Computer Teacher.
108 Ibid; Awad, Al-Juwaideh Computer Teacher.
109 Awad, Al-Juwaideh Computer Teacher.
110 Ibid.
responsibility (financial and otherwise) rather than the teacher’s to ensure that educators have the proper skills to be able to instruct the new class. One source informed the researcher that he had heard that since the time of this incident, the Ministry has corrected the situation and now offers training in any new course that is to be introduced. However, when clarification was requested from officials within the Ministry, this point was never responded to, leaving the issue unconfirmed as of the date of publication of this research. Regardless, the Ministry should either offer this type of training itself or pay for private training if necessary. Finally, all training available from the Ministry should accessible and easily found on the Ministry of Education website. If a new training course is being offered, it may also be beneficial to send out a mass-email to teachers informing them of its availability.

8: Improve Communication between Ministry of Education and School Staff

Several problems were reported in regards to communication between the Ministry and its teachers, supervisors, and administrators at public schools. The first of these issues is in regards to electronic communication via email. Both the Computer Teacher and the Administrator at Al-Juwaideh reported that although it is easy to send an email with a question to the Ministry, getting a response is either rare or extremely slow. The Administrator commented that although he can send the Ministry an email, it is unlikely that his opinions will be listened to. The Computer Teacher mentioned that the last time he sent an email to the Ministry, it took three months to get an answer back from them. He added that if a teacher wants the Ministry to listen to him, he would need an appointment with the specific manager who handles the issue of concern. Unfortunately, such meetings, regardless of how hard they may be to attain, are not an option for teachers due to the schedule of work hours. Teachers are usually not allowed to leave their schools until their classes are finished, meaning that if they want to visit the Ministry of Education, it has to be done after the end of the school day. However, the end of the school day essentially coincides with the end of work hours for many employees at the Ministry.

111 Abdillghani, Al-Juwaideh Administrator Interview.
112 Awad, Al-Juwaideh Computer Teacher.
113 Ibid.
114 Awad, Al-Juwaideh Computer Teacher.
meaning that once a teacher’s work is done, most Ministry employees will be getting ready to leave the office.\footnote{Ibid.}

In light of these issues, the Ministry should change its communication policies in one of two ways. The first option is to assign more staff to handle electronic communications from teachers. If a teacher sends the Ministry a question or comment, an appropriate response should be sent in a reasonable amount of time rather than after several months. The Ministry should also encourage such communications from teachers in order to extract new ideas, suggestions, and feedback for developing Ministry policies and improving teaching practices at public schools. An open dialogue between the Ministry and its employees can only benefit both parties. The second option is to shift forward working hours for departments at the Ministry that might be able to help teachers in person. It is possible however that such a shift could disrupt Ministry work. In this case, relevant departments should be willing to accommodate meetings with teachers by arranging meeting times after regular work hours. Teachers must be seen as a resource for the Ministry to learn from rather than a burden. At the same time, teachers must be willing to contact or visit the Ministry with their suggestions or questions rather than avoiding communication.

9: Modification of Hardware Repair Policies

As described previously, all computers in public school computer labs are the property of the Ministry of Education. Currently, this means that no school employees are allowed to open lab computers for any reason.\footnote{Shaheen, \textit{Um Al-Hiran Computer Supervisor}.} If lab computers develop problems, technical support is available for computer hardware. Software technical support is effectively unavailable, and the staff at both schools reported that they try to solve their own software problems without involving the Ministry.\footnote{Awad, \textit{Al-Juwaideh Computer Teacher}; Shaheen, \textit{Um Al-Hiran Computer Supervisor}.} This technical support does not come from the Ministry itself, but instead from private companies contracted by the Ministry. When a problem is discovered, the school’s computer supervisor writes up a report and calls the relevant department at the school’s directorate, whose staff in turn contacts the computer supplier in order to send a technician to the
school\textsuperscript{118}. Opinions were mixed about the quality of the hardware technical support. At Al-Juwaideh, the staff had a positive opinion of the hardware technical support available to them\textsuperscript{119}. However, at Um Al-Hiran there were complaints that the response time for these technicians was too slow and that when they do show up, they will often make the repair only to replace the entire machine two days later\textsuperscript{120}. The entire process was described as too time consuming and that it wasted the student’s time for learning\textsuperscript{121}.

The rules forbidding opening school computers is certainly an effective way to ensure unqualified individuals at schools do not tamper with the computers and cause more problems. However, given the intermittent inefficiencies of the hardware repair system, there are ways for the Ministry to relax its rules and increase efficiency. The Ministry should authorize computer teachers and supervisors who are proficient in computer maintenance and repair to be able to open school computers for simple repairs, leaving the private company repair process for more serious technical issues. This proficiency could be determined by the possession of certificates from computer repair courses or other official qualifications at the digression of the Ministry. Allowing staff to make simple repairs should reduce the workload for technicians from the contracted private companies, in turn improving their response time for fixing serious issues with Ministry computers. Again, what constitutes a “simple repair” versus a “serious issue” can also be defined by the Ministry in order to increase the likelihood that the new rules wouldn’t cause more problems than they would solve.

\textbf{10: Begin Computer Education Classes Earlier}

Computer education classes at each public school begin at the 7\textsuperscript{th} grade level and continue on through the end of the secondary stage. However, each educator who was asked for an opinion about this system suggested that computer education begin earlier than 7\textsuperscript{th} grade, specifically in fourth\textsuperscript{122} or fifth grade\textsuperscript{123}. One teacher commented that there was significant pressure from the administration for him to teach students more and more skills, and that there

\begin{footnotesize}
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\item[\textsuperscript{118}] Shaheen, 2007.
\item[\textsuperscript{119}] Awad, Al-Juwaideh Computer Teacher.
\item[\textsuperscript{120}] Shaheen, Um Al-Hiran Computer Supervisor.
\item[\textsuperscript{121}] Ibid.
\item[\textsuperscript{122}] Awad, Al-Juwaideh Computer Teacher.
\item[\textsuperscript{123}] Shaheen, Um Al-Hiran Computer Supervisor.
\end{itemize}
\end{footnotesize}
was rarely enough time to be able to achieve this\textsuperscript{124}. In the future it will be more and more common for children in Jordan to be growing up with computers in the household, meaning the educational system can take advantage of this exposure by offering classes earlier. Spreading out the curriculum over more years, like with any subject, will also help students gain proficiency in a wider-variety of computer subjects and at a deeper level than otherwise possible.

\textbf{11: Expand the Number of Programs Taught}

Within the current span of time that computer education classes are offered to students, the Ministry should offer a greater variety of computer subjects. According to the Computer Teacher at Um Al-Hiran, there is a significant amount of repetition in the current course-load that could be eliminated. Specifically, subjects like Microsoft Access, Excel, PowerPoint, and Word are taught year after year and taught in the same way without an increase in difficulty, meaning students in the 7\textsuperscript{th}, 8\textsuperscript{th}, and 9\textsuperscript{th} grade have essentially identical curriculums for Microsoft Office\textsuperscript{125}. This repetition was also reflected in student responses on the Questionnaire. One of the most common responses was a request that new programs be taught in the curriculum, indicating that students are unhappy with the lack of variety that currently exists. It is therefore first recommended that the Ministry introduce new programs into the curriculum, with a focus on imparting computer skills that will be useful in the future, as many programs currently in the curriculum such as Quick Basic are aging and becoming less useful as time goes on. Two excellent ideas from the student Questionnaire comments were for a class on how computer parts work and for a class about how to use the internet (for example internet searches and research for reports). The first of these suggestions of course requires that the Ministry allows its computers to be opened by school staff. The second suggestion indicates that students may not be learning at home how to use the internet most effectively, which in the researcher’s opinion is one of the most important skills a student of computers can learn for the future. Secondly, if essential programs such as Microsoft Office are to be taught to multiple grades, each successive year with the program needs to focus on teaching more advanced skills rather than repeating the same curriculum.

\textbf{12: Increase Teacher Salaries}

\textsuperscript{124} Ismael, \textit{Um Al-Hiran Computer Teacher}.
\textsuperscript{125} Ibid.
The following suggestion is the only suggestion provided in this research that is a straightforward request for more funding. Many of the school teachers that the researcher encountered reported that they had to work second jobs in the hours after school in order to make ends meet. For example, the English Teacher at Al-Juwaideh always had to leave school right at the end of his classes in order to work as a taxi driver, which left him no time to work on lesson plans or prepare for his upcoming classes later in the week. Given that the Ministry does not pay its teachers enough for it to be their sole occupational focus, one must question how much the Jordanian government values teachers as part of the educational system. If the Ministry is interested in developing great teachers in the future, it must pay them enough to allow them to focus on teaching and not on juggling multiple jobs. Teaching must be an option for a career and not “just another job.” If this can be achieved teachers will likely take more pride in their work which in turn will have a tangible benefit for students.

When an inquiry about this was forwarded to the Ministry, an official commented that the need for teachers to work more than one job was indeed a problem, adding that this was not just limited to teachers, but that staff at the administrative level also often have more than one line of work. The official said that any decision to give teachers a raise must come from the Jordanian government and that the absence of this decision is a problem for the “educational program.”

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127 Ibid.
VII. Conclusion

The current research expanded on available studies of computer education in Jordan by offering limited case studies of two public schools outside of Amman. These studies demonstrated in which areas these schools have faced troubles in the implementation of computer education, many of which are relevant to public schools as a whole in Jordan. Specifically, this study elucidated how large a role the Ministry of Education plays in computer education in its public schools and where this amount of control may be impairing a school’s ability to educate its students most effectively. In general, the Ministry is encouraged to relax some of its authority over the current system and allow more input from teachers on how to best educate students. At the same time, the researcher recognizes that biases exist based upon his prior experiences with the more liberalized American education system and that many of the Ministry’s policies are necessary given the needs of Jordan as a relatively young nation undergoing, in many areas, rapid development. Nonetheless, the research encourages individual schools and their teachers to take on more responsibility in the educational system. Teachers and administrators must resist seeing themselves as victims or puppets of a larger bureaucracy and instead do their best to cooperate with the Ministry with the goal of better education for Jordan’s youth.

With these ideals in mind, this study also provides numerous, practical suggestions for the improvement of computer education in Jordanian public schools. Especially in the light of the ambition and resulting cost of programs such as "مدارس إستكشفية"، the suggestions in this report are relatively low in cost and in the opinion of the researcher, entirely feasible if educators are sincerely interested. Secondly, several suggestions are for adjustments to the current system rather than demands for large amounts of additional resources, the latter of which are usually both desirable and difficult to obtain.

With these conclusions also come suggestions for where the current research could have been improved as well as ideas for future studies. These suggestions are dealt with individually and are as follows:
a) Greater Use of Statistical Analysis

Given the amount of quantitative data available from the Questionnaire, the researcher would have liked to have had access to statistical analysis programs such as SPSS. The current research was only able to determine to a limited extent where significant differences existed between categories of data and the opportunity to do more statistical analysis may have allowed for additional conclusions to be made. Such programs are also very useful for performing considerable amounts of analysis in limited time periods, such as the relatively short period of time available for the current research.

b) Additional Interviews to Provide Perspective

The researcher, given more time, would have liked to interview more individuals from the Ministry of Education, individuals from Jordan’s top employers, and individuals from Jordan’s most respected universities. Although individuals from the Ministry were sought out and responded to some extent, the considerable bureaucracy at the Ministry made it difficult for the researcher to find appropriate and willing persons to interview. Follow-ups to the email-interview for clarification of some answers were not responded to as of the date of publication of this research, although it is unclear why this was the case. Because of these difficulties, the Ministry’s perspective is somewhat underrepresented in this research relative to the perspective of its employees at the individual schools. The researcher considers the findings to be reliable as most of the criticisms of the research are based upon more objective observation in addition to the opinions of schools staff. Nonetheless, greater Ministry participation in the interview process would have allowed for a wider diversity of opinions.

Interviews with Jordan’s employers and universities would have had the benefit of double-checking the responses of the educators that were interviewed, specifically about what computer skills are desired of students who wish to find academic and professional success in the future. Such interviews would perhaps have been able to provide more specifics about which skills are valued the most and whether or not these organizations have been satisfied with the performance of graduates of the public school system.

c) Questionnaire Revisions
Future research may benefit from consultation with Jordanian psychological professionals and researchers for the purpose of designing a Questionnaire for extremely large samples of public schools students. Specifically, these researchers may be able to provide insight on how to best phrase questions so that Jordanian youth will find a Questionnaire less challenging as well as how to best employ survey items such as Likert scales to best ensure that data are valid. While the Questionnaire from the current research was effective given the sample sizes at the two schools, a mass-questionnaire to be administered at many schools would require additional streamlining due to the amount of students being surveyed. Secondly, the opportunity to administer such a Questionnaire at many schools would benefit from assistance from the Ministry of Education so that the Questionnaire could be distributed in a more official capacity to ensure cooperation from schools and their students.

d) Family Dynamics

Due to the time and resource limitations of this research, interviews were not conducted with the parents of students. Such interviews, if conducted on a large enough scale, may have shed light on the extent to which parents of students at the schools consider computer education to be important for their children’s future. The extent of this interest could help determine if the proposal of an after-school program would be welcomed as well as how much student at the two schools are being encouraged to pursue their education.

e) Socio-Economic Status (SES) Issues

Future research would certainly benefit from investigating how the SES of a student’s family interacts with his or her success in computer education courses. For example, are students from a high SES more likely to have better computer equipment and/or internet in their homes and how do such factors improve students’ ability to learn in school? Secondly, it would be interesting to determine the interaction between the average SES of a student from a given community and the quality of the computer lab in the school of that community. For example, do poorer communities, on average, receive less or lower quality computer equipment from the Ministry of Education? Such a study is essential for determining how fair Ministry policies are in their funding of school computer labs.
f) Gender Issues

Perhaps one of the most important courses for future research would be to examine the issue of gender in computer education. The current research was limited to research at boys’ schools due to time constraints as well as to increase the likelihood of cooperation from the individual schools themselves given that the researcher was male and would be interacting with students. However, future research should compare computer education programs at boys’ schools and girls’ schools. Questions may include whether or not the quality of the computer equipment is the same, does the curriculum differ significantly, are female students encouraged to pursue ICT education as much as male students, and are there equal opportunities for female programmers in the post-high school stages?

Additionally, the Bryson and De Castell article “New Technologies and the Cultural Ecology of Primary Schooling” (from the “Rationale” section) noted several interesting gender issues that affected computer education in schools in British Columbia. The authors found that school staff assumed computers to be a male’s area of specialty and therefore male computer supervisors were considered more competent than their female counterparts. Although the schools in British Columbia were co-educational, the findings still raise questions about similar issues that may be present in the Jordanian system. Specifically, of the computer supervisors hired by the Jordanian Ministry of Education, what percentage are female? More importantly, are females encouraged to apply for such a position and what is the work environment like for female supervisors in their interactions with the Ministry? There are certainly many other questions to be asked concerning gender in Jordanian computer education, and researchers should consider such questions as models for future studies.

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Bibliography


VIII. Appendices

The following pages contain the documentation used during for the research. This documentation consists of the two versions of the Questionnaire, the Arabic consent forms used for interviews and the Questionnaire, and the original English-language versions of these consent forms for reference. The attached CD for this report includes two additional appendices (Appendices G and H) for photographs taken during the research.
استبيانة الدراسة

المعلومات المطلوبة:

العمر: ................ سنہ.

الصف: ................................ الأساسي.

تعليمات: أجب عن كل سؤال حسب معرفتك بالموضوع. سيساعد الصدق بالإجابة من طرقة تحسين تعليم الحاسوب بمدرستك.

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تحتاج الأسئلة التالية تحديد الموافقة بشدة وعدم الموافقة بشدة للعبارات التالية:

في كل عبارة على العمود الأيمن، ضع دائرة في الصندوق المناسب للإشارة إذا كنت لا توافق بشدة، لا توافق، لا توافق أو لا تعارض، توافق أو توافق بشدة على كل عبارة. الرجاء أن تضع فقط دائرة واحدة لكل عبارة:

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يعتبر الحصول على الحاسوب أمر ضروري للتوظيف بعد التخرج.
أملئ في الأسئلة التالية:

1 - إذا أجبت نعم على السؤال الأول في الجدول الأول، كم عدد الساعات الأسبوعية التي تستخدم فيها الحاسوب خارج المدرسة؟

2 - إذا أجبت نعم على السؤال الأول في الجدول الأول، هل الحاسوب المزود بالإنترنت حاسوب شخصي أم مشترك؟

3 - في الفراغ التالي، أكتب الاقتراحات التي تحسن من استخدام الحاسوب في مدرستك.

شكراً جزيلاً على تعبئة هذه الاستبانة.
Appendix B: Computer Education Questionnaire for Um Al-Hiran

استبيان الدراسة

المعلومات المطلوبة:

الصف: ................................ سنة. 
العمر: ................................ سنة.

تعليمات: أجب عن كل سؤال حسب معرفتك بالموضوع. سيساعد الصدق بالإجابة من طرقة تحسين تعلم الحاسوب بمدرستك.

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- جودة أجهزة الحاسوب في مدرستي جيدة (مثل لوحة المفاتيح، الشاشات،.. الخ).
- جودة برامج الحاسوب، برامج التشغيل، برنامج الحاسوب،........ الخ جيدة.
- يعتبر الحصول على الحاسوب أمر ضروري للتوظيف بعد التخرج.
أملئ في الأسئلة التالية:

1- إذا أجبت نعم على السؤال الأول في الجدول الأول، كم عدد الساعات الأسبوعية التي تستخدم فيها الحاسوب خارج المدرسة؟

2- إذا أجبت نعم على السؤال الأول في الجدول الأول، هل الحاسوب المزود بالإنترنت حاسوب شخصي أم مشترک؟

3- في الفراغ التالي، أكتب الاقتراحات التي تحسن من استخدام الحاسوب في مدرستك.

شكراً جزيلاً على تعبئة هذه الاستبيانة.
Appendix C: Arabic Consent Form for the Questionnaire

قدوش لما قبليت لقبطق قبلوم جذومن قتةمن قتة ينرجم لما قبرت لما قادم
ندرلا: كيبع لمجلا ريغفلا ئاداخا

قنرولا قيوموش دنرادا في بوساحما سورت ناتيلما: قبليت لمجلا تمى للولا نستشيما نارم، درف، قم، سرتفت قعماج، في رجك نلتيك قبارقي قفده:

في برقق يل ينطأب للهذو ندرلا في قبليت لما دنرادا في بوساحما سورت صرسح قغيك نز شقلا ليمست لما في بج مقرلا فندب مليظا اذه لما دجاوت.

فههمت لما شاءارجا ل:

بفسعد لما بسح قفري لما قبليت لما ديبيك شيبتر لما نم بلمشي، قو مجموم، فقيراع نيم أمام قبليت لما ن! ل قبليت لما لقب جيكل في مه، مدمحت، نز، اعبع م، نجرو ريكنتر لما طلع يبغي.

رطاخ لما:

عورش لما بفسعد لما عهت أ، ابليسي رطاخ لما لداني ريت.

فوا قبليت لما:

قبليت لما شاكارت نوسي لما قبليت لما في بوساحما سورت نز عورش لما ىبغي و، وأ نماعل لما مدمحت ندرلا في قبليت لما دنرادا في بوساحما فليني، نرم، العليا لما في ضرع لما لوح ندلما نلتب الدك قفقا لما بوساحما.

امويلعت قبارقلي ناصيتي ل:

ل! لوزنلما وأ شاكارت ل، دب، دب، لويقجا لما دعرم، في كلما ديبيك يا ديكلما نيم، نيدي في مثاقلا: 0777176318 sitjordan@gmail.com

عوينث لما:

عورش لما في سوم يبتر لما طلع قسلا في قفط ربي.

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خيراتلا عيقوتلا                                اذإ ناك لقي نم (يصولا / عيقوت يلو رمألا 18) نس
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راتلا ابلا حطقف (عوينث لما في سوم يبتر لما طلع قسلا في قفط ربي)

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عيقوتلا عيقوتلا                                رجما بيدلو عقوت ئيش ولا) نم نيا كأذ ا8بق ( عوفرلا تطع شحيلما
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عيقوتلا عيقوتلا                                رجما بيدلو عقوت ئيش ولا) نم نيا كأذ ا8بق ( عوفرلا تطع شحيلما
Appendix D: English Version of Consent Form for the Questionnaire

Participant Questionnaire Informed Consent Form
School for International Training
Jordan: Modernization and Social Change

COMPUTER EDUCATION IN PUBLIC SCHOOLS IN JORDAN

Lead Researcher: Ketan Gajria, Tufts University, Medford, Massachusetts, USA

PURPOSE OF STUDY

To research the effectiveness of computer education classes in public schools in Jordan as well as any issues facing such education with the goal of improving such education in the future.

PROCEDURES TO BE FOLLOWED

Participants are asked to fill out the accompanying questionnaire to the best of their knowledge. This questionnaire is completely anonymous. Participants should not put their name on the questionnaire and no names will be used in the results of the questionnaire.

RISKS

No risks are foreseen to be associated with participation in this study.

BENEFITS

Information gathered about computer education will be used in the future to make suggestions about how to improve computer education in public schools in Jordan. As such, answering honestly and to the best of your knowledge is both helpful and appreciated.

CONTACT INFORMATION FOR THIS STUDY

Questions, comments, or complaints about this study can be directed to:

Dr. Muhamed Al-Khalil, SIT Jordan Academic Director
Telephone: (962) 077 7176318
Email: sitjordan@gmail.com

SIGNATURE

My signature below signifies my participation in this project:

_________________________    ________________________________
Date       Signature

________________________________
Signature of Parent/Guardian (if under 18)
نموذج موافقة خطية لمقابلة المشارك
مدرسة التدريب العالمي
الأردن: الحداثة والتغير الاجتماعي
تدريس الحاسوب في المدارس الحكومية الأردنية
الباحث: كيان كاجريا، جامعة تنفس، ميد فورد، ماساشوستس، الولايات المتحدة الأمريكية
هدف الدراسة:

للبحث عن فاعلية حرص تدريس الحاسوب في المدارس الحكومية في الأردن وكذلك التصدي لأي قضايا تواجه مثل هذا التعليم بهدف الارتقاء به في المستقبل.

الإجراءات المتبعة:

إن المشاركة تماماً تطوعية. ستجري مقابلة المشاركون حول موضوع تعليم الحاسوب إذا رغب المشاركون.
لن يجري إعلان المقابلات أو نام الشخص المشارك غير معلن وسري ولن يستخدم في نتائج الدراسة.
لمستخدم في المقابلة الحق برفض الإجابة عن أي سؤال، وكذلك إنهاء المقابلة في أي وقت يتواجهونه.
المخاطر:

لن يكن هناك أي مخاطر يتبناها أثناء المشاركة بالمشروع.

الفوائد:

ستستخدم المعلومات أو البيانات المجمعة عن تدريس الحاسوب في المستقبل لعمل مقترحات تبين كيفية تحسين تعليم الحاسوب في المدارس الحكومية في الأردن. كما تكون الأمانة حول القضايا التي تواجه تعليم الحاسوب مفيدة وقيمة.

معلومات الاتصال للدراسة:

سيتم توجيه الأسئلة، الانتقادات أو الشكاوى ل: 
د. محمد الخليل (مدير الأكاديمي لمدرسة التدريب العالمي)
الهواتف المحمولة: 0777176318
البريد الإلكتروني: sitjordan@gmail.com
التوقع:

بين توقعى في الأسئلة على مشاركتي التطوعية في المشروع.

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التوقع
التاريخ
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لا يوقع الشخص دون إذن قانوني (وإلا\أو ولي الأمر) عند الثالثة عشرة سنة.

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التوقع (الباحث فقط)
التاريخ (الباحث فقط)
Appendix F: English Version of Consent Form for Interviews

Participant Interview Informed Consent Form
School for International Training
Jordan: Modernization and Social Change

COMPUTER EDUCATION IN PUBLIC SCHOOLS IN JORDAN

Lead Researcher: Ketan Gajria, Tufts University, Medford, Massachusetts, USA

PURPOSE OF STUDY

To research the effectiveness of computer education classes in public schools in Jordan as well as any issues facing such education with the goal of improving such education in the future.

PROCEDURES TO BE FOLLOWED

Participation is completely voluntary. Participants will be interviewed about the subject of computer education. Interviewees can choose to have the interview be anonymous and the interviewee’s name will be kept confidential and will not be used in the results of the research. Interviewees have the option to refuse to answer any question he or she deems objectionable and to terminate the interview at any time.

RISKS

No risks are foreseen to be associated with participation in this study.

BENEFITS

Information gathered about computer education will be used in the future to make suggestions about how to improve computer education in public schools in Jordan. As such, honesty about the issues facing such education is helpful and appreciated.

CONTACT INFORMATION FOR THIS STUDY

Questions, comments, or complaints about this study can be directed to:

Dr. Muhamed Al-Khalil, SIT Jordan Academic Director
Telephone: (962) 077 7176318
Email: sitjordan@gmail.com

SIGNATURE

My signature below signifies my voluntary participation in this project:

_________________    ________________________________
Date       Signature

Mark here if you wish                 ________________________________
to remain anonymous:     Signature of Parent/Guardian (if under 18)

_________________    ________________________________
Date (Researcher only)    Signature (Researcher only)