TEL AVIV UNIVERSITY 🕎 אוניברסיטת תל-אביב

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OECD/CERI ICT PROGRAMME

Computer Trustees: Heading Towards the Community Bar-Lev School, Kfar Saba ISRAEL

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OVERVIEW

They use the fact that kids today are more accessible to technology and get along better with it than their teachers. They combine the two worlds: the teachers with their world of content, and the students with their world of technology and applications, helping the teachers. (Parents)
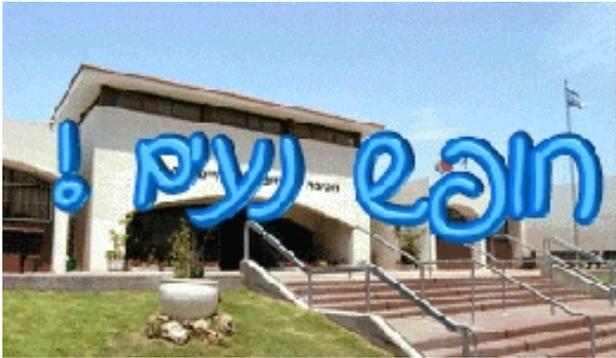
This conversation was conducted amongst students in the Bar-Lev lower secondary school in Kfar-Saba, who participate in the "Computer Trustees Innovation Heading towards the Community . In the course of the innovation a group of students is trained to serve as computer trustees, their role being instruction of teachers, students and community members.

The lower secondary school Bar-Lev was founded in the year 1995 as one of the five integrative lower secondary schools in the city of Kfar-Saba, located in the central part of Israel. The school has listed 635 students, in 7th to 9th grades, aged 12-15, each grade consisting of 6 classes. Altogether there are 18 classes and 53 teachers. The students come from an average and above SES.

The school is divided into 3 wings, on a pedagogic basis: a language wing, a mathematics wing and a humanities studies wing. The wings are composed of professional classrooms. The technology, science and art studies are held partly in a nearby community center, Pais cluster [1]. In planning the curricula, the school is committed to the ministry of education. Computer trustees are integrated in all lessons, as well as in community activities.

The goal of the innovation was to combine students in the process of ICT- implementation within the school. The trustees act as tutors for teachers, assist them in ICT -implemented lessons and support preparation of lesson plans. The computer trustees act in a number of circles outside the school as well:

- Adoptions of a special education school   the computer trustees train the students from the adopted school to use the computer, to edit presentations, to surf the Internet and to download learning materials.
- The Multi-Generation Connection   the computer trustees give a training course to senior citizens once a week during school hours. The goal is to enable the senior citizens a communication cannel to the world, connecting them to their families, helping relieve their solitude and also documenting their lives.
- A telephone support center   the computer trustees operate a telephone support center within the school, three times a week, serving teachers, students and the community.

The use of ICT by the computer trustees is evident in locating network, hardware and software failures, general phone support for ICT use at home, and teacher and student training in ICT skills, utilities and problem solving. Trustees also instruct peers in using applications, build a school online resource center, including teaching material and students papers, a school web site, and constant maintenance of network and computers.

The school has 110 computers serving the student population, 60 in computer labs, 5 in classrooms, 40 in the nearby community center (Pais cluster) located within the school-defined area, and 5 in the library. All computers are connected to one local network.

2-3 students from each class in all grades participate in the innovation, altogether about 40 in the whole school. The computer coordinator is the initiator and leader of the innovation for the past three years. All 53 staff members participated in a training course, with the assistance of the computer trustees. Nowadays, there are about 20 teachers in different subject matters (geography, history, arts, foreign languages, grammar, earth sciences and mathematics), who make active use of the computer trustees in their lessons.

The main benefit from the computer trustees involvement in the ICT implementation process is its wide application in all subject matters, overcoming the teachers fear barrier of technology. It seems that teachers in this school tend to implement technology in their teaching layout, using online facilities on the Internet and multimedia presentations. They also insist that students make use of the endless possibilities open to them using ICT in their learning process and for demonstrating their knowledge in their assignments.

The ones who benefit most from the innovation are the students: *All students are happy. It s much more fun than to hang dry listening to the teacher* . Teachers also feel that with the ICT they can enrich the curriculum through a widening of the learning surrounding, using up to date links from the Internet: *For example, the sin of pride from the Bible: it s here and now. You enter the Internet, into newspaper sites, and you find numerous resources you could compare to the sin of pride. It suddenly gives you a feeling that things that happened a long time ago are still happening today* (Involved teacher).

The wide ICT-implementation in the school had brought about prestige to the school in the eyes of parents and students. According to the principal, *Many parents want to register their children to this school because of ICT-implementation, although it s further away... They are interested in coming here, which means that this influence has a resonance in the community.* Parents told us: *My son was placed in another lower secondary school, but because he heard about the ICT activities in Bar-Lev school, which had fascinated him, he asked to be transferred.*

THE PAST

The innovation began in the year 1998, initiated by the school s computer coordinator, following the computerization of the school as a part of the national computerization program Tomorrow 98 [2]. The teachers, however, were not capable of using ICT at the time. The difficulties and the failures led to the idea of an available support system. This idea developed, and a booklet of common failures was edited by the computer trustees and published by the school[3], Teachers received training, supported by computer trustees, who received additional training, to specialize in areas needed to maintain ICT in the school. The ideological aspects led towards additional goals of contributing to the community. These are a result of the recognition in the ability of the students to lead change processes in the field of ICT implementation within the school.

The school management assumed that it had to make use of available human resources with ICT skills above average. The natural choice was the students themselves. The goal was to foster a group of students, computer trustees, by supplying them with extensive technological training, so they can assist the school community and the community outside the school. The school received donations to fund professional training of the computer trustees, and turned to outside institutes, experts in the field of ICT implementation in education processes (Edusystems [4]), experts in the technological field (Microsoft, Internet-Zahav[5] and Bezeq[6]), and experts in the instruction field. The school served as an experimental model for some of these institutes.

In the first year of the innovation, the computer coordinator turned to the principal and proposed to instruct a training course for the teachers. Back then students with prior knowledge were chosen to become computer trustees, but this was done without mapping of skills. They served as tutors on a one-to-one basis in the training of the teachers.

The innovation was possible as a result of the principal s efforts to facilitate school organizational processes. He sees himself as a leader of school-wide processes and allowing academic freedom for teachers: *Any idea or option that a teacher will bring and say I want to take this upon myself , I m willing... he has a free hand to do it, combining it in his or her schedule.*

In the next few years, the school coped with number of issues:
Fear of the computer On the one hand, the school aspired to enrich the curriculum by encouraging teachers

to use ICT as a channel for various information resources. On the other hand, teachers were drawn back by technology. The computer trustees helped lower the level of anxiety and assisted teacher in overcoming fears from unexpected failures. The principal explained: *A situation in which a teacher enters the computer lab and doesn t have to be tense had to be reached. All technical problems had been solved, because I have the kids.*

Preparation time for teachers   teachers had little time to prepare material from online resources. Computer trustees were recruited for this purpose as well, assisting teachers to prepare lesson plans by searching the Internet. When I need teaching material, explains the computer coordinator, sufficient that I take this request to 4 students, and they ll bring more. They simply have it, and they have time for it. They have the knowledge, the ability. The computer trustees role is also building a school web site, uploading material, building databases, helping teachers build ICT-combined learning units and actively supporting the whole ICT implementation process in all subject matters at taught at school.

Timetable   There are 3 computer labs at school, and it seems that the school is not prepared to deal with the increasing demand of teachers for lessons in the computer lab. This caused a situation in which teachers complain about not allocating enough hours for ICT implementation. The solution depends on expansion of infrastructure, a slow and expensive process.

Loss of the Teacher s prestige and Power - the teachers might have felt tension and inconvenience due to the high-level skills of the students, which put them in an odd position when facing the class. In time, teachers adapted to the idea, especially with the school climate in which learning from students is legitimate and acceptable. One of the teachers commented: *We enjoyed the fact that students can help us. It contributes to the students egos.* The openness of the teachers has enormous weight at this point.

Ongoing upgrading   the ICT infrastructure does not stand up to the pedagogical needs. Therefore, the school funded upgrading of computers, a stronger server and an improved Internet connection. The school sees ongoing renewal as a key factor to innovation: *You cannot advance with ICT without upgrading [infrastructure] once in a while.* (The school external instructor) Some of the obligations of the school management are to achieve high advanced technological standards for use of teachers and students; to organize courses for computer trustees with standards of the today s advanced market.

Funding   The school wasn t satisfied with finance coming from the ministry of education or the municipality. The principal approached external companies to sponsor ICT implementation in school, especially the computer trustees innovation, in return to serving as an experimental model for some of these companies (Edusystems, Microsoft, Internet-Zahav and Bezeq, the national phone company). One of the computer trustees told us: *Our school is lucky to have so many sponsors, because of the principal s efforts to fund computers and software.*

Computer trustees   the intensive work of computer trustees causes some difficulties:
- Status compared to their peers, as a result of their responsibilities relating to the computer lab: *You*

see a friend and you tell him not to do something... he has to listen to you, and it causes friction.

- <u>Missing lessons</u> in order to be a part of the innovation: Sometimes you miss lessons, you have to catch up by yourself, we re stuck before exams because we didn t hear the explanation. It seems that the teachers are willing to help these students: *For instance, I missed grammar and it s difficult to complete. The teacher switched hours between literature and grammar, because literature is easier to copy later on. The teachers also help me in their free hour and explain things.*

- Lack of time   the computer trustees stay in school also in the afternoon hours, but the school is still not prepared for bringing in the innovation as an integral part of the system: *There has to be a change in the planning in the higher levels. To bring it in more extensively into the curricula.* (the computer coordinator)

THE PRESENT

Evaluation of the Innovation

Patterns of Distributing the Innovation

The computer trustees act as a multi-grade group, being exposed to a variety of interactions with their peers, teacher and adults in general. This variety of contacts contributes to their points of view, according to a computer trustee: *Yesterday I spoke with my teacher... usually during the lesson she s not very nice. All the kids don t like her. But yesterday I was with her after school, and I saw she s a good lady. She told me about her family and the curriculum for next year... it brings you nearer... you see the other side of the teacher.*

Another means of sustaining the innovation is the massive presence of computer trustees in all lessons held in the computer labs. This effects the behavior of all students, who evidently take care of the equipment and do not sabotage it, even without the actual supervision of computer trustees, but as a result of the innovation.

Team Development for the ICT Innovation

The presence of computer trustees is noticeable in all classrooms, and is a source of pride to teachers who implement ICT, who accept with love their professional authority. Additional evidence to the influence of the innovation that teachers work in the computer labs even when the computer trustees are not available. They already know how to cope with some of the failures having been trained (in-house and external courses). They appreciate a computer trustees presence in lessons, but are not totally dependent on them. It has to be note that in about half of the students homes there is a computer.

ICT and Innovation Leadership

The innovation was possible as a result of the principal s efforts to facilitate school organizational processes. He sees himself as a leader of school-wide processes and allowing academic freedom for teachers: *Any idea or option that a teacher will bring and say I want to take this upon myself , I m willing... he has a free hand to do it, combining it in his or her schedule.* The school principal does not want to *invent the wheel* . Rather, he supports collaboration of teachers and students in creating learning materials and in thinking processes. The presence of computer trustees is noticeable in all classrooms, and is a source of pride to teachers who implement ICT, who accept with love their professional authority.

The Connection between the Innovation and ICT

As mentioned, there are 110 computers for students use, 70 of which are connected to the Internet. The ICT culture of the school encourages search of online information, ICT-based assignments, and multimedia presentations, entering educational sites and communicating with other schools from Israel and abroad. The demand from teachers and students to produce typed products brought wide usage of word processing. The high academic standards encouraged production of multimedia presentations. The external instructor says: *It s very different, it demands a different kind of thinking about how to present information, how to organize it, how to process it and how to link its components.* Indeed, there are many multimedia presentations all over the school. In addition, the students can contact their teachers beyond school hours, from home or from the computer labs, which are open in the afternoon.

Outcomes

Infrastructure

The infrastructure of the school is constantly upgraded as a result of the innovation. Currently, the computers in Bar-Lev school are Pentium 1 200 MHz with a Windows 95 operating system. All 70 computers connected to the Internet have separate IP numbers. The computers are equipped with CD-ROM drives. There are additional digital-processing peripherals, color printers, a RW-CD drive, a video projector, a scanner and a digital board. Available software includes word processors, electronic sheets, databases, drill and practice software, Internet and e-mail applications, CD-ROM encyclopedias and multimedia presentation software. Educational software is available in several subjects: mathematics, chemistry, earth sciences, grammar, foreign languages, arts, history and geography.

The Efficiency of the Innovation and ICT

The variation in the activities of the computer trustee is derived from their different roles: they function as instructors for senior citizens and special education students, as technicians within the school, in charge of equipment, knowledge engineers and assistants in preparing lesson plans. These students are supported by professional courses, and are exposed to many computer languages as well as technological skills, as derived from the example of the establishment of a helpdesk, from its initial need identification stage through checking community characteristics and in fact functioning in a business-world model.

Computer trustees indicate that the innovation contributes to them personally. They feel a pleasant climate, they learned to be tolerant towards other people different from them, and enjoy getting away from the routine once in a while and be reinforced for their voluntary work. It also has an influence on their future: they are marked by the Israeli army to be recruited to prestigious computer units, based on the valuable knowledge they have acquired.

On the one hand, the approach is that technological failures will not stop innovative pedagogical processes. On the other hand, students complain there are not enough computers, and that ICT transmission is relatively slow. Since most students have up-to-date computers at home, they are not impressed by the facilities in their school. However, compared to other schools with similar background their school is relatively advanced.

Academic Strictness

According to the principal, ICT application is effective only if it facilitates learning. The joint vision of the school staff is to broaden ICT implementation and to have as many teachers involved in the process. The computer coordinator sees a future vision in which students arriving at school with laptops instead of books

and notebooks. The intent in the present is to enable students, especially those without computers at home, to use computers at school for educational purposes in the different subject matters.

The innovation contributed to the students self-esteem, who enjoy a prestigious status and appreciation from the whole community for their volunteering. The students see the participation in the innovation as an investment for their professional future, in skills such as teamwork, in addition to the acquired knowledge.

Equality

The support of the computer trustees contributed to all students, directly and through teachers. Using ICT increased interest in students and caused a stimulus for a different kind of learning: *It interests them, it s something familiar to them, like it was with the television. It doesn t matter if I could write the same sentence on the blackboard. The moment it s written in the computer it s looked at differently...* (Innovation teacher)

There is also positive influence on the computer trustees attitudes towards differences between people, as a result of their experience with special education kids: *In the special education school there are children with problems. At first, it was scary and we were deterred, but when you share information it s fun. They see us as a pair, as friends. It s fun knowing that you re the teacher and you share your knowledge.* (A computer trustee)

MAIN HYPOTHESES

The Role of Technology in the Innovation

It s the right thing to invest in students, because they are a cheap resource. It doesn t cost the school any money. They re here anyway, not outside workers. They are a part of us. They re here on a daily basis. They know the problems, the limitations. Their solutions are sometimes much more creative than ours. I think the more we give them, the more they use it. They re grateful and are willing to give, and they enjoy every minute of it (Involved teacher)

The main evidence supports the claim that the computer trustees are the main resource for ICT implementation. The innovation is seized as the efficient utilization of students as a driving force in ICT implementation. This is captured as the core of the innovation by the principal: What has been done until now in all systems was to bring external forces, such as teachers or instructors... We came to the conclusion that the driving force for teachers and students were these students with abilities above average in the field of ICT. This was a resource that had to be used.

Technology in the Bar-Lev school served as a catalyst of the innovation. Moreover, it was derived as a result of the need to use efficiently technological resources within the school. Nowadays, for facilitating values of collaboration and knowledge sharing, along with values of contributing to the community, technology is used as a valuable resource.

Transferring the Innovation

The principal was very active in ICT implementation in as many classes as possible: *I told my computer coordinator: there are teachers without Internet connections at home. Your assignment is to see to it that all teachers have computers at home, connected to the Internet. How? I don t know. Then she pressured them slightly, drove to their homes, persuaded their husbands to buy a computer, and then we opened the web site. We went step by step to expose them to ICT. One of the teachers who couldn t afford a computer got my laptop.* Evidence supports the claim that the transferability of the innovation was done in stages, not

as a top-down decision. The teachers received all possible means of support for joining the innovation, such as training and available everyday support from the computer coordinator. *In the first year, all the teachers had a sticker on their home computer with my name and phone number, and they could call me until 24:00 in the night, and I was their support.* (The computer coordinator)

The school trained more computer trustees team in an effort to widen the inner circle of participants. Although the principal did approve pressuring teachers to implement ICT, he does respect those who chose not to join the innovation: *There is, say, a literature teacher, who we tried to persuade to join the innovation, but she s not ready yet. She s a great literature teacher, she teaches well; she develops very serious conversations in class. I have no complaints against her: students achievements, their products, they re all OK.* However, it seems as if the principal expects the demand for ICT implementation to come from the students: *Look, there s a teacher that says: Me, the existing lesson plans are enough for me. She s been a teacher for 30 years. There s nothing you can do. It s banging your head against the wall. It s not worthwhile to me. She should teach what she knows, and the students either will push her out, or she won t have a choice but to cope with ICT.*

Implementation of ICT

It seems that the results of ICT implementation in the Bar-Lev school are determined by infrastructure and by students ICT skills, and not by staff capabilities. There is a demand for higher performance of teachers, but the school encourages an approach in which *you combine the content-based world of the teachers and the technology-based world of the students, by which they help teachers... We acknowledge the fact that students have much greater abilities than teachers do in the field of ICT. The school uses this.* according to one of the parents.

Some of the teachers involved in the innovation are relatively young, and had been exposed to ICT in the course of their studies. However, not all teachers are so willing, which is why it s agreed that *the young kids, due to their ability to adapt themselves well to changing situations, they are much more open. Their ICT abilities are much higher than those of the teachers who do not involve themselves in this field.* (An uninvolved teacher)

The claim that students ICT abilities influence the results of ICT implementation is embedded in the nature of the innovation: actions related to the community. In order to facilitate an innovation in which they contribute to the community, students rather than teachers have to be highly skilled in using ICT. One of the goals of the innovation is to virtually document senior citizens life stories, as well as to open another communication channel for them. This requires professional ICT knowledge, as well as pedagogical abilities, together with sufficient infrastructure.

Digital Gap

The students involved in the innovation are those who in the beginning of the year volunteered for it out of personal will and interest, prior knowledge and self-confidence. These students, mostly male, usually had accessibility to a computer at home. They are good students, are considered responsible and have no problem keeping up with the material taught in class even when missing lessons from time to time. They consider themselves as above average in academic achievements, and their preferred subjects are mathematics and computer science.

One of the teachers claimed that *a low SES student who does not have a computer at home and is not familiar with it will find it impossible to be a computer trustee. Not that there is no chance! Of course, if during the first year he will display great knowledge then of course he can participate. But it will e more difficult for him, I think.* (An involved teacher) in actual fact, within the computer trustee group there are some students with lower abilities who benefit from the innovation. Some are students with learning disabilities, which due to the encounter with the computer and the innovation as a whole have gained

appreciation, respect and higher self-esteem: *There is a student who was at the edge of committing suicide, and due to the innovation, he practically came back to life.* (The computer coordinator)

The school is a heterogeneous one, therefore the school prepared to advance each student according to his or her prior knowledge: *Those with higher abilities are certainly influenced by the innovation. They always aim a few steps forward. The lower achievers are less influenced: they have some basic deficiencies. We try to keep up by using the learning center, in which there s a special education teacher involved in the innovation, to help some of the students. This definitely helps them. I concentrated all computers into 3 labs, a library and special education rooms. I understood that this is the way computers will be most helpful at our school, and had I been able, I d have brought more computers. All this is to promote students who are low in academic achievements.* (The principal)

It seems there are gaps between the week and the excellent students, although the school uses ICT as an additional means of expression for the low achievers. In addition, ICT is used for overcoming learning disabilities. The school opens in the afternoon for use of computer lab with no extra charge, for all students, and by this computers are accessible to students from low SES families. Of course, this does not overcome situations in which parents fund private lessons in web design, but it does overcome possible gaps in ICT implementation in different subject matters. One of the parents to a 13-year-old online forum manager is not overwhelmed by the digital gap: *And in math aren t there any children left behind?*

Academic Standards

The school staff believes that one of the results of ICT implementation is the production of products on a higher academic level, due to richer information resources, richer illustration means, coping with higher standards and a high ratio of computers per students (1:2). The necessity of working in pairs so each student can use a computer enabled development of collaborative learning, which brought depth and interest to the studying process.

There does not seem to be a waste of time using technology. Usually this is the result of lack of interest in a lesson, and this is rare in ICT implemented lessons compared to other lessons, although this might happen: *Sometime I see students talking during the lesson, or entering chats and the likes, something they aren t supposed to do. There are always those who aren t interested in anything.* (An involved teacher) It seems to teachers that whoever wants to waste time in school will do it regardless of technology.

IMPLICATIONS FOR THE FUTURE

Stability of the Innovation

There is no reason that this ever ends in the near future, if the funding continues and the participants will continue living in harmony. (The external instructor)

The innovation has been active for the last three years. It seems that the key for sustainability is the belief in its functionality. The goals of the innovation derived from school needs: difficulties in ICT implementation led to the thought of having an available support team on an everyday basis. The teachers needs of an immediate solution for ICT failures during lessons raised the idea of a special issue, Common Failures , teachers training courses and the training of computer trustees, all the result of practical needs, thereby assuring sustainability. The ideological aspects led towards additional goals of contributing to the community and to the sustainability of the innovation. The students are grasped as the center of the innovation and as its striving force, as reported by the outside instructor: *The point of view was that you have to start with the students. The students will be the motivating forces that will set the school forward.*

Another factor influencing the sustainability of the innovation was the teachers attitudes towards ICT as a means of raising students motivation and reducing discipline problems common in traditional teaching.

However, in spite of all the advantages of the innovation, the teachers feel fatigue, not being rewarded as they should be. They invest many hours in adapting ICT to learning materials, building ICT-implemented lesson plans, training and surfing, but indicated they could get tired of it. In addition, the teachers that are not involved in the innovation are drawn back by the efforts involved in ICT implementation.

One of the additional factors contributing to the sustainability of the innovation is the goal set by the school itself to develop ICT-based lesson plans. Much thought had been given to renewing infrastructure and raising creative ideas, such as constructing a web-site and building databases for teacher and student use. Computer trustees have a major role in the facilitation of these ideas.

The support of management influences innovation sustainability, as seen by the outside instructor: *Some principals in the Israeli education system do not understand anything about ICT. They think that every change process should include the whole school staff, but this does not stand a chance. Once the principal understands that processes are multi-staged and you gradually add more classes and students to an innovation, the achievement of goals is possible. But implementing all at once is not realistic.* The main support of the management is in the message, that ICT-implemented teaching and learning is vital for preparing students to the future world of technology, information and values of collaboration and teamwork.

The cooperation and close relations between teachers and students have a profound influence on the continuation of the innovation and the belief in its strength. One of the teachers was quite frank in sating: *If I hadn t come here, I wouldn t have known that Yossi is such a lovely boy.*

Sustainability is possible also as a result of the understanding of the teacher that his role is not under any danger. The same way the computer cannot exchange the teacher, as asserted by the computer coordinator, *the computer trustee cannot exchange a teacher. She still has to prepare lesson plans.*

The aspiration of the school is to expand the circle of participants in the innovative actions. The circles have expanded even beyond school, to the community. The computer coordinator encourages school staff, while the principal encourages factors outside the school to help with funding resources. These stages are backed up by Edusystems, a private company with expertise in ICT implementation in education. *The guidance is not an idea to be actualized in an instance. There are weekly meetings with the principal and the computer coordinator. According to the development of the innovation we bring new ideas, the school brings new ideas they ve sometimes seen in other places, and together we combine these ideas in the activities of the computer trustees.* (The Edusystems advisor)

It seems that with the lack of clear national policy concerning ICT implementation, according to the school staff, the sustainability of the innovation depends mainly on the school itself. The school is making an effort to set high standards relating ICT implementation and to persuade local authorities to fund the innovation, but according to the principal, not always with great success.

In general, the sustainability of the innovation stems from the participants feelings that the place they have reached does not allow them to go back. However, there are a few conditions needed for assuring its continuity: a leading figure in the future, continuing teacher collaboration, appropriate rewarding, support from management changes in learning schedules for teachers who want to join the innovation, enriching the curriculum, constant upgrading of infrastructure and software, and further training.

Transferability of the Innovation

The future vision is that the innovation will be transferred to all schools in Israel... nowadays the innovation is within the city. (The computer coordinator)

The school is leading a process of transferring the project in the municipal level. Students from other schools receive training once in two weeks, serving as computer trustees in their own schools, and taking their knowledge onwards as future high school students. The vision of the computer coordinator is to involve as many schools as possible in the innovation, adopting elementary schools as well.

One of the reasons for the ability to transfer the innovation within the school is its wide acceptance, by teachers, students, parents, management and supervision. There is agreement on the fact that exposing students to ICT enriches the curriculum, teaching and learning, raises motivation and the quality of the learning products, and contributes to the quality of teaching. Students acquire tools for assisting them in the future world, and computer trustees particularly acquire professional skills and competencies for their vocational future. They accumulate great amounts of knowledge that they learn in prestigious courses.

From the community s point of view, this innovation is very special: the students are exposed to professional knowledge and to the competitive market on one hand, and to values of giving, sharing and acceptance on the other hand. The teachers themselves profited from the innovation, learning new skills and developed personally and professionally.

The rumor had spread that the school opened its gates to senior citizens, teaching them ICT skills, and many senior citizens have requested to join the lessons. Parents also feel their children only benefit from the innovation: one of the mothers told us: *Instead of giving the mouse to his own grandpa and grandma and doing things instead of them, he s more capable of explaining to them what to do. He s more tolerant.*

Some difficulties had to be overcome, such as enormous efforts to involve other teachers in the innovation, especially those that aren t as supportive of ICT personally, as described by one of the involved teachers: *There are the limitations of time and knowledge. Not all teachers feel comfortable enough to enter the computer as a result of their lack of personal knowledge.*

The school staff claims that the uniqueness of the innovation is, in fact, in the ability to transfer it. However, transferability *depends on money, initiative, a budget and the municipality* according to the computer coordinator. Any school that is interested in the innovation will have to be equipped properly in ICT infrastructure. However, this is not enough: the school has to update infrastructure constantly, as well as change its pedagogical concepts, so it is combined adequately with ICT.

Another difficulty is to plan and carry out professional courses compatible with the level of the previous ones, since they required large amounts of resources, which were a result of the principal s ongoing efforts. A principal who wants to implement the innovation has to be able to raise funds and to stimulate a spirit of volunteering within school staff and students. For example, the school labs are open twice a week in the afternoon, enabling as much ICT usage as possible for students.

The advantage of schools that are candidates for transferring the innovation is being able to learn from experience. The outside instructor says: *The experience we acquire enables us to shorten certain stages in the process.*

However, the ICT national policy does not seem to learn from experience. According to the principal, other schools may attain the support he did, morally, in public relations, in the media, and maybe even financially, at least to begin with. Still, the real problem is the delay of the process, caused by lack of finance for training teachers, teaching hours and upgrading. The computer coordinator sums it up: *I know how to develop the innovation and transfer it to other places, step by step, how to involve the principal, the staff, how to make plans and implement the process. But it had to come from the top. A change has to be done in the planning on a national-wide basis. This has to be implemented in the curriculum as a policy.*

APPENDIX

APPENDIX 1: Methodology

Research Team: The research team included 3 researchers that divided the data collection between them: Yael Yaron, the team coordinator, Tali Barak-Oshri team member, and Anat Cohen team member. The interviews of the focus groups were usually held in teams. The personal interviews: school principal, computer coordinator, external project coordinator etc.) were usually held by one researcher. The observations were held mostly in pairs.

Research length: The research was carried out between December 2000 and May 2001.

The Data: The chart below describes in detail all the data collected. All interviews were recorded and all observation details were written down. All data were transcribed into digital files and uploaded to the Israeli research Website, at http://muse.tau.ac.il/ict/. The average length of each interview was an hour and a half. The focus group interviews were even longer (an average of two hours). The observations lasted the length of the lesson, usually 45 minutes. According to the material collected, a data matrix was built, which served as a basis for the final report. The matrix and the report were written by the research team coordinator, then sent to the team members for verification and assessment.

Interview and Observation Chart for Bar-Lev School
December 2000-May 2001

Research Tool/Action		Date and Hour	Name of Subject	Role of Subject
Phone contact				
Pre-research meeting		2.1.01	Asaf Naftali	Principal
Administrator interview		18.3.01	Guy Levi	Pedagogic administrator, Edusystems
Principal interview		14. 2.01, 13:30	Asaf Naftali	Principal
Principal questionnaire		2.1.01		
Coordinator interview		31. 1.01, 22.2.01	Dorit Bachar	Computer coordinator
Coordinator questionnaire		2.2. 01 sent; 13.2.01 received		
Observations	1	22.1.01, 10:30	Computer trustees and senior citizens	
	2	22.1.01, 13:00	Computer trustees in training course	
	3	30.1.01, 8:30	Computer trustees and special education students	
	4	15.3.01, 10:30	A civics class with assistance of computer trustees	
Involved teachers focus group interview		30.4.01, 10:00		
Uninvolved teacher interview		15.3.01, 8:45		
Involved students focus group interview		22.2.01, 9:30		
Parents focus group interview		30.4.01, 20:40		
Documentation		24.1, 12.2, 1.3.01	Brochures, School web-site, online forums	

APPENDIX 2: Teachers Computer Skills

Results of ICT Skills Survey among Teacher Population For Bar-Lev School

Methodology

The questionnaire was handed out in the teachers room, and filled out by 5 out of 53 teachers on the school staff. The teachers who participated in the survey were classroom teachers and subject teachers, teaching

7th to 9th grades. The results are shown in the following tables.

		Good	Mediocre	Weak
30	How would you define your ability to use computers?	3	1	1

Answer the following questions relating to your prior experience or to ICT implementation in teaching\learning during the past year.			
		Yes	No
31	Had there been assessment of computer usage among students?	1	4
32	Can you create or alter a web site with one of the classes you teach?	1	4
33	Do you participate in a virtual course on the internet as a student or tutor?	2	3
34	Do you involve your students in collaborative learning on the Internet with students from other classes in other places?	1	4

		All of it	A large part	A small part	A minor part
35	What part of computer usage during the lesson is aimed directly at the lesson content?	1		2	
36	What part of the computer-related assignments is for individual usage?		2	1	

		No limitations	Some limitations	Distinct sites only
37	Do you assign your students to search the web? What is the degree of freedom you allow your students while doing so?		2	1

		A few times a week	A few times a month	Once in a while	Never	I don t own a computer
38	Do you own a personal computer? How often do you use it for your work?	3	1	1		

		Yes	No
39	Do you use technology to collaborate with other teachers? (professional chat rooms, forums etc.)	3	2

		More than 12	6-11	1-5	None
40	How many messages (average) do you send a week by e-mail?	2		1	2

How many of the following activities can you perform?		
41	Altering hardware	1
42	Updating/upgrading applications, such as word processors, graphic software etc.	1
43	Restoration of files	1
44	Site construction	1
45	Developing databases	1

APPENDIX 3: Samples of Activities

An online forum had been opened for the computer trustees activities with the senior citizens , in which they document their meetings and reflections:
www.education.gov.il/michlala

APPENDIX 4: Glossary

CET   Center for **E**ducational **T**echnology   a non-profit institute established in 1971. CET operates in coordination with the ministry of education, with an aim to develop and facilitate education in Israel, by developing innovative ideas, tools, strategies and products in the field of education in general and technology implementation in education specifically; URL: http://www.cet.ac.il/

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[1] **Pais Cluster**   a facility donated by the Pais public organization, built adjacent to secondary schools, for studying sciences, technology art and GE during school hours and in recreation time. These centers serve the whole community as well.

[2] **Tomorrow 98 - 5-year Computerization Program:** a national master-plan beginning in the year 1993/4, 5 years prior to Israel s 50th anniversary, with the goal of facilitating the achievements of the educational system in Mathematics and Sciences.

[3] The school web-site: http://www.bar-lev.kfar-saba.kishurim.k12.il/. In the school website, there are hyperlinks to the computer trustees innovation, as well as to the special issue of common computer failures.

[4] **Edusystems**   a private company with expertise in developing and facilitating technology implementation in education. It operates in two aspects: instruction, implementation, teacher training; development of software and learning ICT surroundings. The company operates wide-range projects

throughout the country in the field of ICT in education.

[5] **Internet Zahav**   a private company supplying Internet services.

[6] **Bezeq**   The Israeli national telephone company.