

PROMOTED SOCIAL PROCESSES IN THE CLASSROOM: MAXIMIZING THE EFFECTIVENESS OF TECHNOLOGICAL TOOLS

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Abstract

This paper describes the experiment carried out as a part of doctoral research aiming to verify the hypothesis that effective maximal utilization of technological tools promotes social dynamics in the computerized classroom. The experiment was carried out comparing reciprocal relations activities taking place within three different classrooms: the traditional classroom, the computerized classroom, and the "classroom maximizing the effectiveness of computers."

It gives a close examination of the most effective use of the opportunities provided by integrating the computer into the classroom to promote social processes among the students.

Key words: effective teaching, successful use of ICT, ICT integration, Teachers integrating ICT, ICT proficiency.

Introduction

This paper describes the experiment carried out as a part of doctoral research aiming to verify the hypothesis that effective maximal utilization of technological tools promotes social dynamics in the computerized classroom, and identifies the aspects of the computer's unique potential contribution to promoting social processes in the classroom while developing a model engaging in maximizing the effectiveness of technological tools and their level of impact on social processes in the classroom.

The experiment was carried out comparing reciprocal relations activities taking place within three different classrooms: the traditional classroom, the computerized classroom, and the "classroom maximizing the effectiveness of computers."

Seeking to examine the most effective use of the opportunities provided by integrating the computer into the classroom to promote social processes among the students, led the researcher to use the action research methodology, that enabled her

to be involved directly in the activity being studied, analyzing existing practice and identifying elements for change and primarily, to improve it [15;40]. In seeking evidence for the effectiveness of the change, and the obligation to look at it from different perspectives, a triangulation of methods was employed [47]. These methods are comprised of: class observations of interactions, monitoring of learners' achievements, analysis of learners' questionnaires, interviews with teachers, an interview with the ICT coordinator, and external documents containing education policies regarding ICT use in schools, published by formal bodies of decision makers.

The school's plan, in order to adapt itself to the 21st century [14;5;11;10;28], emphasizes six operational objectives: Safe web, ICT literacy, Collaborative learning, Activating the ICT integrated teaching in the TLA program, the school portal, and the pedagogical management tool. The school wishes to improve communication, via collaborative tools and the website, between teachers, students and parents, to encourage teachers to use and develop computerized units that involve computer literacy, and to use the school's web site as a platform for sending computerized tasks. Reflection and evaluation [29; Ames' (92) in 14; 9; Kennewell et al (2000) in 41; Savery & Duffy (96) in 44] are part of the policy plan of the ministry of education of Israel, but they are missing in the school annual plan and therefore create a gap [41], as consequence the implementation of technology in this school occurs in 'Islands of Innovation' pattern [Avidov-Unger and Eshet- Alkalai (2011) in 6] which encompasses only part of the educational organization.

Four teachers were interviewed regarding their teaching characteristics, their use of computers in their classrooms, and the social processes undergoing by their students. All four teachers described themselves using the same personal characteristic: innovative, creative, effective and updated. Three even added that they are not a risk taker person. Two teachers had limited ICT skills therefore it is not surprising that they were the teachers that integrated technology ineffectively. The two remaining teachers that integrated technology into their lessons effectively had partial or strong background in ICT. It is interesting, considering the fact that all four teachers acknowledged the importance of integrating technology into the learning-teaching process, and also gave the reasons to support it, that only the effective teachers saw in the ICT integration a necessity.

As for promoting social interaction using ICT, the two effective teachers harnessed

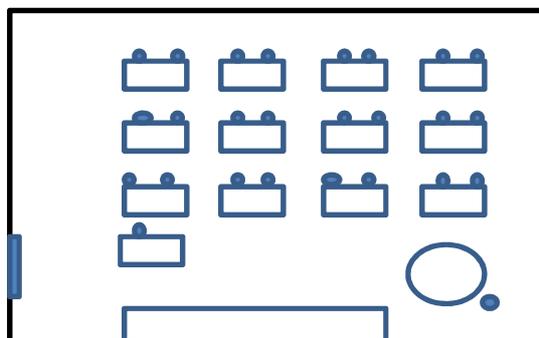
technology to help them promote the dialogue between the pupils in class.

Unfortunately, the two other teachers do not believe in the promotion of social interaction in the learning process in general or with the use of ICT.

With reference to the skills an effective integrating ICT teacher should have, the answers varied. Although all four teachers agreed that being updated is an important characteristic, only two talked about being innovative. An interesting point Teacher B presents, is that although she does not believe that she should be a risk taker in order to integrate ICT in her lessons; She does believe it is an effective ICT teacher characteristic. Finally, it is encouraging to know that all four teachers participate in teachers' training and hope to develop in the technology field.

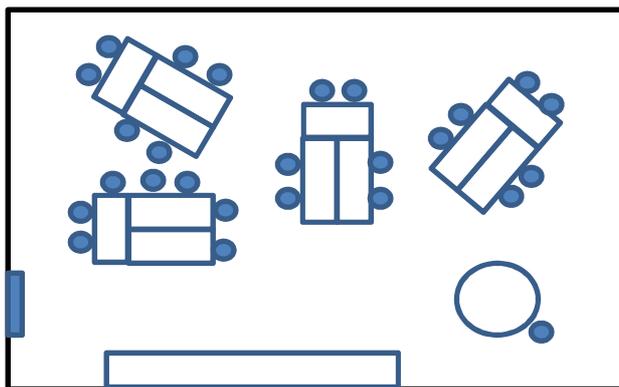
Two classes of six graders in an Israeli elementary school were invited to participate in the research, involving 43 pupils: 19 boys and 24 girls. In all three case studies, pupils were taught English, according to the curriculum, for a period of eight lessons. At the end of each case study, the pupils were examined on the material they have just learned and their scores were divided into four groups according to the school procedure: low level (scores between 0-46); low-medium level (scores between 47-64); medium high level (scores between 65-83) and high level (scores between 84-100). Pupils were also asked to fill up a questionnaire reflecting on their learning process.

Case study I involved teaching in a conservative way only. There was no implementation of ICT of any kind. Lessons were based on books, and most of the practice was done in the workbook and on the board. The two classes were organized in a conservative way that is, pupils were sitting in pairs according to the following structure:



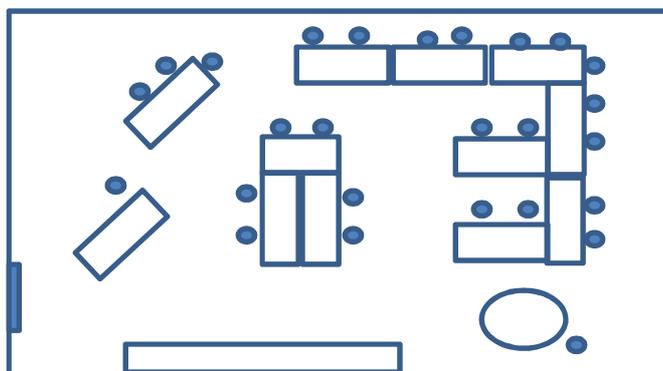
Structure 1: Classroom Organization Case Study I

Case study II involved teaching using ICT, with no effective maximal utilization of the technological tools: The smart board was used only as a projector board, in other words, the digital books were only projected on the board, and homework or class projects were assigned to word processors only. Each class was organized in groups of six according to the following structure:



Structure 2: Classroom Organization Case Study II

Case study III involved teaching using a variety of technological tools effectively. The smart board characteristics were utilized to their full: The digital books were accessible to all the pupils and pupils were invited to the board to take part in the assignments and homework. Class projects were assigned to different technological tools including shooting self-videos, using smartphones. Each class was organized allowing multiple types of sitting arrangements, and pupils were allowed to change their position during the lesson as shown in the following structure:



Structure 3: Classroom Organization Case Study III

Applying the model for effective maximal utilization of technological tools in the classroom was carried out according to the methodology discussed by the researcher of this thesis in the second chapter, considering two aspects:

1. The influence of ICT characteristics on the level of socialization and interpersonal interactions in 3 categories:
 - a. **Classroom Organization in coordinated groups** where small groups working collaboratively [Neilson (02) in 16; Hiltz (95) in 12; Ames' (92) in 14;13;23;39;26;38;22; Bar Tal & Bar Tal (85) in 3; Pea (93) in 32], using means and outcomes, while linking and communicating between each other through an "organizational body" in the image of a coordination committee or a moderator. At some point, the class returns to function as one unite organization while dealing with the learning outcomes of the groups in cooperative social climate.
 - b. **The Learning Task being divided between group members and correlated with the other groups** in this way, each group is dealing with different aspects related to the class theme, that is, specialization in specific components of the overall theme. The completeness of the learning task is a process that takes place amongst learners and not within an individual. There is an attempt to create a group model while significantly utilizing time. Using artificial knowledge representations (such as hypermedia and databases) allows the learner to finish the learning task at the same context but the objectives are different between each learner. As a result the individual learner designs the quality of the knowledge he acquires and its implications via his own interpretation [Neilson (02) in 16; Ames' (92) in 14;19;24;27;39;13; 8] .
 - c. **The Teacher's Activity is groups coordinator** as such, he takes part in the learning challenge while dealing with the learning process, without knowing the path and the target to which he is headed with his students. The teacher is a task leader rather than an authoritarian leader [7; Pitler & Yackel, (02) in 1; 34; Raw (02) and Kinderman (96) in 27; Pomeroy (99) in 27], and helps the groups reach a comprehensive conception of the subject by the exchange of information and opinions between groups [Neilson (02) in 16; Hiltz (95) in 12; Ames' (92) in 14;13;23;37;26;38;22; Bar Tal & Bar Tal (85) in 3; Pea (93)

in 31]. The teacher is interconnected with organizational and content-related aspects in coordination between individuals [27], groups [Neilson (02) in 16; Hiltz (95) in 12; Ames' (92) in 14;13;23;37;26;38;22; Bar Tal & Bar Tal (85) in 3; Pea (93) in 31] and the whole class.

2. Estimating the socialization levels in the computerized classroom was carried out using the "Interaction Level Indicator" [2]. This indicator detects the estimated levels of interaction in the classroom, and includes all factors affecting socialization processes under these four categories: classroom organization, learning task, pupils' behavior and teacher's activities. The indicator is designed this way, in order to facilitate the understanding of the separate influences of the computerized learning environment components, on the social dynamics in class. This indicator can assist teachers to get a social situation report, and a feedback to their actions in class [29; Ames' (92) in 14;9; Kennewell et al (2000) in 41; Savery & Duffy (96) in 44] from their students' point of view. Moreover, the indicator also enables monitoring and feedback for maximal utilization of all the components influencing the promotion of social dynamics in the computerized classroom.

The socializations levels that were found in each case study of the research, in each category, are best displayed in figure 1. The final interaction levels which were found in each case study are displayed in figure 2.

Measuring levels of socialization included adjusted calculation of the results produced by the "Interaction Level Indicator"[2] as recorded by the teacher on the one hand, and the processing of student responses from the questionnaires on the other. Students' results were similar to the ones produced by the "Interaction Level Indicator"[2] as shown in figure 3. Integrating technology effectively into the lesson led all the pupils to feel they are enjoying at least some parts of the computerized lessons. The reasons they gave varied: most of them claimed the atmosphere was more fun (37.2%), or the lesson was more interesting (30.2%), they understood more (20.9%), and felt learning was easy and up-to-date (16.2%). No pupil reported that he felt "not good" during these lessons, as opposed to case study I and II. 95% of the pupils described an atmosphere where they "learn more with friends, help each other and cooperate", they emphasized that social interaction during the lesson provides a fun environment for learning. However, there were still pupils who felt

uncomfortable with the ongoing talking during the lesson (2.3%). This means that some children prefer working quietly by themselves, and are aware and comfortable with their learning style. Nevertheless, compared to case study II, there is a 25.3% increase in the number of pupils that experienced social interaction as a part of their learning process. With regard to the learners' view of the teacher's activity, in case study I, pupils agreed that social processes were not promoted during the lessons (58%), and class organization affected the social interaction between the pupils (74.4%). In case study II, all pupils stated that, to some extent, the teacher demonstrated a good ability in controlling the technological tools in the lesson, but noted that she was helpless when there was no internet connection. Again, pupils reported that the teacher, while integrating technology, is more understandable (44.73%), interesting (21%) and seems enjoying the lesson as well (23.6%). Again, in case study III, all pupils stated that the teacher demonstrated a good ability in controlling the technological tools during the lesson. They also added that she speaks less (9.7%), and makes them feel that learning is a game (19.5%). Moreover, the teacher was described as "more supportive" (56%) [12; Pitler & Yackel, (02) in 1;34; Raw (02) and Kinderman (96) in 27; Pomeroy (99) in 27] and "relaxed" (26.8%), since, as one of the pupils explained it best: "there are no discipline problems because this way it is easy to keep the class in order".

Figure 1: Estimation of Socialization Levels in Each Case Study According to the Four Categories

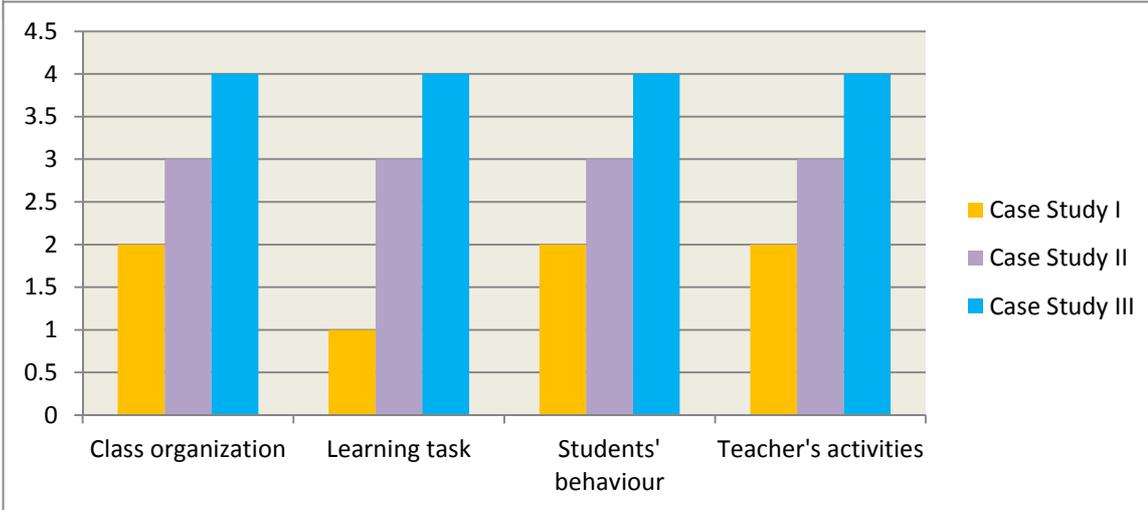


Figure 2: Final Interaction Level Found in the Research

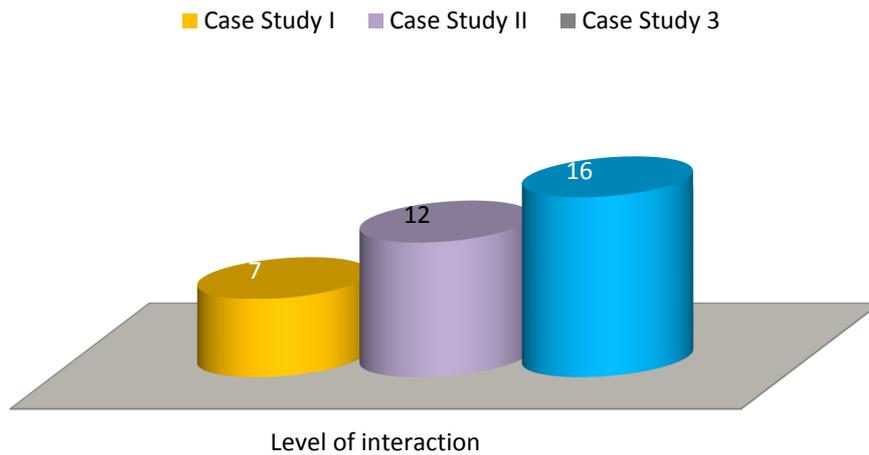
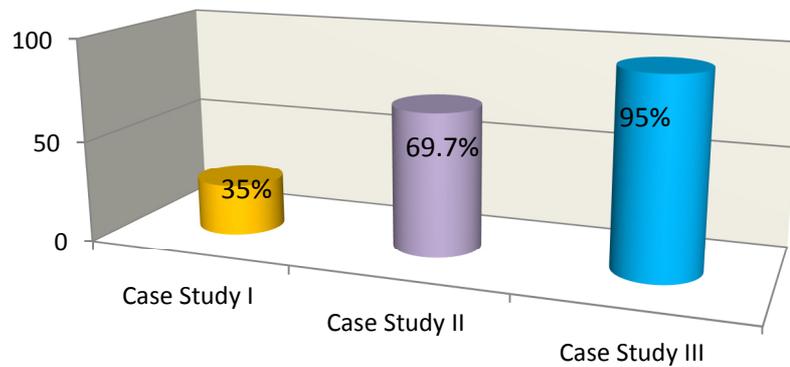
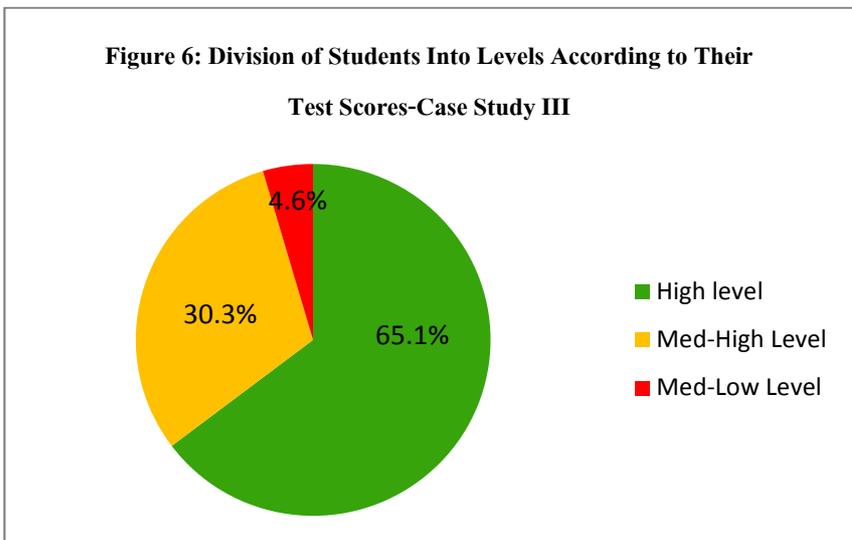
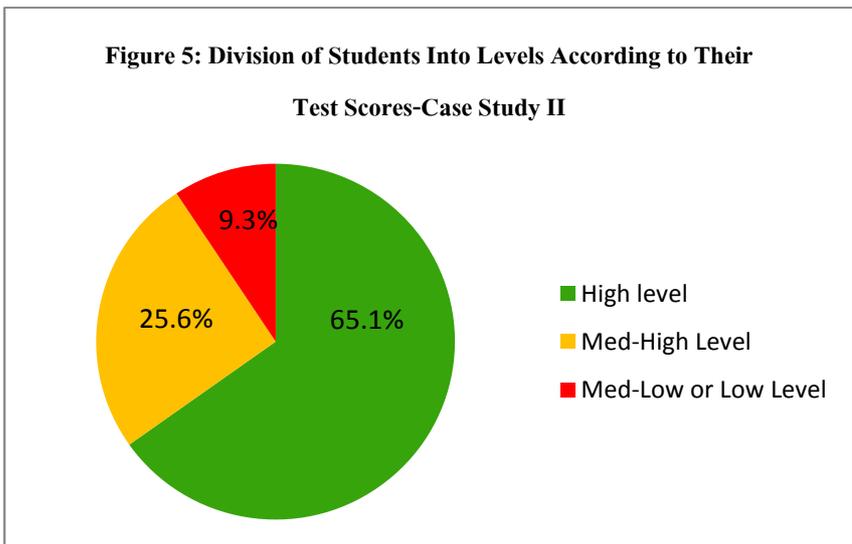
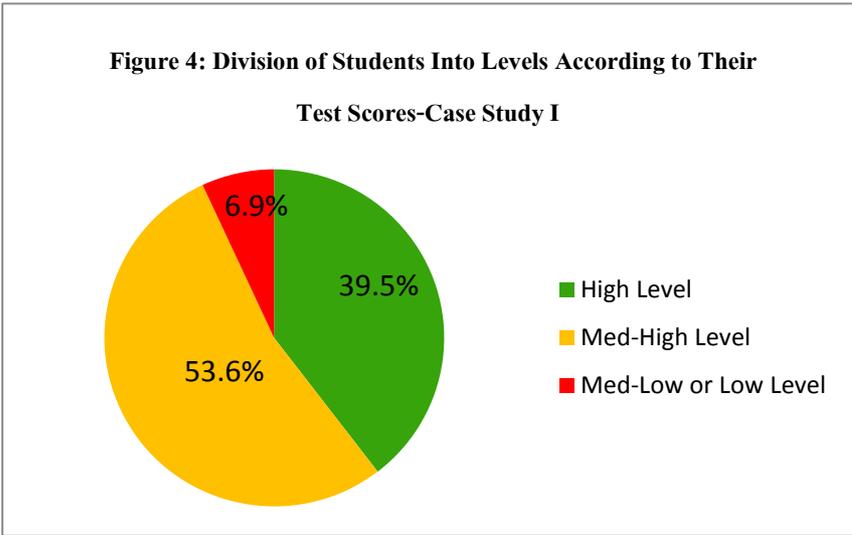


Figure 3 : The Number of Pupils That Experienced Social Interaction During the Learning Process

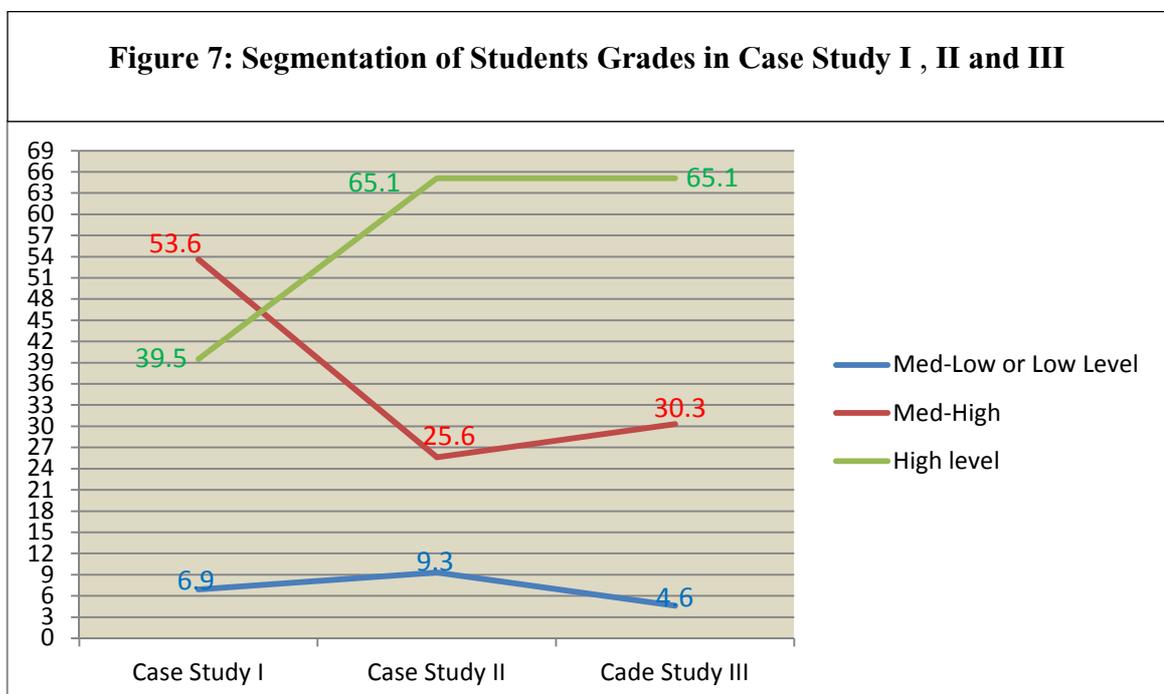


As for students' achievements, they are best displayed in the following figures for each case study:



When comparing the scores of case study II to the scores on the exams in case study I, it appears that although the percentage of pupils who scored med-low or low level went up by 2.4%, which means that with regarding to the exam in case study I, there are more pupils in this level, the percentage of pupils who scored high level grades went up by 11.6%, while the percentage of pupils who scored med-high level grades went down by 27.8%. This means that when teaching while integrating technology into the learning process, and allowing social interaction in the classroom, one cannot ignore the obvious result that more than 60 % of the pupils scored high level grades.

The transition of most pupils was from med-high level to high level grades in the exam. The problem, in case study II, remains the pupils who are in the med-low or low level. These pupils' learning difficulties have not been addressed while using technology ineffectively. Introducing technology into the teaching process has changed the pupils' ideas about their learning. More pupils enjoyed the lessons and were aware to the fact that these lessons involved more social interaction as opposed to the lessons they experienced in case study I [Koren (12) in 18;33;42;16;34;4;25;21;27;45]. The involvement of technology in the learning process and the opportunities that were opened for social interactions in case study II, led 100% of the pupils to realize that interaction is important to the learning process [Davidson (12) in 18; Ames' (92) in 14;27;17;35; Pomeroy (99) in 27;20; Ernest (98) in 1; Anderson & Kanuka (97) in 12;44; Savery & Duffy (96) in 44; Hiltz (95) in 12;43], and that technology has great influence on the social interaction between the pupils [Koren (12) in 18;33;42;16;34;4;25;21;27;45], alongside with class arrangement [36;2;3]. When comparing the scores in case study III to the scores on the exam in case study II, it appears that although the percentage of pupils who scored high level remained the same, the percentage of pupils who scored med-high level grades went up by 5.4%. Moreover, the percentage of pupils who scored med-low level grades went down by 4.7%, while **no pupil** scored the low level grades, as seen in the following figure:



When teaching while effectively integrating technology into the learning process and allowing free social interaction in the classroom, the satisfactory result is that most of the

pupils scored high level grades and no pupil scored low level grades. The transition of most pupils was from low-med level to med-high level grades in the exam. This means that the side effect of effectively implementing technology and promoting social interaction is the academic promotion of sub-achievers students. Integrating technology effectively into the teaching-learning process is reflected in the pupils reaction to the social processes promoted in class. According to the pupils, technology influences these social processes [Koren (12) in 18;33;42;16;34;4;25;21;27;45] in three dimensions:

1. Technology "forces" pupils to work together. Pupils' working in collaboration is an enjoyable learning activity and hence more pupils take part in the learning process, as one of the pupils noted: "when it's more fun, kids want to participate more" [Davidson (12) in 18; Ames' (92) in 14;27;17;35; Pomeroy (99) in 27;20; Ernest (98) in 1; Anderson & Kanuka (97) in 12;44; Savery & Duffy (96) in 44; Hiltz (95) in 12;43].
2. Technology used effectively encourages a great deal of talking, brainstorming and exchanging ideas [27].
3. Technology used effectively involves peer teaching or as one of the pupils indicated: "I don't need the teacher all the time, when I have a problem I ask my friends or if I make a mistake, the computer corrects me" [27].

A dialectical analysis [46] was formed on the final results of the experiment. These results were subject to inclusion and allowed final conclusions and further recommendations.

Conclusions

The experiment compared reciprocal relations activities taking place within three different classrooms: the traditional classroom, the computerized classroom, and the "classroom maximizing the effectiveness of computers." Data were collected, while considering the different conceptions of all the participants in the computerized teaching-learning process: the decision-makers strategies, school policies and planning, the teachers, including the ICT coordinator, and the learners.

In seeking evidence for the effectiveness of the changes between the three different types of classrooms, and the obligation to look at it from different perspectives, a triangulation of methods was employed [47]. These methods are comprised of: class observations of interactions, monitoring of learners' achievements, analysis of learners' questionnaires,

interviews with teachers, an interview with the ICT coordinator, and external documents containing education policies regarding ICT use in schools, published by formal bodies of decision makers. This research has shown that while using effective maximal utilization of technological tools, social interaction processes are encouraged as well [Koren, 2012 in 17]. Moreover, there is also an increase in learners' achievements [Schacter & Fagnano in 30]; this is especially true regarding sub-achievers learners. In light of this, recommendations should be drawn in three levels, for decision makers and schools use, as well as for teachers who intend to progress towards effective maximal utilization of technological tools.

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