e-Learning and ICT in Education at Palestinian Schools:

Towards 21st Century Skills

التعلم الإلكتروني وتكنولوجيا المعلومات والاتصالات في التعليم في المدارس الفلسطينية: نحو مهارات القرن الواحد والعشرين

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Abstract

This paper aims to evaluate e-learning and ICT in education in the Palestinian primary and secondary schools in light of the School-Led Initiatives (SLIs) on e-learning; part of a project funded by the Belgian Technical Cooperation (BTC) for the Palestinian Ministry of Education (MoEHE). It focuses on the e-learning intervention action research conducted during 2014-2015. We measured the most significant change in the MoEHE and among the stakeholders (school principals, teachers, students and their families) in response to the SLIs. Moreover, we explored the impact of SLIs on the teaching and learning processes. We used focus groups for data collection; stakeholders were asked about new teaching practices to develop 21st century transversal skills, such as problem solving, teamwork, and utilization of ICT in their initiatives as an essential tool for life skills.

Results showed that there was a transformation in teacher and student behavior, as active learning strategies made teaching more effective and learning more enjoyable. Underachieving and shy students participated in learning activities. On the other hand, teachers pointed out that they still need more practice to acquire the 21st century skills themselves, and that educational policy should encourage acquiring such skills by updating the curriculum and providing teachers with the needed motivation, support and training. However, there were serious obstacles related to school infrastructure, curriculum density, school culture and ICT skills. For the change to occur, all stakeholders should be involved in the efforts to promote the 21st century skills and to redesign the curriculum taking into account knowledge, learning methods and assessment.

Keywords: ICT in Education, E-Learning, 21st Century Skills (21CS), Education System, School, Initiative, Most Significant Change (MSC), Story Collection, Thematic Coding, Teaching, Teachers, Students, Behavior, Community, Obstacles.

ملخص:

تهدف هذه الورقة البحثية إلى تقييم التعلُّم الإلكتروني وتكنولوجيا المعلومات والاتصالات في التعليم في المدارس الفلسطينية الأساسية والثانوية، في ضوء المبادرات المدرسية المستندة إلى التعلُّم الإلكتروني، كجزء من مشروع ممول من التعاون التقني البلجيكي (BTC) لصالح وزارة التربية والتعليم الفلسطينية. فتتناول حيثيات البحث الإجرائي والتدخلات التي أجريت بشأن التعلُّم الإلكتروني في الفترة (2014-2015)، إذ جرى قياس أهم التغيرات ذات الدلالة أو

المغزى التي أحدثتها المبادرات على مستوى الوزارة وأطراف العلاقة من مديري مدارس، ومعلمين، وطلبة، وأولياء أمورهم، وأسرهم. كما جرى الكشف عن أثر هذه المبادرات المدرسية على عمليتي التعليم والتعلُّم. استند الفريق البحثي إلى المجموعات المركزة كأداة أساسية لجمع البيانات المتعلقة بالممارسات التعليمية الجديدة لتطوير مهارات القرن الواحد والعشرين، من قبيل حل المشكلات، والعمل الجماعي، وتوظيف تكنولوجيا المعلومات والاتصالات في مبادراتهم كأداة أساسية للمهارات الحياتية.

أظهرت النتائج تحولاً واضحاً في سلوك المعلمين والطلبة على حد سواء، إذ أن استراتيجيات التعلم النشط جعلت التعليم أكثر فاعلية، والتعلُّم أكثر متعة. علاوة على ذلك، تحسنت مشاركة الطلبة الخجولين وذوي التحصيل المتدني في أنشطة التعلّم. على صعيد آخر، بين المعلمون أنهم ما زالوا بحاجة إلى مزيد من الممارسة لاكتساب مهارات القرن الواحد والعشرين، وأن السياسة التعليمية يجب أن تتضمن موادّ تشجع على اكتساب هذه المهارات عبر تحديث المناهج الدراسية وإصلاحها، وتحفيز المعلمين ودعمهم وتدريبهم. علاوة على ذلك، برزت مجموعة من العقبات تتعلق بالبنية التحتية للمدرسة، وكثافة المناهج الدراسية، والثقافة المدرسية، ومهارات تكنولوجيا المعلومات والاتصالات. لإحداث التغيير، ينبغي إشراك جميع المعنيين في الجهود المبذولة لتعزيز مهارات القرن الواحد والعشرين، وإعادة تصميم المناهج الدراسية، مع مراعاة المعارف، وطرائق التعليم والتعلُّم، وأساليب التقويم.

الكلمات المفتاحية: تكنولوجيا المعلومات والاتصالات في التعليم، التعلُّم الإلكتروني، مهارات القرن الواحد والعشرين، النظام التعليمي، المدرسة، المبادرة، أهم التغييرات الجوهرية، جمع القصص، الترميز الموضوعي، التعليم، المعلم، الطالب، السلوك، المجتمع، العقبات.

1 Introduction

Palestine has a central place in the Middle East and North Africa (MENA) region, both geographical and historically. Large parts of it are under occupation by Israel, which makes all economic and social aspects of life there, including movement, transportation and communication very difficult. Education in these conditions is critically affected, but of the highest priority.

The Palestinian Ministry of Education and Higher Education (MoEHE) implemented a project titled "E-learning Curriculum in Primary and Secondary Education", financed by Belgium in the period 2011-2015. One of its aspects was School-Led Initiatives (SLIs) to utilize ICT in education. After three years of implementation, the MoEHE assigned the Open University of Cyprus (OUC) and Al-Quds Open University (QOU) to conduct an e-learning intervention action research, to provide upstream advice towards enhancing e-learning resources and practices for teachers, students and their families. The action research was a collaborative work among OUC, QOU, the Project Management Team (PMT) and the MoEHE staff and schools. The PMT was composed of a national project coordinator, a school grant manager, an e-learning content manager, an ICT and multimedia assistant, an administrative and finance officer, and field coordinators.

This research presents the main results of the first work package of the action research, which focused on lessons learnt by teachers, students, parents, school principals, supervisors, heads of directorates, and the MoEHE leaders, since quality improvement of education and measuring its impact are long-term issues.

This paper consists of five sections. The first section introduces the Palestinian education system and the problem statement. The second section goes through the objectives of this research and its methodology. The third section concentrates on sampling and story collection procedure as well as thematic analysis. The fourth section provides results and discussion. Finally, the fifth section presents the conclusions.

1.1 The Palestinian Education System

The Palestinian education system went through several difficulties and challenges since the Ottoman period to the British Mandate and the Israeli occupation between 1948 and 1967 and after 1967, until the establishment of the Palestinian Authority in 1993, when the educational system was placed under Palestinian control. The Palestinian MoEHE restructured the educational system and developed the school infrastructure. This included developing the curriculum, employing teachers, building new schools, beginning ICT infrastructure, and setting a new model for the General Secondary Examination (GSE). However, many challenges were encountered by the Palestinian education system, such as:

- Instability due to the Israeli occupation and its arbitrary practices against schools, especially in Jerusalem.
- Insufficient funding.
- Weak relationship between schools and society.
- Low family participation in the educational process.
- The predominance of traditional teaching style.
- Lack of equipment and ICT infrastructure.
- Class density and the two-shifts system.
- Lack of entertainment programs.

Palestine provides primary and secondary education at school level. According to statistics of the Palestinian MoEHE (2018), the total number of schools reached 2856 in 2014/2015; 75% in the West Bank and 25% in Gaza Strip. Around 1,171,596 students were enrolled in these schools; 58.44% in the West Bank and 41.56% in Gaza Strip (50.4% females and 49.6% males). On the other hand, the total number of teachers reached 65,175; 64.5% in the West Bank and 35.5% in Gaza Strip (59.8% females and 40.2% males).

According to responsibility, there are three types of schools (MoEHE, 2018):

- Public schools: the MoEHE is responsible for these schools. They represent 73.3% of the schools, with 66% of the students and 69.8% of the teachers in Palestine.
- Private schools: Privately owned and supervised by MoEHE. They represent 14.4% of the schools, with 9.4% of the students and 13.1% of the teachers in Palestine.
- UNRWA schools: The United Nations for Relief and Work Agency (UNRWA) for refugees administers these schools. They represent 12.2% of the schools, with 24.6% of the students and 17.1% of teachers in Palestine.

The Palestinian education system includes two stages, pre-school education for children aged 4-5.5 years and general education, which is divided into two levels (MoEHE, 2018):

A.	Basic education (compulsory) for ten years.

B.	Secondary education for two years, which enables successful students to enroll in universities, community or university colleges. It is divided into two categories:

1.	Academic secondary education that concludes with the GSE (Tawjihi). Students in this stage choose either scientific or literary stream.

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2. Vocational secondary education that concludes with vocational Tawjihi. Students choose among five streams; industrial, commercial, agricultural, nursing and hospitality.

The school year consists of two integrated semesters; it begins in September and lasts for nine months. Almost all Palestinian schools with the exception of some private ones use the curriculum developed by the Palestinian MoEHE. Student assessment is exam-based; all students after the fourth grade should pass four exams per subject each semester. Passing score is 50%, and students should pass all the subjects to move to the next grade. Four parties should certify school certificates and certificates of transfer: the student's school, the district directorate of education, the MoEHE, and the Ministry of Foreign Affairs (MoEHE, 2018).

The directorate of education in each district has its own administrative staff and supervisors for various specializations. Each directorate is responsible for the schools in its district and reports to the MoEHE. Each school has its own principal, vice-principal, secretary and teachers. Supervisors together with principals are responsible for teacher training and annual appraisal. Student families are supposed to be in direct contact with schools to monitor their children attitudes.

The turn towards ICT-based teaching and learning over the past 20 years is considered as a means to revolutionize and revitalize education (Uma Maheswari, 2012). It has the potential to be an innovative teaching tool for supporting pedagogy (Somekh et al, 2006) and for increasing student motivation, responsibility and organization skills, leading to independent and active learning (Lewin et al, 2000; Perry, 2003). Palestine is one of the four Arab countries with the largest number of trained teachers that use ICT in teaching (Abu Gazalah, 2013). ICT led to changes on how we act and interact at work, in education, in civic life and at home, pointing to a new set of skills called the 21st century skills (21CS) (Allen, et al., 2012; Lee, 2013). ETS (2007) defined digital 21CS as the ability to collect, retrieve, organize, manage information, and evaluate its quality, relevance, and usefulness.

1.2 Problem Statement

In 2009, the Palestinian MoEHE received funding from Belgium for the "E-learning Curriculum in Primary and Secondary Schools" project (REoI, 2013). MoEHE collaborated for five years with the Belgian Technical Cooperation (BTC) in the project implementation that started in the academic year 2010/2011. The project targeted four subjects (Science, Math, English, and Arabic) for students from the fifth to the tenth grade. In order to ensure the implementation of the project activities, up to five field-coordinators worked on the project on a regional level. The PMT initiated and monitored day-to-day activities in collaboration with MoEHE, its directorates and schools.

The overall objective was "to raise competencies of individual learners to become active members of the knowledge society". Specifically, "to enhance students' acquiring 21CS by applying e-curricula modules and practices" (ToR, 2010). It aimed to train 1000 teachers on e-learning. Teachers developed SLIs and implemented them in their schools for three years. They focused on innovative learning practices including learning objects, mobile learning and piloting new ICT tools and 21CS into the education system.

In order to test the assumption that *by introducing innovative learning practices, students will become more active participants in the education process*, the BTC announced a Terms of Reference (ToR) and a request for proposals (RFP) in September 2013 for an action research on e-learning at the Palestinian schools (ToR, 2013). It selected a consortium to conduct this action research, which consists of experts from QOU and OUC. The action search lasted for two years in the period (2014-2015). In this research, we have tested the assumption above and tried to answer the question: *do SLIs alone without any external intervention lead to the required achievement*? We measured the extent to which SLIs have improved teaching practices, teaching methods and the educational environment. In addition, we investigated the different affected-dimensions, including the attitudes of the teachers and students, the students' acquisition of 21CS, and the obstacles they faced during their SLI implementation.

2 Research Objectives and Methodology

2.1 Research Objectives

The main objective of this paper is to assess the above assumption by measuring the Most Significant Change (MSC) in the performance and the behavior of teachers and students and in the enabling environment through a controlled sample group. Based on the ToR and the action research results, we focused on "understanding the contribution and describing challenges, opportunities and minimum requirements for successful scale up of innovative learning practices and introducing new ICT tools to achieve learner-centered education and students' acquiring of the 21CS."3 The importance of this research stems from the action research results, which can be used as directives for similar future-projects by introducing policy papers for the MoEHE to consider when developing its strategic plan.

We implemented the action research in four work packages (WPs): 1) Lessons learnt from the Pilots: Most Significant Change, 2) A one-semester e-learning action-research, 3) A one-semester m-learning

action-research, and 4) Policy Advice– Participatory recommendation formulation. This paper covers the first work package (WP1), in which the MSC method was applied in order to obtain information about what has been going on with the e-learning project, and the lessons learnt from the SLIs.

2.2 Research Methodology

The Most Significant Change (MSC) is a participatory monitoring and evaluation technique, where project stakeholders are involved in deciding the sorts of changes. It is based on story-collection of Significant Change (SC) emanating from the field and systematic selection of the Most Significant (MS) stories by panels of designated stakeholders. Stories are collected orally or in non-formal written form called *original oral stories* (Davies & Dart, 2005). Stakeholders (e.g. teachers) comment on these stories by agreeing, disagreeing, complementing each other etc. to identify the stories, which express a broader view. In this research, we applied a modified MSC to obtain information about what has been going on with the e-learning project, as follows:

1. Host stories with their metadata in a repository (e.g. social networking), and allow comments to those stories.

2. Process the stories, i.e. allow adding comments, and show the stories of level N-1 from which each story of level N was selected or formed.

3. Answer queries based on the metadata.

The researchers developed a repository module in the Palestinian educational portal[1] and hosted the collected stories under the social networks menu. This allowed teachers and stakeholders to utilize ICT tools in the research, and integrate a critical way of reflection on the stories. The results of the MS stories were organized, analyzed, and visualized.

3 Sampling, Story Collection and Analysis

3.1 Sampling

Sampling was based on subsequent discussion with the PMT and the MoEHE staff. We distributed the 'winning' SLIs, which were implemented throughout the project period, under four categories, as shown in Table 1. Cat1 refers to individual school initiatives, Cat2 refers to multi-school initiatives, Cat3 refers to directorate-level initiatives, and Cat4 refers to mobile learning initiatives using tablets. According to the PMT data, the total number of participating schools was 353, and the total number of distinct initiatives was 283. In order to reflect the goal of the MSC, we selected a large representative-sample (around 30% of the schools). We randomly selected and invited 110 schools for focus groups, using certain formulas[2], as shown in Table 2.

Table 1

e-Learning initiatives and school statistics[3]

Category	1st year		2nd year		3rd year		Total No. of Schools	Total No. of Initiatives
	Schools	Initiatives	Schools	Initiatives	Schools	Initiatives		
Cat1	82	82	77	77	43	43	202	202
Cat2	9	3	5	2	57	18	71	23
Cat3	3	1	6	1	18	3	27	5
Cat4	-	-	-	-	53	53	53	53
Total	94	86	88	80	171	117	353	283

We conducted the focus groups in five branches of QOU in the West Bank (i.e. geographical distribution) in four days within school-time. Occupation authorities did not allow field researchers to enter Jerusalem, so we held the focus group of Jerusalem teachers in Ramallah.

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(1) This portal has been developed in the e-learning project to host learning objects. See the link below: http://www.elearn.edu.ps

(2) For randomness, we used the formula 1+3n for Cat1 and Cat3, and the formula 1+4n for Cat2 and Cat4, where (n= 0,1,2,3,4,..). For instance, schools/initiatives 1, 4, 7 … etc. or 1, 5, 9 …etc. of the original list respectively.

(3) Source: PMT, MoEHE

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Table 2

School-selection criteria

Category	Schools		Initiatives		Randomness Formula
	Total	Selected	Total	Selected	
Cat1	202	67	202	67	1+3n
Cat2	71	20	23	6	1+4n
Cat3	27	12	5	2	1+3n
Cat4	53	11	53	11	1+4n
Total	353	110	283	75	

3.2 Story Collection

For validity purposes, we applied Future Café, which is usually offered in the form of a dialog-based workshop or focus group that builds upon people's natural desire to seek common ground and collaborative exploration. It creates an environment that fosters inspiring conversations in which people are listened to, and different perspectives are allowed (NCDD, 2008). The regional distribution of participating schools fairly reflects all categories of initiatives and school types and validates the selection process. The total number of participants in the future café was 183; most of them were teachers with a small number of principals and field coordinators.

We carefully constructed the focus groups to include five or six participants. One or two field researchers moderated each focus group. For each group, we introduced the objectives and instructions of the MSC method. Moderators asked them ten questions starting with warm-up questions and ending with specific questions to compose the stories, as follows:

- Among the changes, what do you think was the MSC? Please give a specific story that shows the change you are talking about.

- What do you think is needed to be done differently (by you/your colleagues/your school/ the Ministry) in order to achieve more significant changes?

- What challenges have you encountered and how have you overcome them (if you have)?

Moderators wrote down each story as narrated from the participants (i.e. level L0); they allowed storytellers to use a story form to write down their stories. Afterwards, they omitted invalid, weak or similar stories; usually those collected from teachers sharing the same school or initiative. Finally, they submitted 153 original stories (i.e. L1).

3.3 Qualitative and Thematic Data-Analysis

There is no quick-fix technique in qualitative analysis, but there are probably as many different ways as there are researchers doing it (Mays and Pope, 2006). However, there are some theoretical approaches to choose from (Lacey, 2007). The Grounded Theory approach is used when data analysis has a well-defined process that begins with basic description and moves from coding, conceptual ordering, to theorizing (Gerrish & Lacey, 2010; Patton, 2002; Morse, 2009). We have used this approach for analysis by organizing and reducing the stories into codes, and feeding these codes into descriptions, models or theories. Qualitative data-analysis started with *familiarization*, where the data analyst looked across all the stories to identify the common issues that recur, and identify the main themes that summarize the entire views, which includes:

A. A quick reading of ten randomly-selected stories, taking notes on the first impressions, and rereading them more carefully, word by word.

B. Repeating the process on another 30 stories, highlighting the keywords and using labels for codes. We applied each code later in a systematic way to all stories, see Fig. 1.

C. Assigning 5-digit codes for all 153 stories. The first digit represents the initial of the district (e.g. N for Nablus).

Afterwards, we employed *open coding* to explore and examine all data carefully. Open coding is "concerned with identifying, naming, categorizing and describing phenomena found in the text. Essentially,
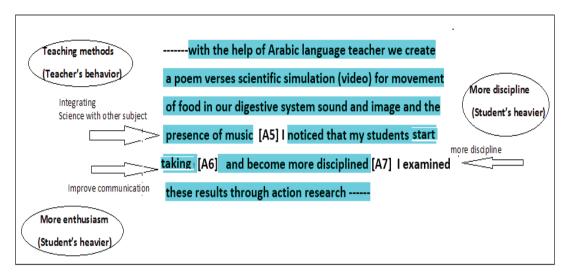
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Figure 1: Transcript (Story) Coding

each line, sentence, or paragraph is read, searching for the answer to the repeated question (what is this about?)" (Lopes, 2012).

In order to code relevant words, phrases, sections that could describe activities, processes, or concepts, we used *thematic coding*, which involves "identifying passages of text or images that are linked by a common theme or idea, allowing you to index the text into categories, and therefore establish a framework of thematic ideas about it" (Gibbs, 2007).

Example:

"------of the most important phenomenon that was noticed and tested when using ICT, was the increased discipline in classroom ----"

The statement above indicates a change in students' behavior, as they became more discipline. It

is relevant, since the participant has explicitly stated that it was important. Moreover, participants have frequently repeated this statement in several stories.

Another example:

"----- students created a biology group on Facebook,--- they downloaded material from YouTube that explains concepts from their textbook -- used electronic games --- the students shared duties and responsibilities.-- My role (teacher) was a facilitator--"

The statement indicates that the students became active part of the learning process. This is obvious and supported with good evidence. It is also consistent with the student-centered learning theory that shifts the focus of instruction from teacher to the students (Jones, 2007). At this stage, we created 27 codes, as shown in Fig.2. The fields represent codes, the records represent stories, and the symbol (x) indicates a match.
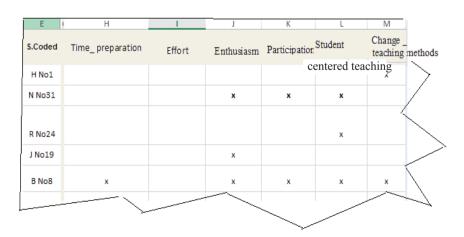

Figure 2: Part of coding method

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In the last stage, we employed selective coding to retrieve all codes and to group the codes of similar phenomenon, idea, explanation or activity in one category. Accordingly, we created the five major categories shown in Table 3:

Table 3

Categories and their relevant codes

#	Category	Codes (Subcategories)
1	Teacher Behavior	1. Decreased teaching effort 2. Enthusiasm for teaching 3. Collaboration with colleagues 4. Social behavior 5. Student-centered teaching 6. Change in teaching methods
2	Student Behavior	1. Thinking levels 2. Achievement 3. Participation 4. Motivation 5. Enjoy learning 6. Discipline
3	Education Towards 21st C Skills	1. Students as part of the teaching and learning process 2. Collaborative learning 3. Learning by research 4. Active learning 5. Brain storming 6. Change in learning methods
4	Community	1. Involvement of students' parents 2. Involvement of teachers' families
5	Obstacles	1. Dense school›s curriculum 2. Inappropriate or poor IT 3. infrastructure (school/ home) 4. Parents' approval of using ICT 5. More difficult to monitor 5. No enough time 6. Lack of computer skills

1. **Teacher behavior**: Behavior refers to the range of activities exhibited by humans, which is influenced by attitudes, values, ethics and profession (Gelisli, 2007; Carr-Back, 2009). The teacher behavior is defined as "activities concerned with the direction of guidance of the learning of others" (Keeley, et al, 2006).

2. **Student behavior**: Students' role is to assimilate the knowledge and skills as a contributing member of society. This would raise their thinking levels and direct their behavior to be self-motivated and self-aware of lifelong learning (OCCC, 2012).

3. **Education towards the 21CS**: A set of abilities, skills, knowledge and expertise that students must master to succeed in work and life; a blend of

content, knowledge, specific skills, expertise and literacies (Kereluik et al, 2013; KSRED, 2010).

4. **Community**: Relations among the parties from schools and the local community (e.g. students and their parents, or teachers and students' families).

5. **Obstacles**: Refer to actions that interfere with or prevent action or progress. An obstacle could be physical or non-physical that stands in the way of literal or figurative progress[1].

3.4 Repository Implementation and Story Animation

In parallel with the implementing the MCS methodology, we disseminated the Palestinian e-learning portal[1] among schools and teachers through adding a story-repository module to the portal. Under social networking menu, we developed three interfaces:

● **Story form**: Used by the field researchers to submit their stories and metadata.

● **Story view**: Shows a list containing story titles, views, comments, likes/dislikes, etc.

● **Story-query form**: Provides a search engine based on story title, researcher's name, storyteller, date of entry: from-to, user name, collection place and date.

Figure 3 illustrates a sample interface, where the field researchers submitted 153 L1-stories. Afterwards, teachers, principals, and supervisors included in the SLIs were encouraged to read the stories, comment and/or agree/disagree. Unfortunately, the interaction was noted to be very weak.

Alternatively, we implemented another procedure as follows:

1. Each field coordinator nominated at least two stories from L1 that they believed to be the MS, and composed attractive titles for them. They nominated around 45 L2-stories.

2. These 45 stories were distributed evenly on a three-member team representing the PMT, the MoEHE and the researchers of QOU. Each member nominated five or six stories and exchanged them with the other members. Then, the team selected by consensus 16 L3-stories (i.e. 10% of the total number of stories).

3. The data analysts performed further analysis

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(1) http://dictionary.reference.com/browse/obstacle

based on the similarities among the L3 stories. They thoroughly read and sorted them out into potential themes according to the generated codes. After revision and refinement, we ended up with *10 MSC L4-stories*.
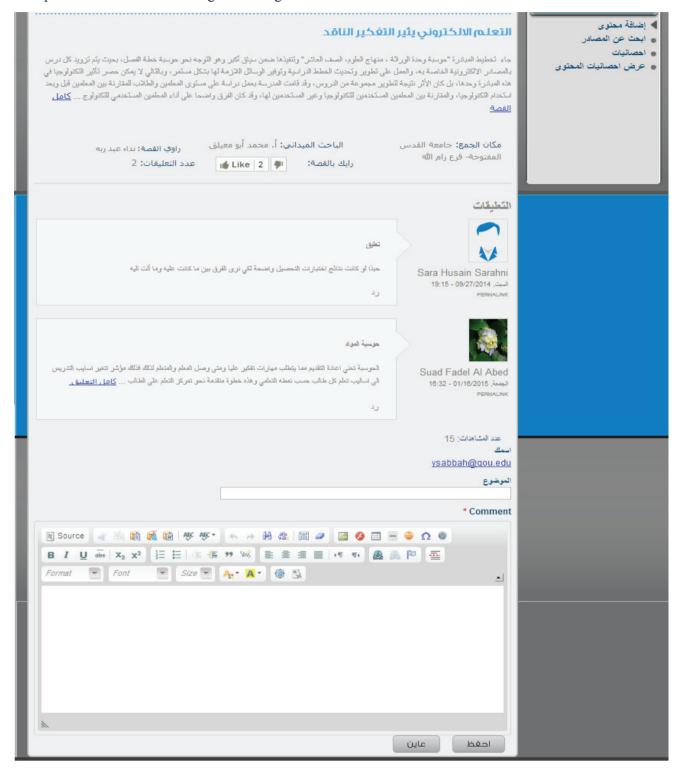

Figure 3: Story view

3.5 Validity and Reliability

In order to ensure the validity of the story collection, analysis and results, we have used a number of steps, as follows:

A. Random selection. We randomly selected the participants of the focus groups.

B. The sample. It consists of 92 schools (i.e. 26% of the research population). This maintained a solid unbiased representation.

C. Use of controls throughout data collection.

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A clear coding system was applied to organize relative data and to address data elements of each story in the entire dataset.

D. **Analysis process**. We revised the 153 stories to find common themes and patterns.

E. **Verified individual response consistency**. We confirmed appropriate responses and detected inadmissible responses.

F. **Accompanied notes and documentation** about the stories.

G. **Dump the data**. The data was categorized in tables, using consistent terminology.

H. **Checked data completeness**. We ensured the availability of all stories and metadata.

I. **Double-checked coding**. To ensure accurate coding, we double-checked the coding.

Reliability refers to "The extent to which the results are consistent over time and the representation of the population is accurate, and if the results can be reproduced by a similar methodology" (Joppe, 2000). In order to achieve reliability, we followed Hruschka (2004) in three steps:

A. **Codebook creation**: We generated an initial draft codebook and examined responses of 10 stories to propose a set of relevant themes. After discussion with the action research team, we agreed on an initial master list of codes.

B. **Codebook modification**: The lead researchers reviewed and discussed the inter-coder reliability and concluded sufficient inter-coder agreement.

C. **Coding the entire stories and segmentation of text:** We considered each story to capture a variation, segmented it into units of observations, and considered each code of a segment (e.g. a word or a sentence) as a measure. This regulated interpretation without changing the content. We categorized and coded stories according to the draft codebook, and the team members reviewed and agreed upon the coding process.

4 Results and Discussion

The qualitative story-analysis and thematic coding resulted in significant changes in five major categories. Table 4 and Figure 4 summarize the number of excerpts found within the collected stories that show changes in each category. We investigated each category in order to end up with the MSC and the lessons learnt from each one.

Table 4

Summary of Most Significant Changes (MSCs)

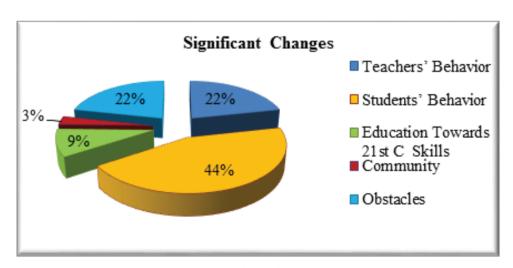| Theme/ Main Category	Teachers' Behavior	Students' Behavior	Education Towards 21st C Skills	Community	Obstacle	Total
SUM	101	206	45	14	101	467
%	21.6	44.2	9.6	3.0	21.6	100

Figure 4

Significant changes

The major change occurred in student behavior (44%), which makes sense, as they are ICT generation. Teacher behavior came next at 22%, which we interpret to reflect that older teachers tend to resist change. However, 9% of the excerpts showed the directions of education towards the 21CS. Keeping in mind that the story-collection occurred at the beginning of the action research, the teachers and students had not yet acquired these skills by that time, or had not yet been subjected to the concept. The least significant change appeared in community at 3%. Finally, 22% of the evidences showed some kind of obstacles.

4.1 Teacher Behavior

In general, research results showed that the teachers effectively engaged the students in the learning process, offered them more opportunities to learn and encouraged collaborative work. They used active, adaptable and ICT-based strategies of student-centered learning. Therefore, their classrooms became more active; they designed activities that allow students to discover knowledge as active participants. They began to focus on students' needs, abilities and learning styles. Furthermore, the teachers designed collaborative and group-learning activities, such as group projects and small internet-based researches, which enhanced the scope of the students' learning, developed their critical thinking, and strengthened student-teacher and student-student relations.

Figure 5 summarizes the results of the teacher behavior, where the largest portion (25.7%) showed some kind of transformation from traditional teaching methods to e-learning. Half of the teachers who reported these changes were from Hebron. In addition, 20.8% stated that they gave their students an important role as active participants. While 12.8% of teachers confirmed a reduced time spent in class preparation, 13.9% of them showed enthusiasm towards using ICT. A few participants (7%) stated that ICT reduced preparation efforts, since they reused the previous material. Finally, the MSC in the teachers' behavior occurred in Nablus and Hebron.
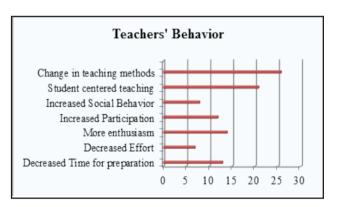

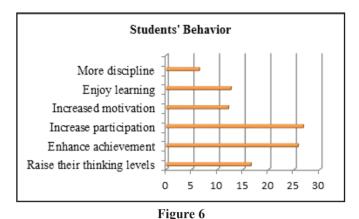**Figure 5**

The percentage of change in teacher behavior.

4.2 Student Behavior

In general, students became more enthusiastic; they were actively engaged in the learning objectives through group work using ICT, games, drama, social networks or other learning strategies. Active learning provided an enjoyable and entertaining atmosphere in the classroom; students themselves became more productive, creative, and cooperative. Shy students became more confidant, and the underachievers improved their work and participation. The results showed that many students did not have internet access at homes, which prevented them from getting the advantage of internet-based activities. Moreover, many students did not have sufficient ICT skills and web security awareness.

The MSC appeared in student behavior at 44% from their teachers' perspectives. Figure 6 summarizes the results, where the level of thinking raised in 34 excerpts supported with evidences. Students even developed a kind of analytical and critical thinking. Some of them showed deep understanding of the subjects and some kind of reflection on complex concepts, and 25.7% began discussing topical issues after class using e-mail and Facebook. In addition, teachers recorded an increased student participation, motivation and well-being within a disciplined atmosphere. Finally, our findings revealed that the insufficient change in teacher behavior did not prevent change in student behavior, as 44% of the change was found in student behavior.

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Unsurprisingly, the more change in teacher behavior, the more change appeared in the corresponding student behavior, as shown in Fig. 7. This was clear in Nablus, where the MSC occurred
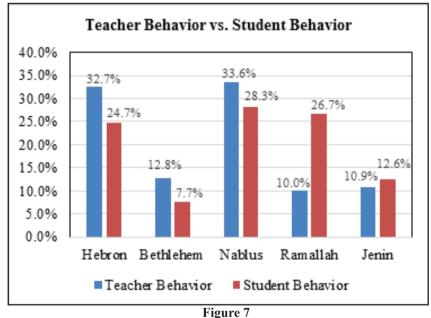

Figure 6

Change in student behavior

in teacher and student behavior were 33.6%, 28.3% respectively. Similarly in Hebron at 32.7%, 24.7% and to a lesser extent in Jenin at 10.9%, 12.6%. This complies with the findings of Keeley et al (2006) that "ICT exhibited by teachers determines, largely, their behavior in the classroom and, ultimately, will influence the student behavior". This was not the case in Ramallah; contrary to the significant change in student behavior, the least significant change was found in teacher behavior at 26.7%, 10% respectively.

Our findings show that student behavior corresponds to teacher behavior usually but not always. There is still debate in the literature regarding

Figure 7

Change in teacher behavior vs. student behavior

the impact of using ICT in education on teacher and student behavior. For instance, Al-Hawaj (2008) indicated that ICT had the potential to transform the nature of education, and Mbah (2010) mentioned that ICT had a positive impact on the students' study habits. Furthermore, Garrison and Kanuka (2004) and Garrison (2011) showed that effective and efficient learning and success occurred in e-learning or blended learning environment rather than in traditional one. However, Leuven et al. (2004) stated that there was no evidence for a relationship between the increased use of ICT and student performance.

4.3 Education towards the 21CS

21CS are a set of competencies that students need to develop in order to succeed in the information age. The MS stories showed that some initiatives encouraged teachers to integrate 21CS into their classes. Moreover, the role of the teachers changed

a lot, as they used different teaching strategies, and provided the students with opportunities to improve their learning skills. Some teachers used the available content to raise global awareness and civic literacy, which are essential 21CS (NCREL & Metiri Group, 2003). Teachers acted as subject matter experts and facilitators. They employed active and flexible teaching strategies that promote 21CS, such as games, role-playing, drama, and group work. They deployed ICT in teaching, when necessary, to attract students and to facilitate the learning objectives, where students were able to think critically and creatively through problem-solving activities. Still, there was no clear vision and common understanding of the 21CS. Therefore, some special assessment tools should be developed to measure the MSC at a MoEHE-policy level.

The necessity of ICT skills was not considered an arguable matter, and the link to the other 21CS was not clear. We suggest that ICT skills should be integrated in the core subjects, since ICT can potentially bridge the gap between formal and informal learning environments. In addition, what students learn from and about ICT outside schools should be integrated in the curriculum. Similarly, what students learn at the school about ICT should be transformed in their daily lives. Moreover, the 21CS should be delivered within the curriculum, which must be redesigned regarding learning and assessment methods.

Six groups of trends were detected in the 21CS and the employment of ICT in teaching and learning, as shown in Fig. 8. One important trend is related to change in learning and teaching methods, which refer to pedagogy and general principles and strategies used for instruction that fit the classroom demographics, subject areas, teacher goals and student learning. Results showed that the MSC in teaching methods was noted in both Hebron and Nablus at 28.6%, followed by Bethlehem at 21.5% and Jenin at 14.2%. Ramallah came last at 7.1%, since its teacher behavior had the least significant change.

Figure 8 depicts the MSC in the 21CS, where a gross of 31.1% of the excerpts showed that teachers attempted to change their teaching methods. Other skills were also recorded, such as brainstorming learning at 26.7% and students as part of the teaching and learning process at 20%. A moderate change occurred in other 21CS, such as collaborative and active learning.

It is necessary to find a national agenda for students' competitiveness that integrates the 21CS into the core subjects, so that students can master
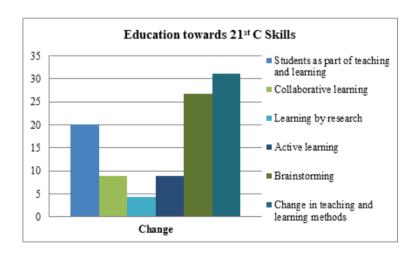

Figure 8
Change in the 21st century skills

the 21CS while learning languages, mathematics, science and other subjects. P21CS (2008) considered the 21CS as indispensable currency for participation, achievement and competitiveness in the global economy. Furthermore, Abu Ghazaleh (2013) referred to education policy-makers who widely accepted that improved access to ICT in education could help individuals to compete globally by creating 21st century skilled work force and facilitating social

mobility.

4.4 Community Changes

Community involves all stakeholders, including policy makers (e.g. the MoEHE), parents, families, researchers, youth organizations, content providers and educational organizations. The change of educational system outcomes entails collaboration

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among community members that affect this change. Many initiatives led to enhance teaching and learning, focusing on teachers as a cornerstone to enhance learning outcomes. Strategies at different levels (e.g. national policies and classroom practices) should be combined with the active involvement of all stakeholders. Figure 9 summarizes the percentage of community change. Employing ICT had an impact on community, mainly parents. It strengthened the relation of parents with their children and with teachers and schools.

Results showed that the lack of parents' awareness of the 21CS required more effort from teachers in order
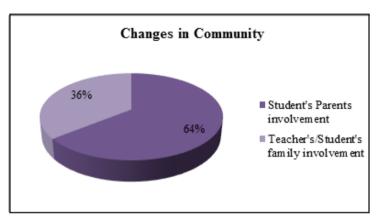

Figure 9
Change in community

to implement these skills, especially ICT. Therefore, all institutes, which care for youth and curriculum, should cooperate to provide both teachers and students with training and raise their awareness on ICT.

4.5 Obstacles

Teachers who participated in the initiatives faced many obstacles. The integration of the 21CS entailed important changes in the curriculum and school's culture. Many teachers felt that the curriculum density, time restrictions, poor school-infrastructure and lack of training and technical support prevented them from using active strategies. Many families refused to have Internet at home, or prevented their children from using it, especially females. Therefore, old teaching methods, weak collaboration and knowledge exchange at school level need to be addressed.

Figure 10 shows the major obstacles that teachers faced while implementing ICT in their schools. Inappropriate or poor ICT infrastructure at schools or homes was the major obstacle at 31.7%. In addition, most of schools did not have computers and/or Internet access in classrooms, or they did but of low specifications or speed. Sometimes, teachers themselves did not have good ICT skills (25%), and 7% of them were unable to employ ICT or monitor its use at schools. In very rare cases (2%), parents rejected using social media in teaching their children. In 2014, the Palestinian MoEHE decided to ban using social media at schools , which added a new obstacle.
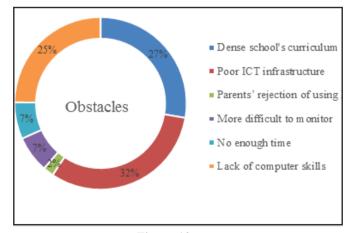

Figure 10
Obstacles

In order to overcome obstacles, teachers need professional training on the 21CS in order to transfer these skills to students. Moreover, students and their families need some training and awareness on ICT and Internet security. The MoEHE should redesign curriculum, improve school ICT-infrastructure, provide schools with safe Internet access, and encourage exchange of experience and knowledge sharing among teachers.

5 Conclusion

Palestinian educators are aware of the importance of ICT integration in education and investment in ICT as a learning tool. Findings of this research revealed that despite the efforts to implement ICT in school education, it is not yet at the desired level. Although teaching has been gradually moving from lecture-based to student-centered, ICT-enhanced teaching, most teachers and students make limited use of ICT. Moreover, teachers implied that they did not have sufficient time, ICT skills and technical support, and that the students used ICT tools in many activities, but in few occasions. According to the above findings and results, educators should pay more attention to the use of ICT resources as a major component in classroom activities. They also need to incorporate and effectively engage students in ICT-enhanced learning.

We can summarize our conclusions as follows:

- The school-led initiatives left a set of successful stories, which can be starters for cultivating 21CS at schools. This implementation entails great effort at the level of the Palestinian MoEHE and all stakeholders.
- High quality teacher training is required in order to develop the teachers' abilities to use innovative teaching methods and ICT tools to support student learning and establish educational leadership at the school level.
- The schools infrastructure should be supplied with modern ICT infrastructure and up-to-date technology to facilitate the teachers' job.
- Collaboration among different parties is needed to conduct awareness programs on the importance of the 21CS, and teacher-training programs are needed to ensure that they acquired these skills.
- Higher education institutes and research centers should organize conferences and encourage the researchers, the teachers and the students to discuss the impact of the 21CS on teaching and learning methods.

- It is necessary to ensure that there is a common language and understanding of the 21CS among all the communities, and accurately assess the schools' current situation in order to develop a plan to integrate these skills into all subjects.
- Curricula need to be redesigned to integrate all needed 21CS, including ICT into teaching and learning. The new design should include a clear and rigorous assessment different from the current one.
- Technology should be considered a powerful learning resource that can support the acquisition of the 21CS. Moreover, ICT facilities ought to be made available in quantity and quality at schools to boost the opportunities of using ICT in the classrooms. Therefore, intensive ICT training should be conducted for teachers and students.

6 References

Abu Ghazaleh (2013). Information and Communication Technology (ICT) in Education in Five Arab States. Talal Abu Ghazaleh Organization. Published by UNESCO Institute for Statistics, ISBN 978-92-9189-127-6.

Al-Hawaj, A. Y., Elali, W., & Twizell, E. H. (Eds.). (2008). Higher Education in the Twenty-First Century. CRC Press.

Allen, J. P., & van der Velden, R. K. W. (2012). Skills for the 21st century: Implications for education (No. 011). Maastricht University, Research Centre for Education and the Labour Market (ROA). https://cris.maastrichtuniversity.nl/portal/files/542332/content

Carr-Back, J. (2009). Influences of teacher behaviors on student learning and motivation: A phenomenological study from the perspective of students (Doctoral dissertation, Walden University). Retrieved February 2014 from: https://search.proquest.com/openview/7953b5eaa53cd713a819b8576256f960/1?pq-origsite=gscholar&cbl=18750&diss=y

Davies, R., & Dart, J. (2005). The 'most significant change' (MSC) technique. A guide to its use.

ETS (2007). The Educational Testing Service. Digital Transformation: A Framework for ICT Literacy. International ICT Literacy Panel.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. The internet and higher education, 7(2), 95-105.

Garrison, D. R. (2011). e-Learning in the 21st century: A framework for research and practice. Taylor & Francis.

Gelisli, Y. (2007). Effects of teachers' attitudes and behavior on students' attitudes, behavior, and academic success in Turkey. International Journal of Educational Reform, 16(1), 96. Retrieved January 2014 from: http://eric.ed.gov/?id=EJ807313.

Gerrish, K., & Lacey, A. (2010). The research process in nursing. John Wiley & Sons.

Gibbs, G. R. (2007). Thematic coding and categorizing.

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Prof. Thanasis Hadzilacos
Dr. Randa ElSeikh Najdi
Ms. Saba Farhana

Analyzing qualitative data. London: Sage, 38-56.

Greenhill, V. (2010). 21st Century Knowledge and Skills in Educator Preparation. Partnership for 21st century skills.

Hruschka, D. J., Schwartz, D., St. John, D. C., Picone-Decaro, E., Jenkins, R. A., & Carey, J. W. (2004). Reliability in coding open-ended data: Lessons learned from HIV behavioral research. Field methods, 16(3), 307-331.

Jones, L. (2007). The Student-Centered Classroom. Cambridge, New York, Melbourne, Madrid, Cape Town.

Joppe, M. (2000). The Research Process. Retrieved August 8, 2015, from http://www.ryerson.ca/~mjoppe/rp.htm.

KSRED (2010). Kamehameha Schools Research & Evaluation Division. 21st Century Skills for Students and Teachers Pacific Policy Research Center.

Keeley, J., Smith, D., & Buskist, W. (2006). The Teacher Behaviors Checklist: Factor analysis of its utility for evaluating teaching. Teaching of Psychology, 33(2), 84-91. Retrieved on February 20, 2014 from: http://faculty.clinton.edu/faculty/TeachingandLearningCenter/Teacher%20Behavior%20Checklist.aspx

Kereluik, K., Mishra, P., Fahnoe, C., & Terry, L. (2013). What knowledge is of most worth: Teacher knowledge for 21st century learning. Journal of Digital Learning in Teacher Education, 29(4), 127-140.

Lacey, A. & Luff, D. (2007). Qualitative Research Analysis the NIHR RDS for the East Midlands. Yorkshire & the Humber.

Lee, L. S. S. (2013). Achieving Quality Assurance and Moving to a World Class University in the 21st Century.

Lewin, C., Scrimshaw, P., Mercer, N., & Wegerif, R. (2000). The KS1 literacy evaluation project using low cost computers. Coventry, Inglaterra: Becta.

Lopes, A. (2012). 'Thing' Qualities: Grounded Theory Method, Discourse Analysis and Semiotics Approaches. In 11th European Conference on Research Methods in Business Management: ECRM 2012 (p. 229).

Mays, N., & Pope, C. (2007). Quality in qualitative health research. Qualitative Research in Health Care, Third Edition, 82-101.

Mbah, T. B. (2010). The Impact of ICT on students study habits. Case study: University of Buea, Cameroon. International Journal of Science and Technology Education Research, 1(5), 107-110.

MoEHE (2018). Official website of the Ministry of Education and Higher Education, Palestine. Retrieved December 2017 from: https://www.mohe.pna.ps/general-education/general-education/Education-System.

Morse, P. N. S., & Corbin, B. (2009). Developing grounded theory. The second generation.

NCDD (2008). Future Café. The National Coalition for Dialogue & Deliberation. D&D Resources, December 2008. http://ncdd.org/rc/item/2776.

NCREL & Metiri Group (2003). Engage 21st century skills: literacy in the digi¬tal age. Retrieved January 8, 2015, http://www.ncrel.org/engauge/skills/skills.htm

OCCC (2014). Oklahoma City Community College. Retrieved March 2014.

http://www.occc.edu/support/characteristics.html.

P21CS (2008). Partnership for 21st Century Skills. 21st Century Skills, Education & Competitiveness: a Resource and Policy Guide. http://www.p21.org/storage/documents/21st_century_skills_education_and_competitiveness_guide.pdf

Patton, M. Q. (2002). Qualitative Research and Evaluation Methods, 3rd edn Sage. Thousand Oaks, California.

PCBS (2016). The Official website of the Palestinian Central Bureau of Statistics. Retrieved April 2018 from: http://www.pcbs.gov.ps/post.aspx?lang=en&ItemID=1661

Perry, D. (2003). Handheld Computers (PDAs) in Schools: Report, March 2003. British Educational Communications and Technology Agency.

REoI (2013). Request for Expression of Interest No.168/2013. E-Learning Intervention Action Research. BTC public registration number: PZA 216. Sep. 17th 2013.

Somekh, B., Underwood, J., Convery, A., Dillon, G., Harber Stuart, T., Jarvis, J. & Woodrow, D. (2006). Evaluations of the ICT Test Bed Project: annual report March 2006. Retrieved March 2018:

http://dera.ioe.ac.uk/1594/7/becta_2005_icttestbed_annualreport_report_Redacted.pdf.

ToR (2010). A Short-term Technical Support Mission. National Expertise Baseline Study producing reliable indicators on e-learning practices in Palestinian schools and e-modules. August - November 2010. Navision Code: PZA 0802311.

ToR (2013). Action Research on e-Learning in Palestinian schools, Internal Ref. No. PZA 216, Navision Code: PZA 0802311. Sep. 17th 2013.

Trading Economics (2016). Retrieved April 2018 from: https://tradingeconomics.com/palestine/gdp.

Uma Maheswari, P., & Arulchelvan, S. (2012). Usage of ICT among the Students and Teachers and its Impact on their Communication Behavior. European Journal of Social Sciences, 36(2), 160-170.