
# The One-to-One Laptop Initiative in Science Classes in the United Arab Emirates High Schools

# دراسة حول تطبيق مبادرة التعليم الالكروني واحد ل واحد في صفوف العلوم في المدارس الثانوية بدولة الإمارات العربية المتحدة

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# Dedication

This dissertation is lovingly dedicated to my respected parents who have been my constant source of inspiration. They have given me the drive and discipline to tackle any task with enthusiasm and determination.

I also want to dedicate this dissertation to my husband, Mohamed, and my 3 loving daughters, Malak, Merna, and Marah. They have been the wind under my wings and have supported me to continue my educational endeavors. I could not ask for a more supportive family.

## إهـــــــداء

**إلهي لايطيب الليل إلا بشكرك ولايطيب النهار إلى بطاعتك .. ولاتطيب اللحظات إلا بذكرك .. ولا تطيب الآخرة إلا بعفوك .. ولا تطيب الجنة إلا برؤيتك.**

**أهدي رسالة الماجستير الى:**

*** من أحمل أسمه بكل افتخار، إلى من حصد الأشواك عن دربي ليمهد لي طريق العلم، إلى والدي العزيز.**

*** من كان دعائها سر نجاحي وحنانها بلسم جراحي إلى أغلى الحبايب أمي الحبيبة.**

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# Abstract

Technology has affected education in several ways. This study investigated the one-to-one laptop initiative in the Applied Technology High school in the United Arab Emirates. It examined the implementation of laptops in science classes, teachers and students attitudes and how the initiative affected the students' academic achievement.

The data collection tools used were teachers and students questionnaires and students mark review. The results of the study suggested that teachers and students had positive attitudes as well as some negatives during the implementation. It also concluded that students have achieved better when they use laptops to study science.

The study concluded with implications and recommendations for better implementation of one-to-one laptop initiative in schools.

# ملخص البحث

تهدف هذه الدراسة إلى البحث في تطبيق مبادرة التعليم الالكتروني "واحد لواحد" في ثانوية التكنولوجيا التطبيقية / فرع العين بنات بدولة الامارات العربية المتحدة، حيث يتم توفير وتجهيز حاسوب محمول مزود بأحدث التطبيقات والبرامج لكل طالبة ومعلمة.

وقد عني هذا البحث بدراسة استخدام الحاسوب المحمول في تدريس مادة العلوم، وأراء المعلمات والطالبات تجاه استخدامه في الصفوف واخيرا مدى تأثيرهذه المبادرة في الإرتقاء بالأداء الاكاديمي الطالبات في مادة العلوم.

تم استخدام ادوات كمية ونوعية لجمع البيانات تشمل: استبيان للمعلمات، استبيان للطالبات وتحليل علامات الطالبات في امتحانات مادة العلوم المقدمة نهاية الفصلين الدراسيين الأول والثاني من العام الدراسي٢٠١١/٢٠١٢.

وقد أشارت النتائج الى آراء إيجابية للمعلمات والطالبات تجاه استخدام الحاسوب المحمول، كما اشارت الى وجود العديد من السلبيات اثناء الاستخدام في صفوف مادة العلوم. وخلصت النتائج ايضاً إلى ان الطالبات باستخدامهن لأجهزة الحاسوب المحمولة في التعلم قد حققن نتائج أفضل في امتحانات مادة العلوم.

وفي نهاية البحث تم طرح عدد من التوصيات للوصول لأفضل الوسائل في تنفيذ مبادرة التعليم الالكتروني "واحد ل واحد" في المدارس بدولة الامارات العربية المتحدة.

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# Chapter 1: Introduction

## Introduction

Ever since there have been schools, there has been a need to improve those schools. Integrating computer technology in education has been implemented as an initiative and solution for enhancing and improving school education (Bebell, 2005; Cuban, 2006; Harrison, 2005; Lemke, & Coughlin, 1998; Paige, Hickok, & Patrik, 2004; Trotter, 2007). The last decade witnessed a significant increase in the number and the scope of one-to-one computing projects.

The One-to-One laptop initiative has many definitions in which one can conclude the general sense of it as teachers and students were provided with laptops and many supportive tools and resources anywhere and anytime in order to improve the educational environment.

Government, technology vendors, policy makers as well as parents' voices have frequently made the argument that using computer technology into schools is crucial to ensure the nation holds its rank as leader of a global society (Schmidt, 2003; Trotter, 2007). They also believe that laptops have the potential to change learning environments to include higher level of students understanding various subjects by connecting classrooms to the Internet (Roschelle, Penuel, & Abrahamson, 2004) and increasing student motivation, engagement and achievement.

A number of early studies also suggest many positive outcomes arising from one-to-one laptop initiatives that include: increased student engagement and achievement (Bebell, 2005; Penuel, 2006), reduced disciplinary problems (Baldwin, 1999), better use of computers for writing, analysis and research (Cromwell, 1999; Baldwin, 1999; Guignon, 1998; Penuel, 2006), digitalizing and sharing information and documents for easier communication between teachers and students and a significant movement from teacher-centered education towards student-centered classrooms (Rockman,

1998).

Moreover, Baldwin (1999) also recognized effects on student behaviors at home such that students spend less time watching television and more time doing school tasks and homework. Similarly, Russell, Bebell and Higgins (2004) documented that students use computers at home for academic purposes more frequently when they were provided with their own laptops. In the same matter many parents in public and private schools said that it is relevant when students use laptop technology to perform their schoolwork and assignments and describe this as challenging. They realize the importance of problem solving, communication and the valued opportunity to cooperate and participate in the real world (One-to-one computing: literature, 2009).

Teachers also have made significant contributions to the success of the project. Many researches have shown that the effective and successful use of the laptop technology in the classroom depends highly on teachers' knowledge, experiences and skills in this area. It seems that, in the innovative classroom environment that is designed with technology tools, the expenses will be worthless if teachers do not have sufficient knowledge, experience, self-confidence and skills to implement technology into the classroom. Earlier research has revealed that teachers' attitudes about teaching and learning affect the implementation level (Dwyer, Ringstaff, & Sandholtz, 1991), but that study was inadequate in explaining how these practices happen and how the attitudes of the teachers and the implementation procedures affect the student achievement.

Technology advocates have frequently been frustrated and disappointed to find improperly used new technology rather than being used as a vital component of instruction (Cuban, 2001; Trotter, 2007; U.S. Congress, 1995, Office of Technology Assessment, 1995). Regardless of these disappointing results, many high schools have adopted one-to-one laptop initiatives, where each student and teacher is provided with a laptop computer and have access to the internet and learning resources 24 hours a day, 7 days a week (Bebell, 2005; Paige et al., 2004).

During the past few years, a number of studies have started to focus more specially on the relationship between student participation and achievement in one-to-one laptops initiative, but measurements on specific technology uses, teachers' pedagogical content knowledge to use technology tools in the classrooms and the suitable methods to use these tools in classroom atmosphere should be researched in more advanced levels.

## Research Question

The One-to-one laptop initiative has been initiated in many schools all over the world. Since this initiative is growing, a spot light has been focused on how teachers and students use it effectively and how it affects the students' achievement. This is particularly true in some schools that have shown extreme resistance to accept the innovation that force them to modify structures and teaching practices that have continued unchanged for closely 100 years (Dexter, 1999).

In the United Arab Emirates, many public schools through the country are implementing one-to-one laptop project in order to cope the knowledge-based 21st century and it is significant to study:

- how teachers and students feel the infusion and implementation of a one-to-one laptop initiative and
- how it affects the students' achievement.

## Significance of the Study

Former studies conducted from the 1980s and 1990s may not be reliable in the 21st century as integrating laptops in the daily life has become applicable on a broader range with more effective educational applications. Furthermore, many private and public schools are using wireless laptops for students and teachers (Hill & Reeves, 2004; Rockman, 2003). The rapid change of this innovation has been a reason of huge concerns.

In the United Arab Emirates, the laptop initiative has been implemented in some schools and very minor number of researches was conducted. Those researches mainly studied financial or budget level of the project. There is no evidence that independent studies concerning the laptop initiative have been conducted to evaluate implementation and consequences. This study is significant because it focuses on a developing area and it also provides awareness on how the laptops were used by teachers and students in classrooms and their attitude toward this project as the necessity to change the traditional teaching and learning practices. Additionally, this research offers an opportunity for policy makers to spotlight the students' achieved scores in response to the one-to-one-laptop initiative.

## Purpose of the Study, Objectives, and Research Questions

The purpose of this research is to study how teachers and students in a high school make use of the laptop technology in science classes and how do they made sense about the implementation of the one-to-one laptop initiative. Furthermore, how the current integration of laptops in teaching and learning science subject affects the students' scores. At that end, the objectives of the study are:

- To create a detailed description of the one-to-one laptop initiative by teachers and students within the science classroom in the context of a high school.
- To describe teachers and students attitudes toward the implementation of the laptop project in the context of a high school.
- To observe the students achievement in science subject in terms of analyzing students marks before and after the implementation of the laptop initiative in the context of a high school.

From the research objectives and framework, the following research questions guided for investigation and understanding of the one-to-one laptop project in a high school.

1. How do students and teachers apply one-to-one laptop initiative in science classrooms in a high school during the academic year 2011-2012 in the UAE?

2. How do students and teachers involving in a one-to-one laptop initiative in a high school during the academic year 2011-2012 in the UAE feel about it?

3. How does the laptop initiative affect the students' academic achievement in science?

The study objectives and questions exemplify what occurred when a one-to-one laptop program was initiated into a high school, and make the step for a mixed method case study.

## Overview of Research Design and Methodology

The research design for this study was a primarily quantitative with some qualitative data case study. It is conducted in a high school in the United Arab Emirates that implements the one-to-one laptop initiative that included 587 students who make sense of the initiative.

The methodology used got participants' own perspectives about the initiative and comprised of data collection actions that conducted over two semesters and involved a survey and student marks excel sheets provided by the School Assessment Unit.

## Organization of the Dissertation

The researcher has organized this dissertation into five chapters. This is an introductory chapter, followed by chapter two that reviews related literature where a comparison between the traditional and technology rich classroom, hoe the one-to-one laptop initiative started worldwide and in education. It also includes a review about students academic achievement with using laptop technology in learning, teachers and students attitudes toward the initiative. Section two ends by describing possible limitations to the one-to-one laptop initiative and the history of the laptops project in the United Arab Emirates Schools.

Chapter three draws the research design and methodology used to study how the participants use and feel about the initiative in a school.

Chapter four reports the results from the data collection and analysis. It investigates the findings from academic year where teachers and students were involved in the one-to-one laptop initiative.

Chapter five ends the dissertation where the researcher makes general conclusions about the initiative. The researcher concludes this chapter with implications resulted from the implementation of the initiative in the site of study followed by recommendations for the research site.

# Chapter 2: Literature Review

## Traditional Versus Technology – Rich Classrooms

There is a significant difference in the pedagogical approaches when the traditional and technology-rich classroom environments are compared. In a traditional classroom: teachers spend more time in giving instructions, leading class discussions, asking and answering questions as well as managing the classroom whereas students are mainly engaged in taking notes, working dependently on each other and not motivated in studying the subject content.

In a technology-rich environment: teachers are mainly involved in demonstration, guiding and directing activities, listening and discussing with students. Students are frequently working on projects, collaboratively working in small groups as well as communicating with other students. A technology-rich classroom environment provides opportunities for more interactive project-based learning and independent research and more opportunities for cooperative learning than in traditional classrooms. The teacher is more likely to act as a facilitator; students can access a wider range of resources and technology is merged to a much greater degree than other classrooms. There are varied opportunities for students to collaborate and interact with others, construct knowledge, skills and understandings within a class, between classes and elsewhere.

Research findings by Owen, Farsail, Knezek & Christensen (2005) highlight that students do not have to wait for teachers to deliver information, as most of it is available on the Internet. This pushes a focus on the changing role of the teacher. If education policy makers think differently about learning environments, there are several opportunities for differentiated instruction and engaging learning.

## One-to-One World Wide

The one-to-one computing program is rapidly growing around the world across schools and universities. The program simply means giving each student and teacher a computer with or without Internet access and latest software anywhere and anytime. Many companies like Apple, Dell, HP and Microsoft helped create the initiative.

The program developed rapidly to an extent that in U. S. it is one of the fastest growing yet most debated programs in classrooms. Recently at least 33 states have schools experimenting with one-to-one laptops program and many schools are really considering the adoption of one-to-one programs (Lei, Conway, & Zhao, 2007).

For example, the state of Maine in 2002, signed an agreement with Apple at 37 million dollars on the Learning Technology Initiative (LTI), which reinforced provides iBook laptops to 34,000 students and 3,000 teachers and the installation of wireless Internet connections in all 239 public middle schools. The significance of the project success is reflected in renewing the contract with Apple for another four years with fund of 41 million dollars (Quimby, 2007).

Michigan's "Freedom To Learn" program spent more than $30 million issuing laptop computers and Personal Digital Assistants (PDAs) to about 30,000 students in 15 school districts (U.S. Department of Education Office of Educational Technology, 2006).

A high successful program, "Texas' Technology Immersion Project" (TIP) which implemented since 2004 has approved funds to 25 school districts around the state to offer not only one-to-one computing devices, but also "ALL of the tools they need to conduct learning in the 21st Century" (The Technology Immersion Project, n.d.).

Many other large initiatives implemented over the past decades. In 2006, 13 million dollars were proposed by the governor of South Dakota to provide laptops to high school students in the state (Dunsmoor, 2006). This project had expanded by 2007 to

9,600 high school students in 41 districts through the state (South Dakota Department of Education, 2007). Starting from 2006-2007, Classrooms for the Future in Pennsylvania would invest $200 million to distribute laptops to every high school student in classrooms (Classroom For the Future, 2006).

In 2006, Alberta education in Canada emerged one-to-one laptop project as a response to an increasing tendency toward one-to-one laptop learning. This initiative involved around 2500 students and nearly 170 teachers in 49 schools through 20 schools in Alberta. Each of the twenty projects purposes to improve teaching and learning for certain students and develop student learning in specific areas (Alberta Education, 2006).

In June 2003, the World Economic Forum at the Dead Sea Conference Centre had launched the education initiative in Jordan. The purpose of the forum was to improve the education in Jordan mainly by the development of 100 Discovery Schools, in which information technology infrastructure would be advanced, e-resources and e-curricula would be employed, and ensure advanced and updated staff training.

There were new approaches in teaching and learning took place in Discovery Schools by assistance with partners to raise teacher ability to deliver e-content, increase the utilization of e-curricula and create ICT-based delivery of new educational instructions that assists knowledge, inspiration, and innovation in Jordan. Through this approach, teachers were given laptops and projectors as well as digital whiteboards to merge ICT into daily teaching so the students would be exposed to and familiar with technologies. Now the 100 Discovery schools are set up with laptops, computer labs, and multimedia projectors.

## One-to-One Laptop Initiative in Education

Wireless-enabled laptops provide students with frequent and immediate access to the Internet and educational software. Penuel (2006) proposed that this places digital technology in an integral position with student learning and teacher instruction. With

increased access to resources to support student learning and tools to plan and organize learning, students can communicate with their peers, teachers and the wider community and undertake collaborative tasks in ways never imagined before.

The main elements of educational processes are the interactions between students themselves, and the interactions between teachers and students, which come via incorporation of technology in the classroom (Abbad, Morris & de Nahlik, 2009). Teaching and learning became more student-centered, as students needed to be trained to integrate and use their laptops in preparing and displaying their projects, designing web sites, building databases and publishing multimedia programs. It is also used as a knowledge constructive and information exchange tool, an easier and faster communication tool as well as to virtualize the classes. This means that each teacher can send invitations to the students and start a virtual class or exam. Additionally, some programs are used to virtualize learning "such as Geometer Sketchpad, Carnegie Algebra, and Aleks" (Lei & Zhao, 2008, p. 108).

Using laptops in classroom for preparing students' assignments canceled the presence and passing of papers between the students and did not make them spend long time for writing and language checking. Students can also see others work for more suggestions and corrections.

Teachers are also involved in this innovation. As stated by Holcomb (2009) teachers used this innovation for preparing their researches, lesson planning, improving the class instructions and facilitating the communication with other teachers within or outside the campus. It was also revealed that more than 70% of teachers could meet the curriculum objectives and meet each student needs when they effectively integrate technology tools in education.

## Education Vision With Technology

It is essential to keep in mind that laptops are only a tool and they are proposed to make learning easier, meaningful and more enjoyable for children (Holmes, 2008). In

2003, Capper listed the following goals of using technology in teaching and learning:

- Enhance content areas.
- Improve essential skills such as using media and formats to communicate with others, use different ways to access and exchange information, analyze information, draw conclusions based on collected information, be independent in learning, assist in team work, cooperate with peers in appropriate and ethical ways.
- Increase students and teachers motivation.
- Change the subject instructional method to be student- centered.
- Improve student- teacher and teacher- teacher interaction.
- Encourage collaboration and creativity.

National Science Foundation's Advanced Technological Education program has funded a project called Probase that is designed to create an education based on technology for $11^{th}$ and $12^{th}$ grade students. The major purpose of this project is to enhance technological knowledge, provide technical content in order to construct student learning based on problem solving and build on the requisite for a high standard technology integrated curriculum (Wyse-Fisher, Daugherty, Satchwell & Custer, 2005).

Examples of goals expressed by six countries that have integrated technology in their schools shown in **Table 1.**

**Table 1: Goals for School-based Computer Use in Six Countries**

| COUNTRY | GOALS |
|---|---|
| Barbados | • To provide better motivation for both teachers and students;<br>• To enable schools to provide better educational management;<br>• To assist students in mastering the requisite skills and competencies of a computerized world; and<br>• To enhance the teaching of subject matter of the various curricula offered. |
| Chile | • To promote cooperative learning, higher-level thinking skills, data management, and communication skills. |
| Costa Rica | • To contribute to the improvement in the quality of education;<br>• To provide access to technology to children in rural and marginal urban areas;<br>• To stimulate creativity, cognitive skills and collaborative work;<br>• To rekindle teachers' interests in teaching; and<br>• To provide students with new learning environments and opportunities. |
| Egypt | • To improve the quality and relevance of education through improved access to information for teachers and students and work-related skills; and<br>• To provide a means of communication within the education system. |
| Jamaica | • To integrate technologies into the curriculum;<br>• To foster literacy and numeracy acquisition through computer-assisted instruction in primary schools;<br>• To electronically network rural schools; and<br>• To expand software available to educators. |
| Turkey | • To promote active involvement of students in individual and collaborative work;<br>• To enrich institutional activities through various kinds of multimedia instructional software and web-based materials;<br>• To enrich the interaction among students, teachers and other schools;<br>• To promote multidisciplinary and authentic tasks, covering more than one course and real-life applications; and<br>• To integrate of IT skills into the existing curriculum. |

(Capper, 2003, p.61).

Many research findings have realized that part of the goals is really achieved by using technology into education process. Riel (1992) conduct a study which discovered that students were motivated when they participated in learning with technology, better understand of content area and have better skills to solve difficult problems. More than 100 studies review discovered that using technology in schools and classrooms play an important role in improving students' attitude toward learning and enhance the skills of problem-solving, encourage student cooperation in-group project, convert teaching approach from teacher- centered to a more student-centered and is of great benefit for students with low achievement.

# Student Performance. Does It Improve With Laptops?

When technology is used appropriately, it provides a more student-centered environment where they become the main and the active constructors of their learning environment while working in various tasks. Furthermore, the project afforded students a wide opportunity to engage with various subjects through writing and publishing, emailing, messaging, lesson preparation and presentation and online chatting with other students and teachers to build up ideas and opinions.

The most important target of the one-to-one project, is improving student learning and academic achievement, facilitating a differentiated, problem-based learning environment demanding higher-order thinking skills, fostering more collaborative, inquiry-based learning as well as skills improvement and how it influences the student achievement and scores in different subjects areas (Bebell & Kay 2010). Students can also do more work faster and with higher quality, learn and study easier when they use their laptops.

> It was found that students in the one-to-one e-learning program earned significantly higher test scores and grades for writing, English-language arts, mathematics, and overall grade point averages than students in non one-to-one programs. In addition to improved test scores, increases and improvements in student learning were observed (Holcomb 2009, p. 50).

In a research study conducted by Hembrooke and Gay (2003), students who were permitted to regularly use their laptops during class did not achieve as well in memory tests as those students who were told to close their laptops. The study focused on students using laptops browsing behavior and found a significant relationship between browsing efficiency and performance. Practice and time expand and develop students browsing ability. Interestingly, students using laptops who did not performed well in the memory test had otherwise good marks when they multitasked normally during lectures to complement their learning.

# Learning in a Digital World

Integration of laptops in education can expand the variety of learning activities for students. In the classroom, teachers guide and become partners in learning while students are the designers of their learning with their laptop as the toolbox.

Digital experience changed the way of communication, social relations and entertainment, further more; it changed the concept of teaching and learning (Lei & Zhao 2008). Many students depend on their laptops for doing different activities such as:

- Writing which is the most common use of laptops. Taking notes, recording observational notes during the lesson is a fast and efficient way than hand writing in a hard notebook. Also, writing in a laptop is much easier for teachers to check, assess and provide feedback.
- Access and use information and data to conduct research. Students can use laptops with Internet access anytime and anywhere to search for background information to contextualize learning and find current data in a wider variety of resources. They can also access online database, watch online videos, use animations to assist understanding of concept, download images, analyze data and listen to podcast. Many teachers believe that students are more involved in research using laptops.
- Students researching on the Internet to access interesting and informative websites to generate discussion strengthen information; extend existing knowledge and link to new knowledge. Students can also prepare background information for the next lesson.
- Students have opportunities to create presentations and project works. They can design multimedia presentations and create personal webpages.
- Using class website to post assignments, publish student work as well as create a collaborative workspace. The website can also contain course outlines and materials, calendars and work samples.
- Laptops are used to extend learning by viewing simulations or movies and using 3D models to visualize scientific ideas. Simulations, movies and

animations stimulate students' senses and thinking skills.

- Laptop environment provides a value to formative assessment that improves quality of the assessment and decreases the time and effort. A study for Zucker & Hug (2007) found that Teachers believe that using laptops for assessment provides more detailed and complete feedback with electronic students' access.
- Teachers had greater access to Internet and online resources used for lesson's planning, supporting curricular activities, helping them to support students with different needs to present the lesson content in different styles (Zucker & McGhee 2005 in Dunleavy, Dexter & Heinecke 2007, p. 441). They are also able to submit their marks; students' feed back, grade electronic assignments, following student improvement and share them with other peers or teachers.

## Science and Technology

Conventionally, science teachers considered content and inquiry as challenging requirements and argued that applying the new criteria and making the balance between the two requirements existed as an impossible target (Edelson 2001). However, under the pressure of the new National Science Education Standards developed by The National Research Center and because of the unsatisfactory performance of the students in science, the requirement for moving further than the traditional methods of teaching became greater. That guided to integrate technology as a methodology that can combine content and practice for the student (Crismond, 2001; Edelson, 2001).

A series of studies conducted by Roth (2001) show what and how students learn about science when they are involved in technology-based activities. His research concluded that using technology to do class activities influences learning science in different means. He stated that when technology is merged in learning science, it helps the students to build ''inspectable and arguable'' ideas (Roth, 2001, p.776). The efficient use of technology helped the students to share their ideas with other peers and encourage them to inspect and critique so assisted in building their accountability for

ideas. This demonstrates that integrating technology in learning science allow the students to conduct a vital discussion and participation in the classroom until they improve their scientific discussions and their scientific views.

Roth (2001) also observed that performing activities through technology developed the students ability to construct scientific concepts while in teacher-centered classrooms, teachers have a problem to realize whether the student understand a definite scientific objective and the basic level where the student stands on. Roth (2001) also determined that as students' attitudes varied with technology use, the frequent use of technology could develop their self-confidence and improve their motivation.

Researchers like Lave and Wenger (1991) and Roth (1995) studied the types of the students that begin to emerge technology in the classroom. One of the most important traits of the science-technology classroom is that learning becomes active and therefore, it is called ''a community of practice'' (Roth, 1995, p.475). Within the classroom, the resources the students share and the practices they are engaged in may affect their learning. Students also show evidence of learning by gaining common viewpoints, manners and standards (Roth, 1995, p. 475).

McGinn et al. (1995) also found that ''knowledge introduced by the teacher was less appropriated by the community than knowledge introduced by a student''. This suggests that supporting collaborative science learning is needed where the students can acquire knowledge from their peers through technology.

In science labs, using probes to gather information has been common for a long time (Mokros & Tinker, 1987) and has changed to the handheld environment (Tinker & Krajcik, 2001). Recently, handhelds have been used in sharing simulations that allow students to conduct experiments that reflect real-world phenomena varying from traffic to genetics to the spread of disease (Collela, Klopfer, & Resnick, 2001; Wilensky & Stroup, 2000). Importantly, many science-learning styles have moved between indoor and outdoor spaces. For example, Graham (1997) described students

who used handhelds in order to prepare for a visit to a garden, record observations and measurements during the visit, analyze the collected data, draw a conclusion and write a report. A recent research described mobile butterfly-watching and bird-watching learning systems for supporting independent learning. Hsi (2003) defined a "nomadic" system for developing the content of displays in a science museum.

## Teachers Attitudes and Beliefs

Teachers beliefs have an enormous effect on one-to-one program implementation. A teacher's professional learning, pedagogical approach and subject-matter expertise can influence uptake of technology (Penuel 2006). Teachers need to be convinced and feel confident that laptops can enhance teaching and learning. Then, teachers are more likely to integrate technology into their practice.

Teachers are also influenced by beliefs about student abilities of using laptops. Teachers who believe their students are able to work independently and collaboratively are more likely to allow students to choose topics to research on laptops. Moreover, teachers who agree on student-centered mode learning but relied heavily on teacher-driven mode have a negative mutual effect rather than a positive one (Liu 2007). However, teachers can modify their attitudes after seeing what students can do with laptop programs and multimedia tools and start to set more challenging tasks.

Teachers have concerns about students' use of computers in tasks not related to research and learning where a focus on policing student's online behavior can distract from the content of the lesson and erode trust. Another area of concern is the negative impact on students learning with reduced face-to-face interaction when students' time is spent on computers lessening social engagement between peers.

In a study by Donovan, Hartley, & Strudler (2007) found that at the early stages of one-to-one program, teachers concern about implementation fell into two views.

Majority of teachers were concerned about the impact of using laptops on their individual planning time as they would have to learn how to adjust their current instructional approaches. Few teachers were concerned about the best way to integrate the laptops so that they could be more confident of implementing useful activities in their classroom. This study suggested that professional development should target the teachers' individual concerns and also should be tailored to address those concerns

Donnovan, Hartley & Strudler (2007) also utilized Hall & Hord's (2001) Concerns-Based Adoption Model to determine how middle school teachers viewed their worries about the technology initiative. They found that, understanding teachers' concerns about technology implementation may have advantages for school leaders who react to teachers' requirements as they adapt to a new learning environment.

Giving teachers the opportunities to express their concerns can help them feel aware of change and help them with building a better understanding of the expectations that drive their responses to the initiative.

## Technology Classroom Management

In a multiple site international study, Jaillet (2004) studied if students were more familiar than their teachers with technology use and the laptop potentials for learning. He emphasized the number of particular ways students used laptops that were not necessarily related to instruction, such as sending emails to their friends, chatting, electronic messaging, and searching for information. In that way, Laptops can cause disruptive and competitive interruption in class, needing teachers with strong classroom management skills to decrease the rate and impact. Classroom management is a matter when the teacher provides a full control on students in what information they seek and when they search.

In a previously cited study, Dunleavy, Dextert and Heinecket's (2007) multi-site case study found that teachers who tried to have their students research using computers could hardly keeping their students on task, particularly if they struggled with

classroom management implementation. However, students will be supported to new depths by laptops adding the struggle for teachers dealing with technology-rich classroom protocol.

Another research conducted in early 1970 confirms teachers' opinions regarding the limited ability of students' engagement in simultaneous tasks. When students are not fully engaged, they talk, look out the window and write notes. This is expected.
A literature in One-to-one computing (2009) suggested some classroom management strategies during implementing one-to-one laptop initiative. For example, issue a set of rules relating to laptop use; circulate around the class to supervise students' screens and online work behavior. Additionally, Students must close their screens when doing non-computer tasks to keep their attention focused.

## Limitations of Technology Integration

Curriculum specialists and planners may choose not to incorporate technology into the curriculum due to a number of reasons. The most significant reasons are:

### 1. Technology Accessibility and Reliability

Few education planners at the planning stage may guarantee that all students have enough and equal opportunities to use computers and access the Internet in order to achieve the technology project goals. Therefore, at this stage, resources for connectivity, hardware, software, teacher development and technical support should be considered to make sure of effective implementation of the initiative.

Schuldman (2004) states, "on a most basic level, if districts expect teachers and students to adopt technology as a core instructional tool, then clearly access to instructional technology resources is not a condition, but a precondition". Findings in his research on using computers and accessing software are summarized in a statement from a participant in the study: "Reliability is the biggest thing; it has to work when you turn it on. You have to be able to get where you are going without the

computer freezing on you" (Schuldman, 2004).

His findings also brought the following irritations from another participant: "The hardest part of implementing a program is a lack of access to computers or lack of computer time in the computer labs" (Schuldman, 2004). Another participant commented, "I have not implemented what I've learned because of the limited access to computers and the lack of working computers" (Schuldman, 2004).

## 2. Time Available to Integrate Technology

Teachers who have adequate skills to use technology in teaching and learning will not use it in a professional way because they do not have enough time to prepare and practice the types of lessons best supported by technology.

Recently, one of the most important concerns emphasized by many teachers, researchers and others is that "most curricula cover far too many topics at a superficial level, and seldom address topics in sufficient depth to promote deep-level understanding" (Capper, 2003, p.61). Studies indicate that when the students learn insulated facts for an exam without practice, they quickly forget them. Therefore, teachers who seriously plan to implement student-centered learning with technology integration, constructivist approaches complain that they are to cover the overly full curriculum. Also, teachers who are beginners to use technology and eager to use it emphasize on the problem of very tight curricula.

Byrom (1998) reports that integrating technology in the curriculum could be a slow process and require enough time, support and encouragement. Some participant's comments in Reel (2009) support findings from Byrom's (1998) study about the time needed to integrate technology into the curriculum. They stated, "My issue is dealing with time constraints and trying to keep up with the changing technology" (Reel, 2009). Another participant emphasizes the disappointment because of not applying what was learned from professional development sessions. They commented, "There just does not seem to be enough time to implement some of what I've learned during

district-led technology workshops" (Reel, 2009).

An obstacle for teachers to integrate technology has been the insufficient time to join professional development sessions; gain new skills to use technology, and reveal on the way the technology will integrate into the curriculum (Schuldman, 2004).

## 3. Teacher confidence to integrate technology into the curriculum

The problem of not integrating technology in a formal way into the curriculum is that many teachers either feel that technology use is overmuch tense to be implemented in classrooms with technical support problems, or are satisfied with their current method of teaching.

Kerr (1996) claims that using technology in classroom activities needs

> "a radical shift in both teaching style and the teacher's vision of what classroom life is all about. This new vision is one that changes the teacher's role in basic ways, reducing the importance of 'chalk and talk', increasing the need for sensitivity to individual students' problems and achievements, shifting how classrooms are laid out, how evaluation is conducted, how teachers relate to their colleagues, and a hundred other particulars of daily life in schools" (p. 24).

Moersch (1995) discovered that teachers with beginning level of technology literacy and technology skills either overlook technology implementation or start with the technology level that they think they can control. He concluded that teachers with high technology confidence and technology skills were motivated to use higher levels of technology in their classrooms. Teachers with entry levels of technology confidence and skills appeared to accept utilizing technology in a comfort way within their knowledge areas. In Reel (2009) participants commented:

> "I get students to access the computer to do assignments, integrate graphs and pictures into their work, access search engines and type their work. But I only do what I know I can do. I am not going to go and try something with my students that is

out of my comfort zone".

Byrom (1998) stated, "no matter how many computers are available or how much training teachers have had, there are still substantial numbers who are 'talking the talk' but not 'walking the walk'". She also mentioned that computers technology has been in schools for more than 20 years that, however, many teachers have certainly not used them as teaching resources.

Other researchers found that the most crucial obstacle of using technology is that teachers do not find it easy to integrate technology into the curriculum of a regular classroom or lab setting (Atkins and Vasu, 2000).

## 4. Technology Impact on Student Learning

Voogt et al. (2005) found that when there is a lack of educational technology skills, teachers will not implement technology in an effective way in teaching and eventually students learning will not be improved with technology. There has been an argument on the effect of technology implementation on student learning and the enhancement of student feeling towards learning when technology is implemented. Schacter (1999) stated that when technology is used, students enjoy their classes more, learn in less time and develop more positive attitudes about learning.

Archer (1998) also showed the progress in the school environment when teachers integrate computers technology in teaching "higher-level thinking skills" (Archer, 1998) when they have sufficient technology training on the effective use of technology in education.

In some countries that have high level exams, the stress to "cover the curriculum" (Capper, 2003) is highlighted, and anything that may slow the student improvement in exams or does not support students' achievement is taken into consideration, involving the use of technology. Some teachers are not encouraged enough to involve the students in tasks that need technology use either because the teachers are

overloaded to finish the curriculum or the students are not well prepared to use technology.

## 5. Professional Development

Professional development is considered very important for teachers to integrate technology in the curriculum. It could be conducted in two areas: "School-based development and Follow up of professional development" (Reel, 2009).

### a. School-based professional development

Teachers who accomplish success with "school-based professional development" (Reel, 2009) realized that there is a complete relation between the workshops, the technology available and the effective use of laptop technology in schools . Russell and Bradley (1997) study findings found that there is a shortage of follow up after professional development sessions and consultation. One respondent in the study conducted by Russell and Bradley (1997) claimed that the follow up was really one of the main benefits of "school-based technology workshops" (Reel, 2009). Professional development in technology is often considered unsuccessful because of the insufficient technology resources such as the access to hardware and software.

### b. Professional development follow-up opportunities

Lacking of development follow up is considered as an important problem in technology workshops. Participants in Russell and Bradley (1997) study cited "The more practice that I have, the better it is. Workshops are on a one session basis and I need more follow up than that". An interview with another participant in the same study indicated that, "Whenever I learn something new after a professional development workshop, I always have an bunch of questions that I need to have answered immediately. Face-to-face or email follow up can both work well" (Russell & Bradley, 1997).

Cooperation is essential to the spread of technology use. As stated by Becker and Ravitz (2001), teachers who cooperate with other teachers to share technology knowledge are more skilled to train their students use computer technology effectively in the classroom than the normal teacher. This statement ensures the importance of the development follow up to inspire cooperation from other support teams when teachers need to integrate technology into curriculum.

## Educational Technology in the United Arab Emirates

In the Middle East, the United Arab Emirates (UAE) provides an extensive education to all students either male or female and offers education for the UAE citizens being free at all grades. There is also a great achievement in establishing private schools and much has been attained since 1970. However, more efforts were put to improve the educational level for all students in order to meet the needs of the 21$^{st}$ century.

Today, the UAE is considered to be one of the countries, which aim to enhance education by integrating technology and use it as a tool to promote the students achievement. The policy of implementing technology has wider ambitions such as encourage technology skills and efficiencies within the curricula, to improve learning with technology during the class time and after that, and to support students to improve the skills required for them to be effective members in the knowledge economy.

The achievement in the education improvements that reflect the progress of the learning skills in the 21-century has become equal to the invested money in the technology infrastructure in schools. There are many initiatives around the country that reveal this relationship.

H. H. Sheikh Mohammed Bin Rashid Al Maktoum as part of his educational strategy to create the UAE knowledge economy initiated the IT Education project (ITEP) in the year 2000.

At its initiation in 2000, ITEP started by teaching ICT in schools and providing teachers with a professional development training that is important to get a recognized international qualification in using ICT to enhance teaching and learning. The training benefits for teachers were described as:

- Developing teaching practice.
- Integrating new skills to apply ICT learning practices and evaluate ICT students.
- Improving student abilities and contributing to the achievement of the schools.

The outcomes of these initiatives can be assessed through "school inspection and review reports" (Dubai Schools Inspection Bureau [DSIB], 2010).

For more infusion of technology in schools, in 2008 the Ministry of Education has signed an agreement with Etisalat to provide the public schools with IP/MPLS Internet (Ministry of Education, 2008). The aim of this agreement was to encourage the students to achieve the highest education level, improve their learning skills and to place the UAE in the top rank globally in term of integrating technology effectively in education.

Another initiative implemented in the UAE is the Higher College of Technology (HCT) laptop program that started in 2000 by distributing ThinkPad notebooks to the students in order to ease their work during and after the college timing. The initiative also aimed to develop the students' technology and researching skills. Afterward, the project was expanded to cover more than 7000 Think pad users in 2010. "At HCT our priority is to ensure our students get the best education. Providing the students with these laptops will support them with the best IT technology; provide them with the technical skills to operate in an increasingly complex technological world and assist them to effectively contribute to the nation-building process," HCT Vice Chancellor Dr. Tayeb Kamali said.

> Integrating technology has been expanded to Al Mawakeb private school, which is the first school in the UAE to have wireless and laptops as an

> effective replacement for hard-copy materials through its 'Notebooks for Books' initiative. Intel and school managers found that "Education is key to the economic future of the UAE and the region, and to the welfare of our young people."

In the school, students used laptops instead of books and benefited from using white board instead of an outdated blackboard. Students got valuable benefits from the initiative as they are able to download subjects' materials, and concerned people can easily track student attendance digitally.

In 2005 the Institute of Applied Technology (IAT) had launched five high schools across the United Arab Emirates and had implemented one-to-one laptop policy in their educational system since 2009. The schools have signed an agreement to provide each teacher and student with Apple Mac notebooks powered by Intel processors. The schools implemented this project to meet the demands of the 21st century, through encouraging the students for self study, creating a learning environment which goes farther than the classroom and the class time, provides fast and easy ways for searching and browsing as well as allowing the involvement and engagement of the students in the educational process.

"This initiative is extremely important for the future of education in the UAE. At IAT we strive to provide our students with a strong foundation for learning and believe 1:1 computing is an excellent platform to help students realize their full potential. We are looking forward to the full roll out of the curriculum and hope to integrate this into our educational system within a suitable timeframe," stated Dr. Abdullatif Al Shamsi, Director General, IAT. "IAT is the first school in the region to fully implement a 1:1 computing model, with a laptop being made available for every student and teacher, in addition to the required IT infrastructure," stated Shelly Shott, Intel Senior Education Manager.

# Chapter 3: Research Methodology

## Research Design and Methodology

The main purpose of the research was to study how teachers and students participating in the One-to-One laptop initiative made "sense of their world" (Merriam, 1998, p. 6). The research design used was an exploratory mixed method case study of a high school during the third year of implementation of the project. The case study helped the researcher "gain an in-depth understanding of the situation and meaning for those involved" (Merriam, 1998, p. 19) by collecting information that develop an accurate description of any circumstances surrounding the project. Furthermore, the case study gives an outline to arrange the process of data analysis and could be a way to document the analysis (Carlson, 2007). In order to gather data about students and teachers' perceptions and how it affects their laptop usage in teaching and learning science and consequently wither or not this will affect the students' achievement in learning science, the researcher used an exploratory design. This design allowed for using qualitative and quantitative data to explore teachers and students viewpoints and study wither they have effectively employed the laptop technology in teaching and learning science by analyzing data collected from surveys distributed for both students and teachers under the project followed by a qualitative study of the students science marks. The mixed method design was found suitable for this research in order to gather a professional and comprehensive understanding of participants' beliefs and perceptions (Methods in education research method, 2010).

In this research the emphasis was put on collecting quantitative and qualitative data as the main objectives were stressed on the teachers and students opinions, applications of the laptops in studying science and the students' outcomes in terms of analyzing their science marks during the third year of implementing the one-to-one laptop initiative. The qualitative data were collected through teachers' questionnaires with open-ended questions to allow teachers express their feelings and opinions about the

initiative. However the quantitative data was collected from students' responses to questionnaires. The quantitative data aimed to understand the students' perceptions in using laptops to study science, how it has been implemented in the science classroom and how this initiative affects the student academic achievement in science.

The study was conducted in two phases, one phase was the analysis of teachers and students involved in the laptop initiative and the second phase was the analysis of the students marks achieved before and during the project.

## Research Site and Study Participants

In the United Arab Emirates, six secondary schools across the country have been implementing the one-to-one laptop project in their educational system since 2009. The schools have signed an agreement to provide each teacher and student with Apple Mac notebooks powered by Intel processors. The laptops loaded with modern efficient software (iLife, iWork, iChat), have access to the Internet at school and used to complete school tasks, exchanging most textbooks and reducing paper usage.

Applied Technology High School (ATHS)- Al Ain Girls Campus in the United Arab Emirates was the site for the study. There are five campuses in the country initiated in 2005 by a Royal decree of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the United Arab Emirates, with complete administrative and financial independence. The founding of the schools was under the lead of General Sheikh Mohammad Bin Zayed Al Nahyan, Crown Prince of Abu Dhabi. His Highness anticipated IAT as "a world class Career-Technical Education system" (One-to-one e-learning solution, 2009) that creates the engineers, scientists, and technicians required for the UAE to construct a knowledge-based economy.

ATHS is a dynamic ninth – twelfth grade high school, implementing a solid base curriculum. It is keen to provide an educational environment, which offers equal opportunity for Emirati students to involve in and practice technology and professional careers. The school has earned an accreditation in 2009 and become an

accredited school body (ATHS Dubai newsletter, 2012). In June 2009 the schools directorate had signed an agreement with Apple's distributor Company for the Middle East region and Intel's Corporate Affairs Group Director for Middle East Turkey and Africa region to provide each student and teacher with Apple MacBook Pro n order to create an effective and useful educational environment.

"IAT is taking the lead in redefining education by introducing a customized mobile learning environment to each individual learner through One-To-One E-Learning Solution. One of the tools for this solution is to provide an Apple MacBook Pro to every student in order to transform learning into an exciting, fun, and fulfilling experience" (Hussain Al Hammadi Chairman, Board of Trustees).

In order to study the effect of the laptop initiative in science education, it was crucial to spot the light on the concerned members in the initiative. Those are teachers and students who are assumed to be the most affected elements in the project. The study was conducted during the academic year 2011-2012. In this academic year 587 students were enrolled in grades 9-12 and were taught by 15 science teachers.

To recognize how students and teachers participating in the one-to-one laptop project made sense of it, a sample of 55 students from grade 9, and 13 science teachers, were requested to participate in the study. Because the laptop initiative affected the whole school, grade 9 students were selected as a sample as they have got their laptops at the beginning of the second term of the academic year 2011-2012 and that was helpful to assess their achievement after getting the laptops and that reflect the third study objective which was to observe the students achievement in science subject.

However, grades 10, 11 and 12 have their laptops from the past years and could not be included in the study. There was no a control group as all grade 9 students have got their laptops at the same time, so all the students turn under the project and been affected under the same conditions during the same period of time.

# Data Collection Strategies

The data collection strategies in this study were selected to gather data and emphasize on how students and teachers picture the one-to-one laptop initiative. Data collection strategies used was open-ended and closed-ended surveys as well as reviewing previously conducted science exam marks. Due to the researcher involvement in the laptop initiative and in order to minimize the bias in this study all data were collected from all science teachers excluding the researcher. The tools used to collect data in order to answer the research questions are:

## Surveys

The researcher followed the following steps to validate both teachers and students questionnaires:

- Reviewing previously published researches in the same field of study in order to analyze its tools.
- Determining the questions related to the area of study for both teachers and students.
- Designing the questionnaires at its initial stage.
- Reviewing the questionnaires questions and ensures that the structure and the content are matching the research questions.
- Evaluating the questionnaire questions by two chemistry supervisors [2][3].
- Designing the questionnaire at its final stage and started to administer it to the study sample.

The survey was conducted at the end of the academic year 2011-2012 for 13 science teachers and 55 grade 9 students. Both teachers and students samples were sent a hyperlink to access the survey by the end of term two. In the teacher questionnaire, (See appendix A for the teachers survey questions) the design of the questions was open-ended to provide more or wider information. It consisted of three sections. The demographic data section included four questions (gender, grade levels been thought

during the academic year 2011-2012, years of experience and education). The second section consisted of six questions measured teachers' technology skills and perceptions and the two questions in the third section measured the technology implementation. Based on existing research questions, the questions were open-ended questions to allow teachers describe their perceptions toward the advantages and disadvantages of using the laptops in science education and the supportive sessions conducted prior of after applying the one-to-one laptop project. The third section consists of two questions to explain how the laptop technology has been used in science education and any future suggestions for better and effective usage of laptops.

The students' questionnaire design (See appendix B for the students' survey questions) was closed-ended questions with one open-ended question. This design was suitable for grade 9 students due to the language barrier. The questionnaire consisted of three sections. The first six questions were administered to collect demographic data, involving grade level, laptop possession and Internet access as well as the students' science marks prior to using the laptops. The second section composed of two questions addressed the students' technology skills and their perspectives toward the initiative involved a question that tackles the students' image was "likert-scale questions measured on a scale of 1–5, with 1 indicating strongly disagree and 5 indicating strongly agree" (Lei, 2010). The last six questions of the questionnaire addressed the students' laptops implementation in science classroom and ended with one open-ended question to allow the students to describe any suggestion for successful upcoming applications.

## Students Marks Review

In order to explore the students' achievement in science after using laptops in studying science, the researcher collected previously conducted science exam marks. An approval has been taken from the director of high school system [1] to access grade 9 end of term one and two exam marks. This tool is highly effective in this study as it provided real understanding of teachers and students perspectives about achievement in science education with the one-to-one laptop (educational research 2008). The

students' marks were studied in the form of trends in the marks and explore how the students academic achievement is affected when they use laptops to search, explore, analyze and conclude scientific problems.

The students' marks were collected after conducting a system wide science exam. The exam papers were reviewed and approved by the Ministry of Education, which provides some validity and reliability for the tool to be used in the research.

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[1] Kenneth Cadd, director of high school system. Applied Technology High School, Abu-Dhabi, United Arab Emirates.

[2] Esam Eldeen Anwar, chemistry supervisor. Future International School. Cairo, Egypt.

[3] Ashraf Ahmed, chemistry supervisor. Future International School. Cairo, Egypt.

# Chapter 4: Results and Discussion

This chapter explains how one-to-one laptops were used, discusses teachers and students perceptions and then evaluates the impact of the one-to-one laptops program on students' achievements.

## Teachers Surveys

### Section I: Teachers Demographic Data

The 13 female teachers who completed this survey were all science teachers of the Applied Technology High School who teach grades 9 through 12. Two of these teachers (15.38%) had more than 20 years teaching experience, one (7.69%) had sixteen to twenty year of experience, five (39.46%) had eleven to fifteen years of experience, four (30.76%) had six to ten years of experience and one (7.69 %) had less than five years. The following table (Table 2) summarizes the teachers' demographic data.

| Teacher number | 1. Gender | 2. Grade level of instruction | 3. Qualification | 4. Years teaching |
|---|---|---|---|---|
| 1 | Female | 11 | Bachelor | 11-15 |
| 2 | Female | 12 | Master | 20 or more |
| 3 | Female | 12 | Bachelor | 6-10 |
| 4 | Female | 10 | Bachelor | 11-15 |
| 5 | Female | 11 | Master | 6-10 |
| 6 | Female | 12 | Bachelor | 20 or more |
| 7 | Female | 9 | Master | 16-20 |
| 8 | Female | 10 | Master | 11-15 |
| 9 | Female | 12 | Master | 11-15 |
| 10 | Female | 11 | Master | 5 or less |

| | | | | |
|---|---|---|---|---|
| 11 | Female | 11 | Master | 11-15 |
| 12 | Female | 12 | Doctorate | 6-10 |
| 13 | Female | 10 | Bachelor | 6-10 |

Table 2: Teachers Demographic Data

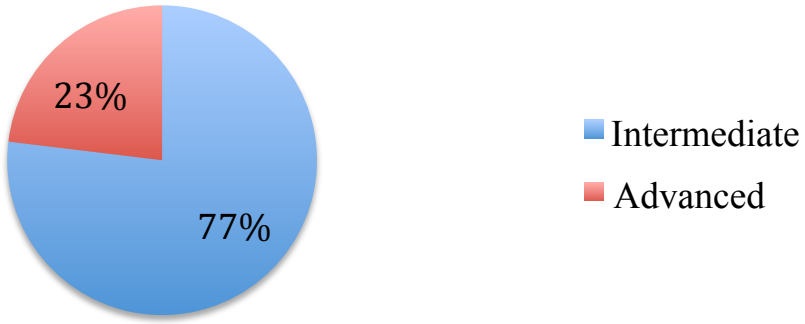
## Section II: Teachers Technology Skills, Professional Development and Opinions

Teacher level of using the laptop technology is influenced by factors for example teacher's technology skill level, involvement in professional development sessions and their perception on the laptop impact on students in learning science.

1. Teachers Technology Skills

How laptops have been used in classes is related to the technology skill levels of teachers. The 13 teachers had evaluated their laptops usage skills between Intermediate and advanced as (77%) had intermediate skills while only (23%) were advanced skilled (see Figure 1 below). No teacher rated herself as a beginner computer user. This indication proposes a main factor affecting the laptops use levels in science classes is the teachers' technology skill levels.

**Figure 1: Teachers Ratings of Their Computer Skills**



2. Teachers Training and Professional Development

Technology training was mainly a positive experience for teachers whether it is conducted prior or after the initiative and teachers were tending to have a positive attitude about technology when they experience a positive training or professional development.

Nine teachers (69.23%) stated that they had participated in professional development on technology usage in science classroom but the quality of the content in unknown. It could be important to examine the quality of these training workshops in order to recognize the teacher's feelings with technology uses.

However, four teachers (30.76%) were not provided with professional development before and during the initiative implementation. The nine teachers were mentioned the areas where the training sessions focused on as in (Table 3).

| Teacher | Professional development areas |
|---|---|
| 1 | The ones that help you to use different kinds of resources like simulations and animations and Vernier equipment. |
| 2 | Smart board, Vernier training. |
| 3 | The ICDL program |
| 4 | The use of educational software in the lab to conduct experiments that improve students' learning and achievement. It makes education less dependent and the computer-aided instruction and creativity and makes the understanding more reliable. Also Computer simulations provide science students with theoretical or simplified models of real-word phenomena. For examples to explain the rate of the reactions with the help of the simulation give the students the opportunity to change features such the use of temperature or particles size and study their affects on the rate of the reaction. The models help them to observe the results. Science teachers can use simulations to prepare students for future learning, to supplement or |

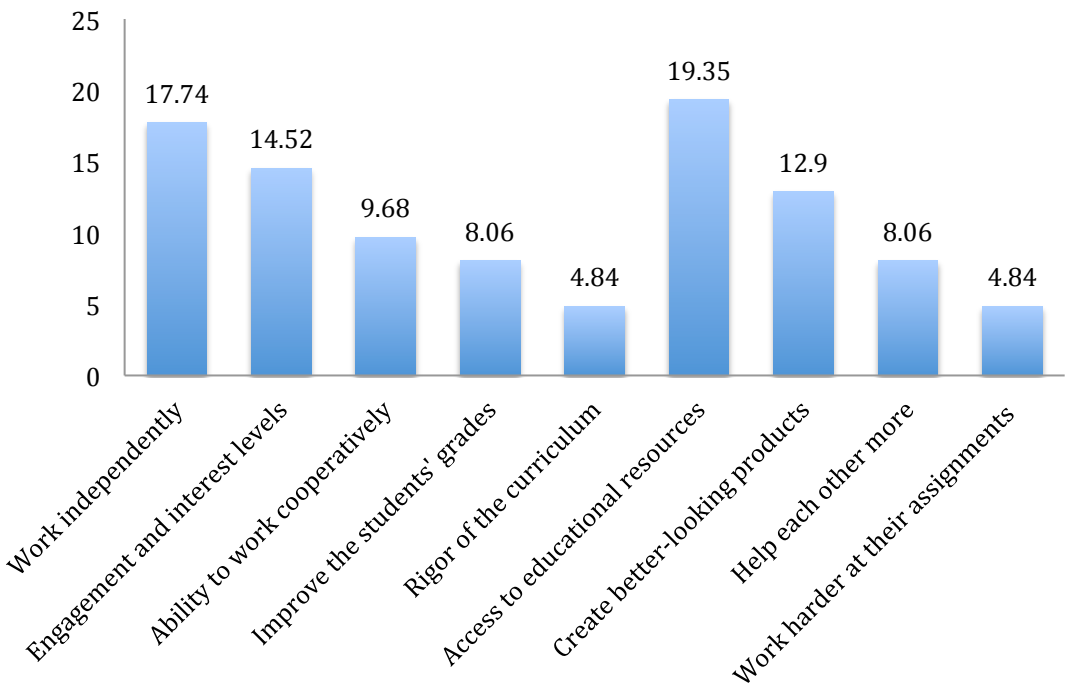
| | |
|---|---|
| | replace other expositions of a topic, or to help students integrate facts. |
| 5 | Intel, IC3, smart board, power lab software, hot potatoes, introduction to Moodle, Eureka. |
| 6 | Use interactive white board |
| 7 | Using programs for plotting points, fitting, and finding equations and corrections |
| 8 | IAT-Tec. workshops for interactive teaching techniques and how to make students participate in a positive way that help them to develop their skills. |
| 9 | No answer. |

Table 3: Training Sessions Conducted by Science Teachers.

3. Teachers Opinions on the Laptop Impact on Students in Learning Science

Surprisingly, all the teachers responded that one-to-one laptop initiative had a positive impact on the students learning. There responses were detailed in the following chart (Figure 2).

**Figure 2: Percent of Teachers Indicating That the Laptop Program Has Had Positive Impacts**




Although it has been observed that 100% of teachers found that one-to-one laptop initiative had a positive impact on students, only eight teachers 61.5% indicated that the laptop program has had negative impacts. Survey responses to an open-ended question did not show that there are major disadvantages of using the laptop in science class, but the most common negative impacts mentioned are:

1. Some students are less responsible and use it to do other issues during the class (e.g., computer games). In some cases, whether or not these activities occur during class time, they may be inappropriate.
2. It has been main source of distraction at many instants. (E.g., When student use of instant messaging, e-mail, viewing different websites and web searching not related to class work).
3. Students are attracted to the copy-paste kind of work plus with the language barrier and students' reading and writing skills have weakened as a result of using laptops.

4. Teacher should follow up with the students, if they use laptop.
5. Long time of usage may have negative impacts on eyes and body.
6. If the school Internet access is weak or not working, this will affect the student engagement in different class activities.

Other study has showed that one of the most important requirements for technology incorporation in education is for teachers to have an idea of amending their teaching approaches to meet different cognitive levels of their students (Levin & Wadmany, 2006). In this research, the participated teachers tended to have a more potential to use technology.

## Section III: Technology Implementation in the Classroom

In the light of results of the study, it could be said that teachers thought that laptops usage was important for themselves and for students as well. When answers for effective usage in classroom have been examined, the following remarkable results have been found:

1. Using laptops in passing on information, some flash games for understanding concepts and conducting online quizzes.
2. Using laptops to show videos, search for different knowledge in the class timing, doing on-line quizzes and worksheets.
3. Student became able to design videos and audios, conduct mini researches about any scientific topics.
4. The quality of student work has improved after using laptops.
5. Showing the students animations, videos etc. in order to explore the lesson objectives.
6. Teachers became continuous learner and eager to learn from the students.

It is obvious in the study that the participating teachers have generally positive attitude about using the laptop technology, so it is probable that little direct and effective use of laptops for teaching can be credited to other related factors, and not low skill proficiency or negative attitude. The outcomes of the study evidently

showed that teachers with positive attitudes and more technology skills are liable to use it for instruction. While, teachers with negative attitudes and technology skills are less likely to use technology for teaching because teachers philosophy usually reveals their opinions more than just have the laptops available (Hernández-Ramos, 2005; Johnson & Howell, 2005).

# Students Surveys

## Section I: Students Demographic Data

The responses were collected from 55 grade 9 students. In the first section of the survey they have provided their demographic data as per the table below (Table 4):

| Teacher number | | Response |
|---|---|---|
| 1.Grade level | 9 | 100% |
| | 10 | 0% |
| | 11 | 0% |
| | 12 | 0% |
| 2. Internet access at home | Yes | 98.15% |
| | No | 1.85% |
| 3. How long the laptop was provided by school | 1 term | 3.64% |
| | 2 terms | 96.36% |
| | 3 terms | 0% |
| 4. Taking laptop home | Yes | 100% |
| | No | 0% |
| 5. Science grades in previous year | 90-100% | 12.73% |
| | 80-89% | 49.09% |
| | 70-79% | 29.09% |
| | 60-69% | 7.27% |
| | < 60 | 1.82% |

Table 4: Students Demographic Data.

The above table shows that all the participated students were grade 9 students and were given the laptops at the same time in term two. Also, all the participants mentioned that the school allows them to take their laptops home where 98.15% students have internet access at home while very few number (1.85%) are not connected to Internet at home.

## Section II: Students Technology Skills and Perceptions

There are many factors affecting the students' level of using laptops mainly the students' technology skills and their perceptions toward using them in science classes. These factors are discussed below.

### 1. Students Technology Skills

The majority of students who participated in this study reported their technology skills as intermediate (63.64%) while a minority (7.27%) ranked themselves as beginners. The percentage of students who found their level of skills in technology to be advanced level was 29.09%. This indication reveals how the students' technology skill levels affect the laptops use in science classes.

### 2. Students Perceptions on One-to-One Laptop Initiative

In general, students participated in the study had positive attitudes about using laptop technology use in science education. The total percentage for the strongly agree scale that revealed the students opinions to laptop usage were satisfactory, indicating students had a positive attitude. The average rating for each factor was described using a scale of 1 (strongly agree) to 5 (strongly disagree) for responses and is showed in Table 5.

| Factors | Average ratings |
|---|---|
| a. The laptops help to search for information. | 1.5 |
| b. Using laptops is better and easier to create presentations and projects. | 1.8 |
| c. I prefer using laptops to the paper and pencil to take notes in class. | 2 |
| d. Laptops help in organizing information. | 1.7 |
| e. It is better to communicate using e-mail. | 2.1 |
| f. I prefer using the laptop to take a quiz, test, or assessment. | 2.6 |
| g. Laptops make me more interested and motivated in doing schoolwork. | 2.1 |
| h. Having a laptop has improved my grades. | 2.3 |

Table 5: The Positive Impact of Laptops on Students.

Respondents revealed (89%) as a positive usage to search for information and (78%) attempt to use their laptops to create presentations and projects. Around (64%) of the students preferred using their laptops to the paper and pencil to take notes however only (51%) would like to take quizzes using their laptops. Students in the study (85%) showed that they would consider using laptops when organizing their work and (73%) replied that laptops could be used to communicate with teachers and peers through e-mails. Approximately (69%) of students who responded in the survey indicated that laptops technology could improve their interest and motivation to complete science work. Based on the previous figures, it is surprising that only (58%) students stated that the use of laptops in science class has improved their grades.

## Section III: Technology Implementation in the Classroom

Students were asked to report their supposed level of laptop use in science class and at home. The average time period that most of students (54.6%) have chosen was 15-30 minutes in a 90 minutes class. The majority (43.6%), however, ranked themselves as

middle users of laptop at home where they estimated their average use of the laptops is 3-5 hours daily. Students were asked to report their experience in having their laptops damaged and how long does it take to fix it. The results indicate that the most of them (70.9%) never have their laptops damaged whereas the time spent to fix their laptops was varied. Same percentage of students (31.6%) reported that they stayed without laptops for the time periods 1-7 and 8-14 days while 26.3% got their laptops in less than one day. The minority of students (10.5%) indicated that they spent more than 30 days without their laptops in science class.

## Findings From Students Marks Review

Quite more than half responses to students' survey (58%) stated that using laptops in science classes has contributed in their achievement in science grades.

To study the variations in student academic achievement after using laptops in science classes, students' marks at the end of term one of the academic year 2011- 2012 were compared to the end of term two in the same academic year in which the one-to-one laptop initiative was applied. Table 6 below illustrates the results of Paired Sample Test on student marks. Table 5 shows that there is an increase in the student marks over the academic year (Mean 1= 53.59, Mean 2= 62.63), and this increase was significant ($t$ = -2.481, sig .016, see Table 7). Yet, we must be careful in outlining any conclusions on the influence of the laptop use on the in achievement of student science marks, since student performance, particularly academic results measured by marks, is affected by many elements. Technology practice is considered one of these elements.

The effect of using technology on student results is not determined only by the specific technology uses in science classes, but other environmental factors, the students technology skills, educational practices, as well as the parents, curriculum, administrative, and school technical support.

Consequently, it may be impracticable to assume significant improvement in student academic performance through specific or limited technology uses. Furthermore,

student marks were evaluated by traditional ways of evaluation, which could not be an exact assessment of student learning science with technology.

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| | | | | | |
| Pair 1 | EOT1 Science | 53.5965 | 57 | 19.40072 | 2.56969 |
| | EOT2 Science | 62.6316 | 57 | 19.30269 | 2.55670 |

Table 6: Paired Samples Statistics

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Pair 1 | EOT1 Science - EOT2 Science | -9.03509 | 27.48959 | 3.64108 | -16.32906 | -1.74112 | -2.481 | 56 | .016 |

Table 7: Paired Samples Test

# Chapter 5: Implications and conclusions

## Implications

This study investigated the effectiveness of implementing one-to-one laptop initiative, teachers and students attitudes about the initiative and the relationship between technology use and student results by studying how technology was used, the quality of technology use and the students achievements in terms of science marks.

### 1. Relationship between laptop use time and student achievement and technology skills

It has been expected that if too much time is spent on using laptops at home to study, the students will perform better in exams. In this study, when the researcher investigated the time students spent on using laptops in school and at home, there was no significant relationship found between laptop use time and any student achievement, since only 3.64% and 21.82% spent the maximum time in science class and at home in using laptop technology respectively. However, when students indicated how laptop technology was used, a significant relationship was recognized between technology use student technology proficiency.

### 2. Relationship between laptop use and student achievement in science

This study showed that it could be unrealistic to assume significant changes in student outcomes through specific technology uses. There are many other factors that could affect the student performance in science subject besides laptop usage. Other factors include student technology skill, educational practices, as well as the parents, curriculum, administrative, and school technical support. Furthermore, the method that was used to evaluate the students was a traditional assessment method, which could not be an exact assessment of student learning science with technology. “This might be disappointing to some people in that a major argument and goal for

integrating technology in schools have been to improve student achievement" (Lei, 2010).

Recent days students have the chances and resources to investigate away from the borders of the classroom. Students use different techniques to solve a problem such as searching for online information, making PowerPoint presentations and creating websites. However, the assessments were not different from earlier traditional activities.

A teacher pointed out "student learning with technology was difficult to measure because much of this kind of learning was hidden". Another teacher commented, "I don't think we have a way to evaluate it yet, or we don't ask the right questions to find out what they did" (Lei, 2010).

## 3. Set specific goals before laptop project integration

It is significant to establish well-defined short-term and long-term goals even before purchasing and installing in schools because studying the initiative goals carefully and how technology practices impact the student performance would facilitate the implementation process in schools and accurately measure the effectiveness of laptop uses. "It has been pointed out that schools have often been uncertain about the outcomes they want to achieve with technology and this uncertainty can and probably often result in a waste of money, inappropriate purchase and teacher preparation in the process of technology integration" (Lei, 2010).

It is essential for policy makers to ask these questions before implementing to one-to-one initiative in schools:

- What skills do students require to improve?
- What practices teachers should perform daily?
- How can laptop technology support achieve the initiative goals and assist the technology practices?

According to the provided information in this study, teachers and students should be given a clear idea and understanding of the reasons behind laptop use in education. Also, the influence of laptops use could be evaluated in more effective and valid ways.

# Recommendations

In order to effectively integrate technology in the science classes, the researcher recommends the following to effectively integrate laptops technology in science education and to other recommendations to improve future researches.

## Recommendations to the Initiative Policymakers

Technology specialists involved in the initiative should consider some areas in the planning stage. The following recommendations are addressed: (1) teachers attitude toward the integration of technology in curriculum, (2) recognize of the importance to integrate technology in the curriculum and (3) organize more effective professional development workshops.

1. Teachers awareness toward the integration of technology in curriculum

Teachers' awareness strongly affects the technology integration in schools. There are different attitude areas that affect technology integration into curriculum includes, teaching methodologies, "teacher technology self-efficacy" (Ross, Hogaboam-Gray & Hannay, 1999) and specially their feelings about using technology in education.

Increase the teachers' awareness of the effective use of technology in teaching and learning is essential to improve the students learning outcomes. Various researches findings "suggest that many teachers feel that the integration of technology into the curriculum does not necessarily enhance student learning" (Reel, 2009).
However, a literature review by Schacter (1999), suggests that technology has not only had an effect on student learning improvement, it also enhances "positive

attitudes and improves student attitude and confidence" (Reel, 2009). The insufficiency of teacher technology skill could be a main factor that adds to the fail of technology to improve student learning. Voogt et al. (2005) discovered that teachers might have a high level of technology experiences and skills; however, they do not have equivalent level of teaching skills. This may conclude that teachers could have proficient level of technology training but do not know how to implement it in education and to increase the student achievement.

To increase the awareness of teachers toward the integration of technology in curriculum, the following are some suggestions that could improve this area:

1.1. Curriculum specialists should develop the efficiency of technology integration in curriculum with the assistance of experts in technology field, who are able to show the effect of technology use on student learning enhancement.
1.2. The school should make the integration of technology in teaching a school main goal.
1.3. Allow teachers to make peer observation in order to get knowledge in using technology in classrooms and get the benefit of it.

2. Recognize of the importance of teachers to integrate technology in the curriculum

Understanding of teacher attitudes towards using technology and also the availability of technology resources like hardware and software is very important to recognize the needs of technology in curriculum. Some teachers have a level of concern towards technology and its integration into the curriculum. Brosnan (1998) created the phrases technophobia that is related to the extreme anxiety of new technology. If the curriculum specialists aware of teachers anxiety towards integrating technology in curriculum, it will be much easier to understand that and consider it in the integration stage. The following recommendations may help teachers to overcome the challenges they face while learning to integrate technology in the curriculum:

2.1. Provide regular professional development for teachers emphasizing on the

teachers anxiety towards utilizing technology and integrate technology workshops for teachers at the beginning stages of technology implementation.

2.2. Offer time for professional development in the absence of the students with the main theme of integrating technology into the curriculum.

2.3. Assign time for teachers to practice various technology skills, time to create technology integration plan, and time to suggest different ways to integrate technology into their curriculum.

2.4. Provide different and valuable technology related educational resources, which facilitate the teacher teaching strategy.

3. Organize more effective professional development workshops.

Teachers' professional development in schools may need improvements in order to provide teachers with chance to learn effective ways to integrate technology into the curriculum.

> Teacher preparation should not be based on training for 'computer literacy' but should prepare teachers for using technologies to construct, represent and share knowledge in real life authentic contexts. (Vrasidas & McIsaac 2001, p. 129)

Teachers should be given appropriate professional development and give more time for less experienced teachers to improve their technology skills by practicing with other advanced technology users. As teachers' technology skills improved, the implication of different instructional methods will be improved as well (Holcomb 2009).

It is also important to understand teacher difficulties that block the integration of technology into the curriculum such as lack of confidence in their technology knowledge and skills, any concern during the implementation of technology in the classroom, and shortage of time provided for professional development workshops must all be considered when designing the curriculum. The following are some

suggested recommendations in order to improve professional development opportunities:

3.1. Increase teachers' motivation to develop their technology knowledge by attending professional development sessions.
3.2. Identify the objectives of professional development workshops. That will help teachers with basic technology to attend "basic level workshops" (Reel, 2009) and teachers with advanced technology skills to attend "higher-level workshops" (Reel, 2009).
3.3. Increase the opportunities of "school-based technology integration workshops" (Reel, 2009) that are teacher directed and administrator supported.
3.4. Provide professional development follow-up chances for teachers to ask questions and share their knowledge following the workshop.
3.5. Create "technology-focused school based teams" (Reel, 2009) to motivate teachers to use technology in the classroom and deal with any school-based technology issues.

4. Teacher readiness

Teachers should have enough and clear information about the project and the aims of the project's implementation to " realize how laptops can support assessment-centered learning environments." (Dunleavy, Dexter & Heinecke 2007, p. 450).

Furthermore, teachers should be given enough time to be involved in any discussion or concerns related to the initiative prior to the start of using laptops in their classrooms. As a result of that, teachers with less technology qualification could be identified and given more sessions about e-learning and allow them to discuss and ask questions. Moreover, teachers with more experience in their subjects and with more professional development hours would be recognized and get more benifits so, teachers know that their skills are evaluated (Vrasidas & McIsaac 2001).

5. Curriculum alignment

Old curricula and educational approaches should be modified or replaced to incorporate the new technology in teaching different subjects. These changes are important for success of the policy improvement. An "evaluative framework" (Dunleavy, Dexter & Heinecke 2007, p. 450) has to be applied on variety of resources, subjects and software applications. The framework is targeted to support the curriculum and align the learning resources to students' outcomes in order to use their laptops in the classroom regularly and in a useful way.

6. Student training

The school should provide students with appropriate and sufficient professional development opportunities for example "organizing in-school workshops on various technology hardware and software" (Lei & Zhao 2008) in order to provide students with wide opportunities for thinking in a professional way, making useful decisions, selecting appropriate application for searching and browsing, constructing helpful learning activities and integrating educational sound effects in real context.

Students can conduct an online discussion on a school blogging system where the students can express their opinions and share their ideas on a specific topic assigned by teachers. Such discussion might help students to think critically and that help them to understand that their ideas and opinions may not be true and the best all the time and it could be improved by others' opinions (Lei & Zhao 2008).

7. Class management

Teachers should not be focused on the significant technology integration problems such as "charging the laptops' batteries or preventing students from accessing inappropriate Internet sites" (Dunleavy, Dexter & Heinecke 2007, p. 451). It was recommended by some teachers that teachers' leadership should not be distracted

after the policy implementation and they have to be trained on the useful ways to keep the class controlled and managed.

8. Design or modify proper policy vision

The policy vision had to be aligned with the policy objectives and widely distributed via electronic, printed or face-to-face means to teachers, students and parents. The first year of implementing the policy could be considered as developmental year in which mixed ideas came from different schools and policy practitioners could improve the vision that then could be reviewed annually as needed. The vision should also be aligned with the classroom goals as well as community, culture and learners needs.

9. Wider distribution of technology

It is better to expand the technology utilization to provide all classrooms with electronic whiteboards and ease access to them using the laptops, video cameras to record different subjects classes so, student will be able to view them via the school website in case he/she was absent. Additionally, data projectors facilitate the teaching –learning process, as teachers will be abled to display movies, slide show or any Internet bases activity. As long as students find other technology sources, which support the one-to-one e-learning policy, their academic achievement and skills will be improved.

10. Policy assessment and evaluation

Revise the initiative policy plans every year or two years to consider digital applications in the schools, wireless networks, laptops and building a portal of digital resources as appropriate. One way to evaluate the policy outcomes includes assessing different samples of students' projects, assignments, school journals and class presentations. Another way is to assess teachers' technology knowledge and skills every year after the policy implementation in order to ensure correct policy practices

within the schools. Bebell & Kay (2010, p. 118) suggested, "performance assessment, essays, and portfolios might be more effective in assessing student learning with and about technology".

11. Sufficient technical support

Technical support is one of the important factors affecting the development of the policy. It is necessary to develop a supportive policy to ensure sufficient technical support of different software and hardware, estimate accurate technical requirements and the amount of technical support needed in many areas especially in the first year of policy implementation. For example technical supporters have to test all laptop devices, technology tools and resources before using in the classroom and design agreement with parents and students that outline the deduction for any laptop damage, loss or malfunction. In addition, employ an in-school technical support person from Mac Company. Some teachers pointed out their need of fast technical support especially during the first year of implementing the project; while others complained from repairing their laptops out side the school and that may take more than one month.

## Recommendations for future research

This study opened the door for additional research ideas that could be conducted in the following areas:

1. Identify more effective technology applications.

Technology integration has the ability to improve teaching and learning. Yet, for this ability to be understood, it must be used properly. More research is required on the effective usage of technology to help initiative participants; educators and policy-makers realize what technology proper uses are so that teachers and students can gain the effective benefits of technology.

2. The student results are depending on the effectiveness of technology use.

Student academic achievement should not be the only measure to assess the effectiveness or significance of technology usage. Some other results are also important aspects of school education, including student attitude, behavior, digital literacy, self-esteem and career aspiration. Consideration of these components can help improve the effectiveness of technology use to assist develop success students.

3. Study and develop various assessment techniques to assess student learning with technology.

Student technology use and learning through technology cannot be evaluated by usual traditional methods of assessment. Some other evaluation ways such as "performance assessment and portfolios" (Bebell & Kay 2010) could be more effective in evaluating student learning with technology.

## Conclusion

This study focused on learning with laptops. It reflects varied attitudes of teachers and students regarding the implementation of one-to-one laptop initiative in schools.

In a technology-rich classroom where students have frequent and immediate access to the Internet and much educational software, there is a possibility for a change in the learning environment to enhance student-learning outcomes. Moreover, there are many opportunities for a wider range of activities in which students can utilize higher-order cognitive skills. The one-to-one laptops initiative assists in developing the learning activities in different subject areas. Also, having one-to-one laptop initiative in education can significantly help increase student technology skills due to increasing the technology knowledge and skills while using the laptops to do different tasks such as "learning, communication, expression, and exploration." (Bebell & key 2010, p. 117).

The result of this study found that students use their laptops in an imaginative, creative, and diverse ways. They used their laptops to solve many problems, such as doing homework, browsing and searching for information, communicating with teachers and friends, developing personal entertainments and having fun. They use the Internet to find information for their class assignments or share information through easier communication with peers and teachers.

Although student academic level is increased over the first academic year of policy implementation, no clear conclusions were made on to what extend the students' outcomes is related to the laptop use. It is significantly important to find and develop evaluation techniques to appraise student learning with technology. Furthermore, although the presence of some challenges, teachers and students believed that the laptops are very important and the one-to-one laptop initiative really helped teaching and learning process.

Teachers utilize available technology resources in various ways. Some teachers may use technology as a reinforcement of topics covered or use PowerPoint to make all class presentations.

A common idea through the study is that a successful application will take time and need effort. This may be an interactive process where teachers adapt to new technologies, discover new methods to meet curriculum needs, improve approaches to widen students thinking abilities using technology, and alter their pedagogy to outfit a new learning environment in their classrooms.

Incorporation of interactive technologies into teaching and learning is not guaranteed by the facility of technology tools. It cannot be expected that teachers have the 21st century ability or skills to modify their teaching practices rapidly. Continuing professional learning, time and the support of the school leaders are critical factors to success but the educational outputs will be great.

Lastly, there is little doubt that one-to-one E-learning could evolve to be the norm

within the UAE educational system if the policy makers considered the policy limitations, drawbacks and recommendations stated by the policy practitioners.

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# Appendix A

## One-to-One Laptop Initiative in ATHS-AlAin Girls

### Teachers questionnaire

This survey investigates the one-to-one laptop program implemented in Applied Technology High School in the United Arab Emirates. It emphasizes on how the laptops being used in the classrooms, the students attitudes about using the laptops in science classroom and students learning future with one-to-one laptop initiative. The findings of the questionnaire will be reported to the faculty of Education - British University in Dubai.

Your participation in the survey is voluntary, and your identity and responses will be kept confidential. Please take a few minutes to answer all of the survey questions honestly.

*Section I: Demographic data

1. What is your gender?

a. Male

b. Female

2. What grade level(s) do you teach?

a. 9

b. 10

c. 11

d. 12

3. What is your highest Level of Education?

a. Bachelor's Degree

b. Master's Degree

c. Doctorate

4. For how many years have you been teaching?

a. 5 or fewer

b. 6 - 10

c. 11 - 15

d. 16 - 20

e. 20 or more

*Section II: Technology skills and perceptions

5. How would you rate your overall skill level in the use of the laptop for instruction?

a. Beginner (I am just learning)

b. Intermediate (I am comfortable using a computer)

c. Advanced (I can help teach others)

6. Have you participated in any professional development or training activities that have helped you integrate technology into the curriculum?

a. Yes

b. No

7. If YES, Please briefly describe the most useful training you've participated in.

8. Please describe the types of professional development you would like to receive as you continue to use the laptops in your classroom.

9. In which of the following areas do you think the laptop program has had a positive impact? (Check any that apply)

__ Students' ability to work independently

__ Students' engagement, involvement, and interest levels

__ Students' ability to work cooperatively

__ Improve the students' grades

__ Rigor of the curriculum

__ Student access to educational resources

__ Students create better-looking products

__ Students help one another more while doing computer work

__ Students work harder at their assignments when they use computers

10. Do you think the laptop program has had any negative impacts?

a. Yes

b. No

11. If YES, Please describe.

*Section III: Technology implementation

12. Please briefly describe how you see yourself using technology in the classroom.

13. Please include any other suggestions that you think may help to improve the implementation of One-to-One laptop initiative in Teaching and learning.

# Appendix B

## One-to-One Laptop Initiative at ATHS-AlAin Girls

### Students questionnaire

This questionnaire investigates the one-to-one laptop program implemented in Applied Technology High School in the United Arab Emirates. It emphasizes on how the laptops being used in the classrooms, the students attitudes about using the laptops in science classroom and students learning future with one-to-one laptop initiative. The findings of the survey will be reported to the faculty of Education - British University in Dubai.
Your participation in the survey is voluntary, and your identity and responses will be kept confidential. Please take a few minutes to answer all of the survey questions honestly.

* Section I: Demographic data

1. What is your grade Level?
a. 9
b. 10
c. 11
d. 12

2. Do you have access to the Internet at home?
a. Yes
b. No

3. For how long have you had your own laptop computer provided by the school?
a. One term
b. Two terms

c. Three terms

4. Are you able to take your laptop home?

a. Yes

b. No

5. What grades do you usually receive in science before you got your laptop?

a. 90% - 100%

b. 80% - 89%

c. 70% - 79%

d. 60% - 69%

e. Below 60

* Section II: Technology skills and perceptions

6. How would you rate your computer skills overall?

a. Beginner (I am just learning)

b. Intermediate (I am comfortable using a computer)

c. Advanced (I can help teach others)

7. Please indicate whether you agree or disagree with each of the following statements.

| | Strongly agree 1 | 2 | 3 | 4 | Strongly disagree 5 |
|---|---|---|---|---|---|
| a. The laptops help to search for information. | | | | | |
| b. Using laptops is better and easier to create presentations and projects. | | | | | |
| c. I prefer using laptops to the paper and pencil to take notes in class. | | | | | |
| d. Laptops help in organizing information. | | | | | |
| e. It is better to communicate using e-mail. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| f. I prefer using the laptop to take a quiz, test, or assessment. | | | | | |
| g. Laptops make me more interested and motivated in doing schoolwork. | | | | | |
| h. Having a laptop has improved my grades. | | | | | |

Section III: Technology implementation

8. How much do you use a laptop at school during the science class (90 minutes class)?

a. 60 – 90 minutes

b. 30 – 60 minutes

c. 15 – 30 minutes

d. Less than 15 minutes

9. How much do you use your laptop at home daily?

a. 1 – 2 hours per day

b. 3 – 5 hours per day

c. More than 5 hours per day

10. Has your computer been damaged or broken down this year?

a. Yes

b. No

11. If YES, for how long were you without a computer?

a. less than one day

b. 1-7 days

c. 8 - 14 days

d. 15 - 30 days

e. more than 30 days

12. Do you have any suggestions for new ways laptops could be used to improve your learning experience at school?

a. Yes

b. No

13. If YES, Please briefly describe: