UNIVERSITETI I EVROPËS JUGLINDORE
УНИВЕРЗИТЕТ НА ЈУГОИСТОЧНА ЕВРОПА
SOUTH EAST EUROPEAN UNIVERSITY

LANGUAGES, CULTURES and COMMUNICATION
ENGLISH LANGUAGE TEACHING

-MASTER THESIS-

Title: **"Learner perceptions of Computer-mediated collaborative learning in High Schools in Gostivar"**

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Tetovë, 2019

Acknowledgements

I would like to express my deepest appreciation to my mentor Prof. Dr. Brikena Xhaferi for her support through the entire process of this research. Her useful comments, guidance and willingness to respond to my e-mails when I needed help have helped me in designing the thesis. Furthermore, I would also like to thank her for introducing me to the topic and the support. I would like to thank her for encouraging me.

Also, I would like to express my gratitude and appreciation to my family for suppoting me through the entire procces of this research.

Without them I would never have had the same abilities in writing a scientific paper.

I sincerely thank You all!

CONTENTS

Abstract

The recent reform of education in the Republic of Macedonia has brought innovation in the use of technology in the teaching process, as well as the use of computers as a tool, but also as a method and way of learning. Projects and curricula for computer learning in schools were developed.

In this context, this theoretical-empirical research gives a clear picture of the situation with the empirical results of the survey of 100 high school students from the city of Gostivar on the application and use of Computer-Collaborative Learning (CMCL) in the teaching process.

From the results of this research, we conclude that the respondents are familiar with the manner of applying computer technology in the class, the work of computer learning, and that in the secondary schools in Gostivar this method is used more often. The neutral attitudes of students (54%) are dominant, compared to 38% of students with positive attitudes and 8% with negative attitudes towards computer-mediated collaborative learning (CMCL) in high schools in Gostivar. Furthermore, depending on the type of secondary education, students from technical schools have more positive views concerning computer-mediated Collaborative Learning (CMCL) compared to other types of high schools in Gostivar.

Keywords: *collaborative learning; Computer and online collaborative learning; e-Learning; Computer-Mediated Communication (CMC); Computer-mediated Collaborative Learning (CMCL)*

Abstrakt

Reforma e fundit e arsimit në Republikën e Maqedonisë ka sjellë risi në përdorimin e teknologjisë në procesin e mësimdhënies si dhe përdorimin e kompjuterëve si një mjet por edhe si një metodë dhe mënyrë për të mësuar. Në këtë segment janë zhvilluar projekte dhe kurrikula për mësimin e kompjuterave në shkolla.

Në këtë kontekst, ky hulumtim teoriko-empirike jep një pasqyrë të qartë rreth kësaj problematike duke u referuar rezultateve empirike të studimit të 100 nxënësve të shkollave të mesme nga qyteti i Gostivarit për aplikimin dhe përdorimin e të nxënit bashkëpunues-kompjuterik (NBKM) në procesin mësimor .

Nga rezultatet e këtij hulumtimi, ne konkludojmë se të anketuarit janë të njohur me mënyrën e aplikimit të teknologjisë kompjuterike në klasë, në punën e të mësuarit kompjuterik dhe se në shkollat e mesme në Gostivar kjo metodë përdoret shpesh e më shpesh. Qëndrimet neutrale të nxënësve (54%) dominojnë, krahasuar me 38% të nxënësve me qëndrime pozitive dhe 8% me qëndrime negative ndaj të nxënit bashkëpunues-kompjuterik (NBKM) në shkollat e mesme në Gostivar. Për më tepër, në varësi të llojit të arsimit të mesëm, nxënësit e shkollave teknike kanë pikëpamje më pozitive në lidhje me të nxënit bashkëpunues-kompjuterik (NBKM) në krahasim me llojet e tjera të shkollave të mesme në Gostivar.

Fjalët kyçe: *Të mësuarit bashkëpunues; Mësim me kompjuter dhe me rrjet online; e-mësimi; Komunikimi i Ndërmjetësuar me Kompjuter (KNK); Të nxënit bashkëpunues-kompjuterik (NBKM)*

1. Introduction

The growing virtualization of today's advanced society produces, especially in the field of education, the emergence of an increasingly widespread use of new technologies and their inevitable evolutions, and transformations to the point that it is natural to ask whether it is lawful to identify some possible watershed between a 'healthy' use of technological tools that enhance the processes of teaching and learning and, instead, its use actually alters the actual scope of these formative processes.

In fact, it is not always clear whether new technologies are introduced in educational and institutional environments to facilitate the process of cultural transmission, or whether you actually meet them from colliding with certain educational priorities of the learners' mind - priorities that institutional contexts training would have the task of not failing, you always want to think of minds educated to construct actively the meanings of reality transmitted, rather than passive made from rote learning models.

Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits. Educational methods include storytelling, discussion, teaching, training, and directed research. Education frequently takes place under the guidance of educators, but learners may also educate themselves. Education can take place in formal or informal settings and any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational. Educational technology is defined as "*the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources*" (DeFleur, Everette, Dennis & Melvin, 2010, 33). Educational technology refers to the use of both physical hardware and educational theoretic. It encompasses several domains, including learning theory, computer based learning, online learning, and, where mobile technologies are used, m-learning. Accordingly, there are several discrete aspects describing the intellectual and technical development of educational technology:

- ✓ educational technology
- ✓ educational technology that assists in the communication of knowledge and its development and exchange
- ✓ educational technology (LMS), such as tools for student and curriculum management, and education management information systems (EMIS)

- ✓ educational technology itself as an educational subject; such courses may be called "Computer Studies" or ICT

So, first we can say that this research was done in the field of education and, knowing this fact and based on relevant experiences and research in this area, we can say that the field of research in question is based on finding a link between Computer-mediated collaborative learning (CMCL) and the quality level in education by focusing on assessing students' attitudes to this type of learning.

2. Aims of the research

The purpose of this research is to determine the possible connection between the use of Computer-mediated Collaborative Learning (CMCL) and the level of student satisfaction with this type of learning in the secondary schools in Gostivar. In doing so, to determine how this potential correlation influences the quality of the teaching process, and, on the other hand, with this study, in fact with the conclusions of this study, we will enable the competent educational entities to have a clearer picture of the ongoing reforms in education and also to have the opportunity to compare data and conclusions with such studies in the western countries.

Regarding the aims of this research, according to the scientific research methodology for this type of scientific research, the objectives can be summarized in five points as follows:

1. To prove that computer-mediated Collaborative Learning (CMCL) is used at an appropriate level in secondary schools in Gostivar.

2. To confirm that the use of Computer-Based Collaborative Learning (CMCL) shows satisfaction for students during the lesson.

3. To confirm that the use of computer-mediated Collaborative Learning (CMCL) affects the quality of education in general in secondary schools in Gostivar.

4. To confirm that there are differences in students' attitudes towards Computer-mediated Collaborative Learning (CMCL) according to their demographic characteristics.

5. To confirm that there is a difference in the level of usage of computer-mediated Collaborative Learning (CMCL) depending on the type and status of the school.

3. Hypotheses

The hypotheses outlined below will address questions about the procedures to be passed in order to achieve the basic research goals and to achieve a higher level of objectivity during the research process.

H.1 Computer-mediated collaborative learning (CMCL) is applied and used in the secondary schools in Gostivar

H.2 High school students in Gostivar have a positive attitude and are satisfied with Computer-mediated collaborative learning (CMCL)

H.3 Pupils who have positive attitudes to Computer-mediated Collaborative Learning (CMCL) achieve higher learning success (so Computer-mediated collaborative learning (CMCL) increases the quality of education)

H.4 Students' attitudes to Computer-mediated collaborative learning (CMCL) is determined by their demographic characteristics (age, gender, success, residence and level of computer use)

H.5 The level of Computer-mediated collaborative learning (CMCL) use in secondary schools in Gostivar is determined by the type and status of the school

4. Importance of the thesis

As mentioned above, the very nature of the research focuses on the importance of computer mediated Collaborative Learning (CMCL) in the development of psycho-social relationships among students, the development of quality education, and the ability to develop critical thinking in students and many other segments that coincide with a healthy education process. Thus, the results of the research will help the general public and especially the relevant subjects in the educational processes to be sensitized about the importance of new approaches and methods in teaching, as well as their effects on the quality of education, and especially their impact on the development of psycho-social benefits of students in schools.

The results of our research will also be the starting point for other relevant research in this area, especially in our regions where there is still a certain amount of reserve concerning new teaching methods, especially those with the use of computer technology in lessons.

Numerous relevant studies in this area that have been performed in the west (Alavi, M. 1994 “Computer-Mediated Collaborative Learning: An Empirical Evaluation”, Althaus, S. L. 1997 “Computer-Mediated Communication in the University Classroom: An Experiment with Online Discussions”, Frick, T. W. 2006 ”Criteria for evaluating the use of information technology in K-12 education, Kearsley, G. 2000 ”Learning and teaching in cyberspace, etc.) will be used for benchmarking as well as orientation points for the objectivity of our research and the acquisition of relevant factors and indicators for formulating recommendations and suggestions for subjects in the process of education as a whole.

I. THEORETICAL PART OF RESEARCH

1.1 Concept of collaborative learning

Collaborative learning, defined as a process in which participants are collectively responsible for developing knowledge through structured activities and in which the instructor's role is to facilitate and co-participate in the learning process (Nunan, 1992), is one of the principal elements in a sociocultural perspective of learning, in which learning is seen as a social process rather than a restrained one within an individual (Vygotsky, 1981).

Different from traditional learning, which is characterized as a stage where learning is a transmission of information from the teacher to learners, collaborative learning is a learning method that considers social interaction as a means of knowledge construction (McInnerney & Roberts, 2004).

This type of group-based learning is related to the concept of the teacher as the facilitator and learners as active participants (Lamy & Hampel, 2007). As far as units of analysis are concerned, collaboration is principally conceptualized as a process of shared meaning construction (Stahl et al., 2006) which is assumed to be a group interactional achievement, rather than an expression of individual mental representations.

The pedagogical framework that supports collaborative language learning can be traced back to Piaget's (1932) constructivist theory and to Vygotsky's (1978) sociocultural theory (Torres & Vinagre, 2007). Piaget (1932) observed that learning is the result of collaboration. Likewise, Vygotsky (1978) highlighted the significance of social interaction, such as peer collaboration, in developing cognition. He believed that collaboration promotes learning because the process enables learners to operate within one another's ZPD (Zone of Proximal Development). Learning through the ZPD is supported by complete social interaction. Working with peers is academically beneficial because when learners are closer to one another in their levels of proximal development, they are able to describe things to one another in a way easier to comprehend, rather than when things are being explained by a person with a very different mental age. In other words, looking from the ZPD's point of view, collaborative learning provides a framework for guided concept building and assists learners to advance to greater competency (Warschauer, 1997).

Sociocultural theories also support the supremacy of collaborative learning over traditional methods. McCafferty, Jacobs, and Iddings (2006) maintained that the course of conversation during the process of collaborative learning helps students verbalize and elaborate their initial, immature thoughts. According to Beatty (2003), collaboration should be encouraged in the classroom as it promotes social and thinking skills and "mirrors the way in which learners often need to work once they leave an academic setting" (Beatty, 2003, p. 100).

In other words, SCT (Socio-Cultural Theories) views learning as grounded in diverse collaborative activities. Regarding language learning, collaboration is not only valued for its contribution to learners' "accumulation of language knowledge" (Donato, 2004, p. 289) through their own decisions about what materials they study and how they should study them; it is also conceived as an approach that enables learners to involve themselves in a social community of practices, thereby supporting the individual's sociolinguistic development and reciprocal contribution to that language community. In sum, the SCT perspective considers collaborative activity as a facilitator for learning that promotes dialogic intermental relationships, leading to target language internalization.

1.1.1 Collaborative versus cooperative learning

First of all, both collaborative and cooperative learning involve processes that lead to supporting peer group impact on intellectual concerns, renegotiating classroom control, validating knowledge as a social construct, and contributing to education as a process of re-acculturation (Bruffee, 1999).

Though the terms ”collaborative learning“ and ”cooperative learning“ are sometimes used interchangeably by some authors (Graham & Misanchuk, 2004; Greenfield, 2003; Kumpulainen & Wray, 1999; P. M. Nguyen, Terlouw, & Pilot, 2005), some others (Barkley, Cross, & Major, 2005; Beatty & Nunan, 2004; Ingram & Hathorn, 2004; McInnerney & Roberts, 2004) insist on a transparent distinction between the two terms. Whereas cooperative learning takes place when individuals in a pair/group split the task in the "divide-and-conquer" style of working (Ingram & Hathorn, 2004, p. 216) so that each member solves a part of the assignment, collaborative learning is the interdependence of the pair/group members as they share ideas, negotiate all aspects of the task and co-construct a conclusion.

Cooperative learning is believed to focus on the products of group interaction and individual skills development. Collaborative learning, on the other hand, is used in higher education for interdependent learning, focusing on the processes of group interaction, social learning and management of the educational setting in attaining educational outcomes (Roberts, 2004).

As regards teaching methodologies, cooperative learning is defined as a teaching strategy where groups of learners undertake a group task, and are individually and collectively accountable for the group's presentation to produce a cooperative performance. In contrast, collaborative learning is associated specifically as a didactic approach to help learners become members of a knowledge society (Roberts, 2005).

Another way of differentiation suggests that cooperative learning is an activity initiated and controlled by the teacher while collaborative learning activities are those naturally set up by the learners (Beatty, 2003; Bruffee, 1999).

Viewed from the perspective of classroom practice and for those who hold a more pragmatic approach to this distinction, cooperative and collaborative learning are on a continuum. On the cooperative end, group-based learning is highly constructed in a well-structured task and algorithmic skills; the collaborative extreme, in contrast, involves a loosely structured task and synthesis skills (P. M. Nguyen, et al., 2005).

Enhances cognitive and social skills	**Purpose**	Acculturates learners into knowledge community
Higher	**Degree of structure**	Lower
Lower levels/algorithmic	**Skills**	Higher levels/synthesis
Well-structured	**Tasks**	Loosely- structured
Assigned	**Learner roles**	Negotiated
Teacher facilitates, but group is primary	**Relationships**	Learners engage with more capable peers who provide assistance and guidance
<==========		==========>
Cooperative extreme	**Variables**	**Collaborative extreme**

Figure 1: Loosely structured task and synthesis skills (P. M. Nguyen, et al., 2005)

In general, learners are required to take more control of their learning process in collaborative than in cooperative learning. It is suggested that collaborative learning can be applied to higher level skills than is the case in cooperative learning; and collaborative objectives can be seen as one of the motivational elements, along with competitive and individualistic goals, in classroom learning (Beatty & Nunan, 2004).

While cooperative learning is seen by some researchers as including collaboration (D. W. Johnson & Johnson, 2004), I agree with Chung (1991) and later, Mangenot and Nissen (2006), who consider collaborative learning as an *umbrella term* which includes cooperative learning as one of the components. In other words, students can still assign some subtasks among others in collaborative learning, and then combine and synthesize them later to form the whole task. This umbrella conceptualization encompasses multiple educational strategies and approaches involving both the teacher and students in a joint intellectual effort.

1.1.2 Potential benefits of collaborative learning

According to Danielewicz (2001), collaborative learning generates a social setting in which not only are learners supported to negotiate access to the academic discourse community and acquire disciplinary knowledge, but also their collaborative efforts will produce new knowledge, leading to a critique of accepted knowledge, conditions, and theories, as well as of the institutions that produce knowledge.

As for the major categories of potential benefits created by collaborative learning, many key authors, such as Lamy and Hampel (2007) and Roberts (2005), refer to Panitz's (2001) extensive list presented in Figure 2. These academic, social, and psychological benefits of collaborative learning are thought to reside in the social interaction between group members.

Looking from a more specific sociocultural point of view, collaborative learning has been growing in popularity in education because it is a move away from the traditional teaching-learning process that emphasizes knowledge transmission from teacher to student, in favor of socio-constructivist approaches that emphasize discovery learning and view knowledge as the product of social activity. In addition, learning how to work collaboratively prepares students for life after school in the workplace and in communities. Furthermore, opportunities for students to work together are enhanced by the use of technology, and advances (e.g. the Internet,

videoconferencing, and blog/wiki) that enable students to interact in both asynchronous and synchronous modes (De Lisi & Golbeck, 1999).

Potential benefits of collaborative learning

Category	Theme
Academic	Promoting critical thinking skills; Involving students actively in the learning process; Improving classroom results; Modelling appropriate student problem-solving techniques; Personalizing large lectures; Motivating students in specific curriculum.
Social	Developing a social support system for students; Building diversity understanding among students and teacher; Establishing a positive atmosphere for modelling and practicing cooperation; Developing learning communities.
Psychological	Increasing students‟ self-esteem; Reducing anxiety; Developing positive attitudes towards teachers.

Figure 2: Panitz‟s extensive list (2001)

1.1.3 Components of collaborative learning

Based on various dimensions surrounding collaboration, including the context, the domain, the theory, the type of control and tasks, and the type and role of participants, that characterize collaborative learning (Kumar, 1996), Ingram and Hathorn (2004), operationalize collaborative learning into three critical attributes, namely interdependence, synthesis of information, and independence. According to Ingram and Hathorn, the key element of interdependence not only influences individual behavior in positively promoting learning in others, rather than obstructing or ignoring learning of others as in competitive or individual learning respectively; it also affects outcomes of the group, in which the individual's aim will not be attained unless the group goal is accomplished.

Collaborative learning also requires, apart from exchange of ideas, a creation of new insights in the individuals of the group during discussion, i.e. the synthesis of shared information.

Independence of the teacher is the third requirement of collaborative learning, which facilitates the classroom power shift from teachers to learners, and encourages the autonomy of learners.

These three attributes are measured by examining the elements of participation, interaction, and idea synthesis of the collaborative group. While participation is important since collaboration cannot occur without roughly equal participation among the participants, equal participation in and of itself is not enough. The level of interaction and synthesis of ideas of the group should be the main focus for analysis. Without these three characteristics, group work may be many things, but it cannot be called collaboration (Ingram & Hathorn, 2004).

In summary, the key point of collaborative learning therefore is to build up a community of equals in which learners can gain a sense of real responsibility to perform an authentic discourse in the academic community.

In a word, the benefits that collaborative learning brings about in education in general and in language education in particular are evident from the literature. Learning in and of itself cannot and should not be a solitary process. There is certainly a need for social interaction for the sake of learning. The questionable issue has therefore shifted from the effect paradigm to the condition paradigm, and then to the interaction paradigm (Dillenbourg, Baker, Blaye, & O‟Malley, 1996).

In other words, the concern regarding collaborative learning is now not whether it is more effective than learning alone, nor under which conditions it is efficient; but rather, *"which interactions occur under which conditions and what effects do these interactions have"* (Dillenbourg, et al., 1996, 197).

Under this paradigm shift, microgenetic features of the interactions between peers have become the key element of the collaborative process, and therefore the key variable of analysis.

1.2 Computer and online collaborative learning

Promoting student collaboration has often been viewed as one of the many challenges instructors face in the educational setting. Collaboration conjures up notions of students who resist working in groups, students who struggle in creating equitable team effort and the difficulty of evaluating and ultimately grading the productivity produced by students and student groups (Palloff, Pratt, 2005).

Collaborative learning is certainly not a novel teaching strategy with research dating back to the 1970s (Reinman, Spada, 1996).

In the online environment, student collaboration has come in the form of a computer-mediated version of its in-class traditional counterpart. It has come in forms of discussion boards, blogs, and wikis, the intention of which is to ultimately promote critical thinking and creativity. Despite its rather attractive and novel appeal in using computer mediated communication software, online collaboration has posed a challenge to instructors and issues on how to deploy emerging computational technologies that could fully support online collaborative learning, teaching activities, and enhance the overall learning experience (Zhan, 2008).

A misconception of online collaborative learning regards instructors who assume that collaborative learning strategies that were shown to be successful in traditional in-class courses could fit into online courses with little to no adjustment. Some educators assumed that the exposure to technology-driven collaborative environment would automatically initiate and lead to student collaboration (Zhan, 2008).

What may be even more shrouded with ambiguity are the foundational theories and frameworks involved in online collaborative learning. Some authors such as Reeves et al. and Tsai have indicated the existence of gaps between the theoretical ideal and the practical application of online collaborative approaches (Reeves, Herrington, Oliver, 2004).

Tu suggested that some theoretical constructs found in online collaborative learning are also found in aspects of cooperative learning. One of these constructs is the importance of interactivity and active learning. Collaboration will not occur unless students are given authority over their learning activities. Online collaborative learning engages students in knowledge sharing, inspiration, dependence on one another, and the applications of social interactions within a small group (Tu, 2004).

Another construct is the importance of empowering the learner. Educators must be able to empower online students with the determination and accountability of how, what, and when to learn. Instead of forcing students into identical learning patterns, the educator takes on the role of facilitator to guide the learning experience while incorporating various elements and characteristics that accommodate diverse learning styles. Another construct of online collaborative learning is the idea of the ‘community.’ Collaboration assumes that knowledge is

socially constructed. Students should be able to associate what they have learned and will learn with a sense of connection that fosters the social context and community dynamics (Tu, 2004).

The trends of pedagogy in higher education have begun to merge with the emergence of computer-mediated and web-based technology that allows and enhances greater student learning control, responsibility, and student collaboration. This has become obvious in several countries, including the United States, where college students are required to take at least one introductory computer course for the purpose of improving computer literacy and computing skills (Sun, Tsai, Finger, Chen, Yeh, 2008).

According to Roberts, this convergence was brought about due to the attractive appearance that the e-learning setting has given to self-directed learners who seek meaningful and engaging activities, as well as interested educators who are willing to dabble with various technological techniques, practices, and approaches to facilitate the collaborative learning experience. Faced with the growing challenges of developing instruction for technology-driven education, some educators find difficulty in making the connection between pedagogy and technology. Either educators may be unfamiliar with the technology or they may simply be oblivious in translating formal in-class education into the e-learning setting. It is because of this unfamiliarity, given the crucial nature of these important skills, that online pedagogy is a key feature of many online instructor-training programs (Roberts, 2004).

Some of the technologies that support the online collaborative learning atmosphere include the wiki, the podcast, and the discussion forum. Stemming from the Hawaiian word wiki-wiki, meaning ‘fast,’ a wiki is a web-based tool that has the capability of being edited and has the capacity to link one webpage to another. Some view the wiki as among the most influential tools in online collaborative learning (Wever, Keer, Schellens, Valcke, 2011).

Podcasting is defined as a series of downloadable published digital files such as audio, video, or other portable digital media distributed online using portable devices such as smart phones, iPods, or computers (Wever, Keer, Schellens, Valcke, 2011).

Finally, the discussion forum is a form of online collaborative communication where users that are not co-located can asynchronously communicate conveniently through a designated and facilitated forum. However, this form of collaborative communication can seem slow, with users waiting hours or days until they receive a response to a posted message (Wever, Keer, Schellens, Valcke, 2011).

These examples of online learning only serve to indicate that teaching is no longer limited to the traditional walk, talk, and chalk. Online collaborative learning has become increasingly important since online enrollments have increased substantially more than on campus enrollment (Wever, Keer, Schellens, Valcke, 2011).

Johnson and Johnson state that our current society has moved to such lengths that the ability for students to work collaboratively and coordinate their efforts has become more and more crucial to the advancement of knowledge, resulting in greater achievement than individualistic learning and influencing their eventual success in future vocations. Online collaborative learning could serve as a productive tool in the efforts to help students develop the necessary skills in becoming proactive inter-professional team members. These new lengths will only be expanded as new forms of collaborative learning continue to unfold (Johnson, Johnson, 2003).

1.3 E-Learning and Computer-Mediated Communication in education

1.3.1 e-Learning

Although e-learning is still in its infancy, the knowledge acquired by teachers who use online and face-to-face methods can be of great use in improving both types of teaching, which is the reason why researchers nowadays study issues related to these teaching methods, e.g. Urtel (2008) and Georgouli et al. (2008).

It is not simply a question of retaining traditional teaching methods such as the master class and applying e-learning techniques to gain access to more information; nor does it mean involving students in the same learning methodology using a different medium.

Considerable progress must still be made to enable the today's society to take full advantage of the potential of online teaching. Several researchers (Wilcox & Wojnar, 2000; Mason, 2003; Rovai, 2004; Salmon, 2004; Kearsley, 2005; Cabero, 2006; García Aretio et al., 2006, among others) have reported on the peculiarities in design, contents, activities, interaction, tools, and evaluation processes in face-to-face and online modes of teaching. On comparing the two methodologies, people may mistakenly regard the two processes as similar when in fact they should be seen as different from the outset. However, it is useful to carry out comparative research, which might lead to improvements in each type of learning model. Coates et al. (2004)

have pointed out that it is negative to explain only the differences between face-to-face and online methods and not the basic attitudes that form the starting point for each model.

At the beginning of the 1990's education by correspondence was criticized on the grounds that it reduced education to a mere process of industrial production (Peters, 1993).

Shaw (2001), however, believes that problems only arise when conventional teaching methods are simply adapted to distance learning; indeed, Johnson et al. (2000) found that there are no significant differences between the two methods when success factors are determined. In this way, students can learn just as effectively in either of the two formats, whatever their style of learning, providing that the teaching is conducted with an adult learning theory and has instructional design guides. In this respect, online learning is especially useful for students who, for reasons of work, family or social commitments, require a different way of learning (Jeffcoat & Golek, 2004).

Blankson and Kyei-Blankson (2008), among others, have investigated the extent to which students are satisfied with online, face-to-face and blended courses. They decided to integrate synchronous online discussions with traditional face-to-face instruction, and the results of their study suggested that students were generally satisfied with the blended course format. However, Lim et al. (2008) conducted an empirical investigation of student achievement and satisfaction in different learning styles, and found that no significant differences existed between online learning and traditional learning groups. So and Brush (2008), having also studied student perceptions of satisfaction in a blended learning environment, discovered that students who perceived high levels of collaborative learning tended to be more satisfied with their distance course than those who perceived low levels of collaborative learning.

Reisetter et al. (2007) examined whether online learners and face-to-face learners were equally satisfied with the quality of their learning; their findings showed that both learning styles scored equally with regard to learning outcomes and satisfaction, despite the fact that each style had decidedly different learning experiences.

Solimeno et al. (2008) compared the efficacy of face-to-face (frontal or interactive teaching) and online learning. Overall, their results showed that asynchronous collaborative learning online can increase professional competences normally acquired only in small face-to-face educational settings; they report that online learning can be used to provide innovative

educational opportunities to fit the particular needs of students who have time management problems in their learning strategies, with low anxiety and high problem solving efficacy.

A field experiment carried out by Hui et al. (2008) compares the effectiveness and satisfaction associated with technology-assisted learning with that of face-to-face learning. It showed that technology-assisted learning improves students' acquisition of the kind of knowledge that requires abstract conceptualization and reflective observation, but adversely affects students' ability to obtain knowledge that requires concrete experience. Technology-assisted learning is better for vocabulary learning than face-to-face learning, but it is comparatively less effective in developing listening comprehension skills.

It is clear that to compare the advantages and disadvantages of each system would require an examination of the needs of a diversified population. Some researchers have concluded, in this respect, that it is necessary to design flexible courses that integrate techniques from both face-to-face and online methods (Delfino & Persico, 2007).

Wuensch et al. (2008) evaluated the pedagogical characteristics of their most recently completed face-to-face class and their most recently completed online class. The results showed that students rate online classes as far superior to face-to-face classes in terms of convenience and in permitting self-pacing, but they also rate online classes as inferior in a number of other ways. Online and face-to-face instructional formats, then, each have their own strengths and weaknesses. The authors cited have detailed these strengths and weaknesses with the aim of improving both methods of teaching by reducing the weaknesses and maintaining the strengths.

These studies confirm the relevance of what is known as "blended learning", which consists of the combination of face-to-face and distance teaching/learning methodologies. According to Berger et al. (2008), online and face-to-face environments play different and complementary roles. In this way, the development of "blended learning" as a grounding area will enable teachers to design, develop and deliver effective mixed programs (Chew, 2008). However, Jackson and Helms (2008) have found that hybrid classes continued to exhibit the same weaknesses of the online format, and that the addition of face-to-face interaction does not minimize weaknesses.

On the other side, in this part we will focus essentially on asynchronous text-based computer-mediated communication (CMC). By this, we mean email, whether one-to-one or one-

to-many, e-mail-based discussion lists, bulletin boards, computer conferencing environments, and the growing number of Web-mediated manifestations of these types of communication.

As technologies change, the forms of CMC evolve. Sometimes there is divergence, for example, the newer audiovisual possibilities to contrast with the purely text-based, while in other aspects there is convergence, as in the amalgamation of many forms within a single Web-browser environment. Some forms of CMC are purely synchronous, some purely asynchronous, while others (e.g., NetMeeting TM, ICQ) are now allowing the two to occur in the same environment. Technological issues, such as system and interface design, and speed of message transmission, have been known for many years to influence CMC use (Collins & Bostock, 1993; Perrolle, 1991; Porter, 1993). With this in mind, e technology should "be transparent, so that the learner is most conscious of the content of the communication, not the equipment" (Mason, 1994).

Many other forms of CMC exist, and especially many more synchronous (real-time) forms. All of these have been proposed and tested for educational purposes, in the same way that synchronous one-to-one telephone conversations have been used to provide learner support and telephone conference calls have been used for discussions among groups of students and their teachers. However, as the advantages of distance and online education, and the various models of e-learning, are posited around the idea of overcoming the need for students to meet together in real time, the use of real-time interactions of this type are open to question. Chat forums, mediated through IRC (Internet Relay Chat) chat and other software, such as the many proprietary forms of instant messaging now available, have been used for educational purposes, but usually as an adjunct to other modes of delivery. Thus, for example, they might be used to provide an additional communication channel to accompany a web broadcast of a lecture, and to provide the facility for students to pose questions to the lecturer and to other students. One of the major advantages of such synchronous CMC is to bring together geographically dispersed students, and in doing so, add immediacy and increase motivation, although it also reduces flexibility. This whole area merits further study, as we may be on the verge of seeing some really significant changes with real time electronic communications in developing social presence and hence community (Mason, 1994).

Some have advocated the use of MOOs (multiuser object-oriented environments) for learning, especially because they see the real-time role-playing aspects fitting with aspects of

professional continuing education, or less formal forms of education (Collis, 1996; Horton, 2000).

Fanderclai (1995), Looi (2002) suggests that MOOs and MUDs (Multiuser Dungeon, Dimension, or Domain) can provide learning environments that support constructivist approaches to learning, due in large part to the students controlling the timing of learning, and through the construction of knowledge within the online environments. Collis (2002) views them as still peripheral forms of online education, due to the technical support that is often needed, and the difficulties of scheduling the synchronous interactions needed for them to function effectively.

Many other forms of computer, Internet and web-based technologies exist and can be used for educational purposes. One can stretch definitions of communication to possibly include them. However, we will exclude from our definitions and discussions the use of computer networks for accessing remote databases, or library systems, or for the transmission of large amounts of text. Online journals are another area that we will exclude, although evolving models of journals, which encourage interaction of readers with the authors through feedback, are starting to blur the distinctions (Murray & Anthony, 1999).

One example of this latter area is the *Journal of Interactive Media in Education* (JIME)[1], which promotes an interactive online review process, while many health journals, for example the *British Medical Journal,* regularly publish responses to articles, appended to the articles themselves.

1.3.2 Computer-Mediated Communication (CMC)

A working definition of CMC that, pragmatically and in light of the rapidly changing nature of communication technologies, does not specify forms, describes it as "the process by which people create, exchange, and perceive information using networked telecommunications systems that facilitate encoding, transmitting, and decoding messages" (December, 1996).

This seems to encompass both the delivery mechanisms, derived from communication theory, and the importance of the interaction of people that the technologies and processes mediate (Naughton, 2000).

[1] http://wwwjime.open.ac.uk

It also provides for great flexibility in approaches to researching CMC, as "studies of CMC can view this process from a variety of interdisciplinary theoretical perspectives by focusing on some combination of people, technology, processes, or effects" (December, 1996).

The social aspects of communication, rather than the hardware or software, form the basis of more recent definitions. Jonassen et al. (1995) focus on the facilitation of sophisticated interactions, both synchronous and asynchronous, by computer networks in their definition of CMC. One of the most overt examples of the move away from a technological focus in definitions describes it thus: "CMC, of course, is not just a tool; it is at once technology, medium, and engine of social relations. It not only structures social relations, it is the space within which the relations occur and the tool that individuals use to enter that space" (Jones, 1995).

In our selection of research studies for the present review, we have been guided more by the social and organizational aspects of specific projects than by their use of specific varieties of CMC and the associated technologies.

Synchronous and Asynchronous Communication. One of the main distinctions that has been made in CMC has been between synchronous (real-time) and asynchronous (delayed time) communications. Synchronous, real-time communications, as between two people in a face-to-face discussion, or talking on the telephone, or as in a one-to-many form, such as a lecture, has its equivalent within CMC in chat rooms and similar environments. Much software exists to mediate this form of communication (e.g., IRC and various forms of instant messaging).

These forms have had some use within educational contexts, but, in general, asynchronous forms seem to predominate, wherein there is a potentially significant time delay between sending a message and it being read. In offline communication, this latter form is similar to letter writing, or sending faxes, and online has its usual manifestations in email, discussion lists, and most forms of bulletin board and computer conference. For reasons that will become obvious as the reader proceeds, we do not plan to review synchronous and asynchronous applications of CMC in separate sections. Instead, we will refer to both of these categories as relevant in any or all of the sections of our review.

Highly Interactive Communication. CMC provides for complex processes of interaction between participants. It combines the permanent nature of written communication (which in itself has implications for research processes) with the speed, and often the dynamism of spoken

communications, for example via telephone. The possibilities for interaction and feedback are almost limitless, and are not constrained as they are in some of the "electronic page turning" forms of computer-aided instruction, wherein the interaction is limited to a selection among a small number of choices. It is only the creativity, imagination, and personal involvement of participants, that constrains the potential of online discussions. The potential for interaction in a CMC environment is both more flexible and potentially richer than in other forms of computer-based education. The textual aspects of CMC, and in particular of asynchronous CMC, support the possibility of greater reflection in the composition of CMC than is seen in many forms of oral discourse, with implications for levels of learning. We reflect these aspects of CMC in specific sections dealing with the dynamics of CMC processes in educational contexts.

Oral or Textual. There is a substantial body of work within the discussion of CMC practice and research on the nature of CMC, in particular whether it is akin to oral discourse or to written texts, or whether it is a different form (Kaye, 1991; Yates, 1994).

CMC has been likened to speech, and to writing, and considered to be both and neither simultaneously. Some have criticized this oral/literate dichotomy, believing that it "obscures the uniqueness of electronic language by subsuming it under the category of writing." (Poster, 1990).

Discussion list archives, and the saving of interesting messages by individuals, which they may then reuse within later discussions, provide for new forms of group interaction, and suggest features unlike those seen in communities based on face-to-face interaction and the spoken word. Such a group can exist and "through an exchange of written texts has the peculiar ability to recall and inspect its entire past." (Feenberg, 1989).

This ability to recall and examine the exact form of a communication has profound significance for research conducted on or using CMC (McConnell, 1988).

From a poststructuralist theoretical perspective, "the computer promises to redefine the relationship between author, reader and writing space." Bolter (1989).

For the reasons implied by the above, our review will place special emphasis on discourse analysis studies. Many of these have been performed by researchers especially interested in questions of language acquisition and use and are reported in journals and websites that are not part of the "mainstream" literature of educational technology.

Active or Passive Participation (Lurking). In most discussion forums, a majority of subscribers do not contribute to the discussion list in any given time period. Of those who do

contribute, most tend to make only a small number of contributions, while a small number of active subscribers provide a larger proportion of message contributions. One of the criticisms of many forms of CMC discussion is this tendency for a few members to dominate the discussions, or for the majority to lurk and not actively participate or contribute messages to the discussion forum. However, face-to-face discussions in educational contexts are often designed to be, or can become, monologues, with "silence filled by the teacher, or an exchange of unjustified opinions" (Newman et al., 1996).

The fact that it is technologically possible for everyone to speak leads initially to the assumption that it is a good thing if they do, and to the measurement of a successful conference being related to the number of students who input messages. Most members of discussion forums are, most of the time, passive recipients of the messages, rather than active contributors to discussions; they are, de facto, lurkers. Lurking, that is, passive consumption of such electronic discussions, has been the subject of much discussion in CMC research. However, despite all that has been written, it remains under-theorized and under-researched. In most face-to-face group discussion environments, most participants lurk most of the time, and make occasional contributions. Indeed, most discussion forums, whether online or offline, would be impossible if all participants tried to actively contribute more frequently than they do. In addition, there is an assumption, one that has been insufficiently challenged in the research, of lurkers as passive recipients, rather than actively engaged in reading. Reading cannot be assumed to be passive. Much reading, whether online or offline, can encompass active engagement, thought, even reflection on what has been read. The fact that it does not elicit an overt contribution to the discussion forum should not, as has generally been the case in CMC research, be taken to assume lack of such engagement, or of learning (Newman et al., 1996).

1.3.3 Pedagogical/Instructional Aspects through Relevant research in this area

Do online learning environments (Web courses) work? Do people learn in these environments? The literature on the topic is large and growing, but most of it is anecdotal rather than empirical.

The many outstanding research questions will not be resolved quickly, since many variables need to be accounted for and control groups established for comparisons, which is a difficult task in real-life "intact" educational environments (Mayadas, F., 1997).

Early studies of online education focused on the viability of online instruction when compared to the traditional classroom. Recently, researchers have begun to examine instructional variables in courses taught online. Berge (1997) conducted a study of 42 postsecondary online instructors to discover strategies that educators might use to improve their online teaching. The instructors indicated that they believed learner-centered strategies to be more effective than instructor-centered strategies. They also indicated that they preferred the following methods: discussion, collaborative learning activities, and authentic learning activities. However, what was not discussed in the study was the effect the strategies had on the students.

Carswell et al. (2000) go a bit further than most previous studies when they describe the use of the Internet on a distance taught undergraduate computer science course. This paper examines students' experience of a large-scale trial in which students were taught using electronic communication exclusively. The paper compares the experiences of a group of Internet students to those of conventional distance learning students on the same course.

Learning styles, background questionnaires, and learning outcomes were used in the comparison of the two groups. The study reveals comparable learning outcomes with no difference in grade as the result of using different communication media. The student experience is reported, highlighting the main gains and issues of using the Internet as a communication medium in distance education. This paper also shows that using the Internet in this context can provide students with a worthwhile experience. The students elected to enroll for either the conventional course or the Internet version. In a typical year, the conventional course attracts about 3500 students; of this, about 300 students elected to study the Internet version. The target groups were as follows (Jonassen, 2004):

Internet: all students who enrolled on the Internet presentation (300);

Conventional: students enrolled on the conventional course, including students whose tutors also had Internet students (150) and students of selected tutors with only conventional students. The composition of the conventional target group allowed the researchers to consider tutor differences as well as to make conventional-Internet comparisons for given tutors.

The data sources for this analysis included:

- *Background questionnaires:* used to establish students' previous computing experience and prior knowledge, helping to assess group constitution;

- *Learning style questionnaires:* used to assess whether any student who displayed a preferred learning style fared better in one medium or the other, and to compare the learning style profiles of the groups overall;
- *Final grades* including both continuous assessment and final examination; used to compare the two groups' learning outcomes.

The student's final grade was used as an indicator of learning outcomes; the final grade is the average of the overall continuous assessment score and the final exam grade. Eight continuous assessment assignments were spread over the course. Each assignment typically had four parts that related to the previous units of study. The background questionnaire and the learning style questionnaire were sent to students in the target populations at the beginning of the course. Conventional students received these materials by post and Internet students received them by electronic mail. The research results suggest that the Internet offers students a rapid and convenient communication medium that can enable increased interaction with fellow students (both within and beyond their tutor groups) and tutors. Possibly the biggest gain for Internet students was the improved turnaround time of assignments, so that students received timely feedback. A summary of gains includes (Jonassen, 2004):

- ✓ Faster assignment return; more immediate feedback;
- ✓ Robust model for queries, with greater perceived reliability;
- ✓ Increased interaction with tutor and other students;
- ✓ Extending learning experiences beyond the tutorial;
- ✓ Internet experience.

Learning outcomes (as indicated by continuous assessment and final examination) were comparable, and the Internet students' experience was favorable and was one they would wish to repeat - a major factor in maintaining the enthusiasm and motivation of distance education students throughout a complete degree program (Jonassen, 2004).

The biggest obstacle to Internet presentation was inexperience, and cultural inexperience presented a tougher obstacle than technical inexperience:

Internet presentation requires a culture shift by students and tutors. Both must learn how to cultivate communication in a largely asynchronous environment, and both must develop a sensitivity to the emerging etiquette and conventions of the Internet culture. Using the Internet does imply higher expectations: students (both Internet and conventional) expect electronic

communication to be faster. One of the keys to successful Internet presentation is to instill appropriate expectations among all participants (Carswell et al., 2000).

A comparison of correspondence and Web versions of the same course by Collins (2000) indicated that, although the students were very satisfied with the Web version, the correspondence section achieved the higher mean final scores in three of the four semesters while the Web course achieved higher mean final scores in only one semester. Each module ends with a multiple-choice quiz (with a text and diagrams) which students can complete and submit for immediate online scoring and feedback. The feedback informs the student as to whether each response was correct or incorrect, and in the case of the latter, gives the correct response as well as a hot-link to the subunit containing the information related to that particular question. The Web version of the course is, therefore, much more interactive than the correspondence version in which students receive, by mail, a course manual, containing the text and diagrams, in addition to the course objectives and glossary of terms, and multiple-choice quizzes with the answers provided (Jonassen, 2004).

Students taking the correspondence version of the course do not have access to the class Web forum, and their only access to the instructor is by the phone during weekly office hours, or by email.

While most other studies, with the notable exception of Zhang (1998), have reported that there was seemingly no significant difference between the performances of students in the Web and traditional versions of courses, Collins found that the students in the Web course achieved lower mean final marks than those in the correspondence and lecture sections, although the differences were not statistically significant. As with other studies, the students were very satisfied with the Web course, and gave a number of reasons why they liked this approach, including the ability to study at one's own convenience, being able to communicate easily with both the instructor and classmates, and the opportunity of gaining experience with email and the Internet. However, the learning effects, as measured through the instruments used, were inferior for the Web-based students. This important aspect will be addressed further and in depth in the remainder of this section of our review (Jonassen, 2004).

In recent years, partially as a result of the so called "technology revolution" and partially due to paradigmatic shifts in educational philosophy, both the theories and the practice of instruction have undergone significant change. In the area of learning theories, there has been a shift from a

behaviorist to a constructivist view of learning as a process involving the construction of knowledge. This, in turn, has led to an increasing emphasis on collaborative learning strategies, in which people work together in small groups. The physical environment of learning is also shifting ever more from face-to-face classroom instruction, to distance learning on the Internet (Jonassen, 2004).

The constructivist theory states that students should be encouraged to construct their own knowledge. Computer-mediated communication, it is argued, effectively supports constructivism because of the emphasis on access to resources and the extent of collaboration between students promoted using discussion boards. Therefore, many constructivists argue, students in an online environment can construct their knowledge through active learning and collaboration and, therefore, would presumably learn more effectively (Jonassen, 2004).

Another theoretical perspective engagement theory suggests that learners must be actively engaged in meaningful tasks for effective learning to take place (Kearsley & Schneiderman, 1998) and one means of providing such meaningful tasks is to engage the students in discussions. Researchers also argue that collaborative learning and social interaction play a major role in cognitive development. Collaborative learning is the "acquisition of knowledge, skills or attitudes that take place as a result of people working together to create meaning, explore a topic or improve skills" (Graham & Scarborough, 1999).

Hiltz (1997) states that collaborative learning is crucial to the effectiveness of online learning environments. Both engagement theory and collaborative learning theory would suggest that the use of discussion forums brings the students directly into contact with the content material of the course instead of leaving them on the outside as passive learners. Through this interaction, it is postulated, students are building their knowledge instead of relying on simple memorization skills. If these theoretical positions are valid, one could expect the use of discussion forums to be more effective than, for example, quizzes or objective testing as a means of promoting learning.

However, both these theoretical positions seem to espouse online learning mainly because it offers tools for collaboration and so is in tune with the latest philosophical views on education in general and the learning process in particular. We see a certain circularity in the arguments presented in the literature. This lack of clarity in the arguments makes it particularly important to investigate the relative effectiveness of the two levels of interaction represented by

the two most-used forms of online learning exercises: individual quizzes and group discussion forums (Jonassen, 2004).

The substitution of interactive "CAI" (Computer Assisted Instruction) tutorial sequences, or individually completed quizzes, by online group discussions is observed to be an increasingly common practice among teachers who modify previously existing courses for online delivery. This trend is often justified from the standpoint of Collaborative Group Learning principles drawn from the theories of Active Learning based on modern educational philosophies such as Constructivism. However, the available research data that would confirm these claims is scarce and inconclusive. Furthermore, given that the popularity of this trend seems to have grown with the increasing availability of efficient technology for the organization and management of threaded discussions, one may question whether theoretical principles or technological fashion are the real driving forces. It also seems that some of the specific new strategies that are being implemented in the name of new theoretical positions do not always exhibit the characteristics that these strategies should (theoretically speaking) embody. In some cases, it seems that the changes are driven more by the appearance and availability of the new technologies than by any coherent set of theoretical principles. Lewis (2002) addressed exactly these concerns when she investigated the learning effectiveness in online course contexts of two alternative forms of practice activities: asynchronous online discussion forums and individually completed quizzes (Jonassen, 2004).

The study was conducted in existing regular courses, where learning effectiveness is formally assessed by means of objective tests derived from the subject matter content of the course. The goal of this study was to investigate the extent to which one specific change in methods and media, namely the use of asynchronous discussion environments as a component of online courses, can be seen to be theory driven or technology driven. Another motivation for the study arose from the desire to understand the effectiveness of such discussion forums on students' achievement scores. Among the many yet unanswered questions regarding Web-based courses is whether the use of asynchronous online discussion activities, as a means for providing opportunities for practice and learning, is necessarily an improvement over previously used strategies, such as quizzes (Jonassen, 2004).

The theory and practice of the discipline of instructional design suggests that in order to implement a new instructional approach, based on a different theory of learning, it is usually

necessary to modify not one, but maybe all or most of the components of a lesson (Dills & Romiszowski, 1997; Romiszowski & Chang, 2001).

However, it is currently quite common to utilize the newly available online discussion environments as the practice component of lessons that are otherwise unaltered in their basic instructional design. Existing content-presentation materials, previously used in conventional courses, are posted to the Web without any modification. The same final evaluation tests and procedures are employed, regardless of the implied modifications to the underlying course philosophy and shift in key objectives from the content to the process of learning.

The Lewis (2002) study intentionally selected just such a context for its investigation. An existing course that has for some time been offered as a conventional face-to-face course is now also being offered as an online course. This course is based on a well-established basic textbook that not only is a major source for the course content, but also includes a large questions bank from which instructors may create a variety of learning assessment instruments and practice quizzes. In the process of transforming the conventional course into an online version, little instructional design change was introduced as regards the presentation phase, in that the same textbook was made available online and similar instructor advice and support was offered. Also, little change occurred with respect to the final test or assessment phase, in that the same questions bank was used to generate final examinations. However, some of the instructors involved chose to modify the practice phase by introducing online discussion activities in place of the previously used quizzes (Jonassen, 2004).

This particular course that Lewis analyzed is a 15 week online course in a major university setting. The course and the instructional materials it uses (i.e., the content of 12 chapters of the set book, the test bank and any tests and unit quizzes derived from the bank) is a standard online course that is offered by three different instructors each semester at the university. The enrollment is 50 students per course. Therefore, on an average, 150 students per semester take the online version of the course, using the same course materials. The entire course syllabus, quizzes, and discussion activities are available online in a WebCT course shell. An intact cohort of 50 students, registered to take the above-mentioned course was randomly subdivided into two experimental groups who were subjected to different treatments as regards the practice phases of the online lessons that compose the course. All students participated in quizzes for some of the lessons and in online discussions for other lessons, according to the

experimental design explained below. This procedure allowed the investigator to compare the learning effectiveness of the two alternative practice procedures and also to investigate some other secondary questions. The following procedures were applied to the assignment of the participants to the treatment sequences and measurement of the results. Each participant (Jonassen, 2004):

Completed an online pretest that was based upon the information contained in 12 chapters of the required textbook;

Read the book and the lecture notes, one chapter per course unit;

Completed six online quizzes for six of the course units (based on randomized assignment to one of two groups: Group 1 in odd and Group 2 in even units);

Completed six threaded discussion forums for the other six course units, which were based on questions posted by the instructor on issues in the unit.

Completed an online posttest based upon information in the textbook (exactly the same assessment procedure that has been used for years for grading both on-line and face-to-face versions of the course);

Completed an end of course evaluation questionnaire.

The tests were taken from the test bank prepared by the publisher of the book used in the course. This book and test bank have been used for the past 3 years at the university. As stated above, the course is offered three times a semester as an online course for a total of nine times a year. Besides the online version of the course, this course is also offered three times a semester as a traditional course using the same test bank. Therefore, even though there is no available statistical analysis of the reliability of the test items, it could be inferred that the test questions do have general acceptance by expert teachers of the subject as a valid instrument by which to measure learning of the course material. Different versions of the assessment instrument (i.e., test) have been used at least six times a semester (including traditional and online courses), three times a year, over a period of 3 years, for a total of 54 times (Jonassen, 2004).

Fifty students began the class; however, only 37 students finished the course. Thirteen students either dropped out of the course or took an incomplete grade. The concluding 37 students remained in the same random groups and subgroups as assigned at the beginning of the course. The first step of the experiment involved administering of a pretest. The main reason for administering a pretest was to verify that the randomly selected groups were indeed equivalent as

regards entry level. Once this was established, all comparisons between the groups were made based on posttest scores. Each posttest score was divided into the 12 chapter units' scores (Jonassen, 2004).

The investigator found some interesting differences among the subunit scores. Several one-way ANOVAs were performed to test the null hypothesis: "there is no difference in the learning outcome for those who engage in discussion activities versus those who complete the quizzes." This analysis revealed that the null hypothesis is accepted for subunits 1, 3, 5, 6, 7, and 9. However, the null hypothesis was rejected for subunits 2, 4, 6, 8, 10, 11, and 12. This finding is interesting in that the Chapters 2, 4, 8, 10, and 12 are the chapters for which Group 2 did the discussion forums and Group 1 did the quizzes. These results, taken on their own, seem to suggest quite strongly that the quiz-taking activity generally leads to superior posttest performance than the discussion activity (Jonassen, 2004).

However, the other half of the results did not tally with this finding. The only time when there was significance when Group 2 did the quizzes and Group 1 did the discussion forums was in subunit 11. In all the other 5 such cases, the differences were not significant. The question that arises out of the data, therefore, is why there is generally no significance when Group 2 takes the quizzes, and Group 1 engages in online discussion (Jonassen, 2004).

Let us examine these findings from yet another theoretical position of the objectivist theory of instructional design. This position has a long history of practical use and acceptance. It is arguably rather incorrect and unfair to label the position as behaviorist, because it really represents the established practice of the teaching profession from times way before the development of behaviorism. However, this position did tend to get formalized as a result of the growing popularity of the use of behavioral objectives as a basis for the design of learning activities (Jonassen, 2004).

The practical influence of programmed instruction models reinforced the widespread acceptance, almost as an axiom, of the principle of designing learning activities as a mirror image of the final evaluation activities. In the case of this particular study, the objectivist position would argue that we should expect the quizzes to be more effective learning activities than the discussions, because they better reflect the final test conditions used to evaluate the learning. Once more, however, one must observe that, in the present study, one part of the results supports

this position, but the other part does not. Further light is, however, shed on the results of this study if one examines the objectivist position a bit more critically (Jonassen, 2004).

The partial result that students who participated in the discussion activities scored just as well as those who took the quizzes is in line with Mouton's (1988) findings that success on lower level testing can be achieved by the review of "higher-order learning" problem-solving questions during the practice assignments. In his study, Mouton looked at what types or combination of types of practice activities should be provided to students, studying through mediated self-instruction. The finding of the study showed that a *"more stable and durable memory trace results if deeper cognitive processing occurs during encoding"* and *"students when engaged in higher level thinking questions will do as well on lower level thinking test items as students just doing lower level thinking questions"* (Jonassen, 2004, 97).

Also predating the constructivist movements of today, Bloom (1981) suggested that, in order to be independent and active learners, the learners should engage in the so-called "higher level thinking." They should also "possess the ability to learn and solve problems, be intrinsically motivated, and possess a degree of social responsibility to interact with others in the acquisition of learning." Using the logic of Mouton and Bloom, the use of online discussion forums can be postulated to serve as an avenue for learners to obtain higher levels of achievement, even on lower-level rote-memory test instruments, than by means of participation in lower-level forms of learning activities, such as quizzes. From this theoretical position, the use of higher level thinking questions and discussions does not hinder but enhances a student's learning, even if tested by lower level thinking tests. This theoretical analysis helps to explain the partial finding in the present study that Group 1 students studying in the higher-order-thinking mode of the discussion forum did just as well as Group 2 students who studied these same subunits in the lower-order-thinking mode that was a mirror image of the final test conditions (Jonassen, 2004).

However, we still have the other partial result that seems to support the conventional objectivist position of designing the learning activities as a mirror image of the testing procedures. It is difficult to escape the conclusion that, despite the apparent equivalence of the two groups, as demonstrated by means of analysis of overall pretest scores, something differentiated them during the course of the study. One factor that may have played a part is the intensity and frequency of participation in the group discussions (Jonassen, 2004).

To explore this question, Lewis looked at the content of the online discussions. She reviewed the number of messages read and number of messages posted to see if any differences may have had an effect on the posttest scores. A one-way ANOVA was conducted on both the messages read and messages posted by the students. There was a significant difference on messages read by students between groups. However, there was no significant difference on messages posted within the groups (Jonassen, 2004).

Palloff and Pratt (1999) claimed that interaction and collaboration become critical in Web-based training. They also suggested that the successful online learner is a "noisy learner" who is active and creative in the instructional environment. Students in Group 1 were more active than students in Group 2. This is apparent from the number of messages read by the students. Students who participated frequently and intensively in the online discussions could be expected to have benefited from the higher level thinking activity more than those students who engaged less thoroughly and less frequently in the discussions (Jonassen, 2004).

Thus, a possible, though by no means proven, interpretation of the results of this study is that the difference between Group 1 and Group 2 scores is due to the varying amount of effort and frequency of participation in group discussion activities. The higher level of engagement of Group 1, as compared to Group 2, led that group to get more value out of the discussion activities and thus compensate for the "handicap" imposed by the lack of a practice exercise that directly mirrored the final evaluation. Further research would be required in order to establish whether this hypothesis is consistently supported in practice. If it proves to be supported, one may gain some important insights into the factors that must be designed into online learning activities in order to ensure that they are effective learning experiences as measured and evaluated by the conventional, content-based, criteria that are commonly utilized by most educational systems. Finally, we may add that the study here analyzed illustrates the importance of adopting a theory and research-based instructional design approach to Web-based education and training. One outcome of such a design approach would be to reexamine right from the start whether the maintenance of the same conventional testing procedures for the online course was theoretically justified, or was just the result of overlooking an opportunity for the improvement of that aspect of the course as well (Jonassen, 2004).

1.4 Use of technology in schools

The use of technology in our schools has changed considerably these last years. Thus, to equip the students with the necessary technological skills, they need to use new methods of learning as opposed to the methods used in traditional learning. Technology and technological tools have become part of education in schools and the goal is to use technology in the classroom as a tool that develops and further promotes the process of learning. From the use of these new technological tools pupils have gained computer skills, skills that they can use in the future in the countries where they work. Schools in the education system have created an infrastructure technological approach, which optimizes the integration of technology into the educational process. Use with the efficiency of new technologies that supports the student thinking process increases the ability of learners to focus on learning, improve understanding and transfer content to a long-term memory. Based on this reasoning, it is intended to return the traditional classes in classrooms conceived on the basis of technology. This process requires the teachers to equip themselves with the right technological skills and learn to use new tools of technological advances that support the students' teaching process and their progress (Archee, 1993).

Some of the technological tools that can and should be used in schools are (Archee, 1993):

• Computer: Seen as one of the most necessary teaching technologies, up to recently it was considered a novelty, now it is an imperative because of its technological orientations that include teaching.

• USB: It is one of the most advanced storage and transmission technologies of different information; they exist in different sizes and are already an inseparable part of the educational reality.

• CD / DVD: There are old ways of transmitting and storing materials. But, this is very fruitful in the case of different presentations.

• Multifunctional digital photo-enhancing devices: These devices have a lot of importance in the field of teaching foreign languages, with their own registration and presentation of the skills of each student in terms of language training.

• The Internet: This is technology that has revolutionized teaching in every corner of the world. The teacher is no longer the only point of reference, but is the coder of new entrants to the student's educational culture.

• Interactive Table: It is a highly advanced technology that has not yet been widely used in the educational system, but because of its simplicity, innovation and advantages that it represents, it is desirable in educational work.

• Video Projector: This is a technological teaching tool frequently found in the education system. It is used for presentations of various works in the didactic and scientific field. Indeed, it is the forerunner of the interactive chart, but, because of the conditions in our system of education, it remains the most advanced technology used in teaching.

1.4.1 Using computers and the Internet at school

A well-crafted computer curriculum is attractive and interactive and has two qualities important for students who have problems with concentration of attention or have a history class waste that has ruined their motivation. For example, math or spelling programs can use images.

Interactive digital media programs teach students who cannot hear how to use sign language. Many programs do not use sound, so students with hearing impairments can take full advantage of visual lessons. Pupils who have difficulty in reading can use programs that "pronounce" words unknown to them if they click them. With this opportunity, students have more chances to do the reading practice that is needed to develop the level of recognition of new words (Archee, 1993).

Other devices are those that print pages and printed texts turn into words for blind people or for other students who learn better by listening to information. For a student with learning disabilities, whose writing cannot be read, computers offer a perfect scribbling, so this student can be understood.

Using and surfing the Internet is one of the fastest ways to get to information. One of the most positive values of the Internet is the interactive, direct opportunity that is offered to any user to express his / her opinion about certain topics, i.e. the ability to be a communicator. Thus, the Internet is the most interactive medium today.

Many organizations are involved in increasing teachers' capacities for computer use in the process of teaching and learning.

The Internet meets the resources and materials that are in the hands of teachers and students and reduces dependence on time and space, which in fact are the limiting factors in schools. The Internet is a tool that can be used almost with each educational theory and each

subject. Learners need to get used to the rules of conduct while using the Internet, by which they will be able to get better education experience and gain a lot of knowledge through this modern source of information by searching for information online, with an easy procedure, looking at webpages, or just writing the right info on the main search page on the Internet. It is imperative that before the student gets access to these cabinets, or to these computers, he/she should be instructed in the classroom for their use, and be advised to preserve the inventory and other ancillary equipment. The subject teacher is obliged to properly arrange the students through computers for their most effective use (Blázquez & Alonso, 2006).

Somewhere up to 35.5% of teachers have stated that they guide students to different addresses to research teaching topics. These topics are then discussed in the classroom and supplemented by other students. A significant number of teachers say they instruct students on how to use the Internet for homework and how they should do their research at home. Other ways of learning development are presenting certain topics with photos, maps, sketches, tables, in PowerPoint, learning development through CDs etc (Blázquez & Alonso, 2006).

The Internet was introduced in the eighties and nineties of the XX century, but the beginnings of its appearance are on global computer networks that were presented at the end of the sixties of the twentieth century.

Since then the use of the Internet has become worldwide. Its name is abbreviated from English - International Network (the first letters of these words Inter and Net) comprising all computer networks. Linking to the Internet can be done in three ways: gateway computers, remote access modem access and direct access to the Internet. According to Market Surveillance Agency "Nielsen" in the US, 38% of children under 12 years of age are logged in on Facebook. A recent study, at the beginning of April 2012, showed that the most visited sites by children 9-10 years old are on Facebook. 4% are children under the age of 6, 14% are aged 13-14, 29% are aged 15-16 and 19% are aged 18-19 (Blázquez & Alonso, 2006).

The Internet is the world's largest information net in which all people are involved, and today it is present in each home and enterprise offering knowledge, experience, news, fun, and communicative and learning-study opportunities. For the impact of the Internet on children, there is no total agreement among experts. Some devalues it and others call it irrelevant, but generally negative judgments about its use dominate. The Internet today has become a very important network for people all around the world. However, this network has also become the source of

important information, for both teachers and students, wherever they are (Blázquez & Alonso, 2006).

1.4.2 Positive and negative impact of computer and internet usage at school

In general, the current dilemma in the educational process is set out in the segment of using new technology and the contribution of this technology in the educational process. In fact, it is not always clear whether new technologies introduced in the educational and institutional environments facilitate the process of cultural transmission, or whether they actually collide with certain educational priorities of the learners' mind - priorities that institutional contexts training would have the task of not failing; we always want to think of minds educated to actively construct the meanings of reality transmitted, rather than passively make them from rote learning models (Archee, 1993).

This question of the possible dilemma between teaching techniques and new technologies touches quite a few ethical, educational and programmatic-didactic issues, especially when we consider how the new media are now becoming familiar with the traditional teaching of languages, integrating and dynamically interacting with them within a broader cultural process that is now the spokesman for a progressive phenomenon of hybridization between the classical instruments of knowledge, such as textbooks or lectures, and tools such as hypertext, networking or remote lessons, leading us to "navigate" in a kind of an expanding media universe, an instrumental cyberspace as much virtual as you might think (Archee, 1993).

The production of these new educational machines and their level of technological evolution are particularly active in the present era, which is why the pedagogical objective methodological potential of the heartfelt debate for these new media is even more achieved, because of their functional use in the educational process. It is clear that such educational and technological progress implies unavoidable changes in the organization of the school and the functions of the lecturers, although it is obvious that we can not specify which educational methods and strategies are compatible with a particular technological method, therefore we need to identify the correct scientific lines and the functional links between specific educational tools. In any case, it seems useless to keep criticizing these new media, degenerating towards attitudes too circumspect, as is often the case in front of the new, strongly criticized writing because it weakened memory; nor should it be regarded as much unlike the attitude of those who opposed

the means that today have become standardized, such as radio or television, or, in more recent times, the personal computer. The problem around the new educational media, perhaps, is not so much whether to use it or not: the only question would be enough to fear the pedagogical danger of increasing the already extensive existing rift between school practices and the sociocultural reality, a training dyad between school and mass culture that forces the young to live more than a few cognitive tensions and values vacuum between times, and school and extracurricular spaces (Blázquez & Alonso, 2006).

The culturalist Bruner and the contextualist Gardner are clear in this regard, calling on pedagogical experimentalists and school programmers to remain sensitive to the cultural context of belonging when making educational reform policies and curriculum planning if the languages we use to communicate in everyday life, in the work, in the media, is a reflection of those used in the teaching process in schools, compatibility in the junction of the technology and the educational strategy itself will be very easy. In this case, the risk of contextualizing the dynamics of teaching, making it abstract and uninteresting, due to the difficulty in adjusting the rapid virtual progress of a student from the Internet, the impact and slow changes in the schools themselves in this segment will cause a big gap as a social, cultural both educative and educational (Archee, 1993).

It is likely, however, that a good use of the many tools that the new technologies have brought about could prove suited to the good use of certain cognitive properties of the pupils and (not least) of teachers: it could be argued that, depending on the medium used to transmit the necessary information, different cognitive areas are solicited by the learner and that those areas can be mobilized in different ways and intensities; in this way, it could be argued not only that the new languages used are closer to the context of the student's life, being able to turn to him with symbolic lexical tools that are most familiar, but also that educational stress can trigger a more wide range of individual and group cognitive nuances, by virtue of certain priorities of a pluralistic mind itself complex, designed to interact in terms recursive with a cultural environment equally complex, priorities that would otherwise remain out of the scene of the pedagogical and educational considerations, because we are indulged by a unitary and static view of the potential cognitive or apprehensive pupil (Blázquez & Alonso, 2006).

On the other hand, if it is true that the education language is the language of creation of culture, not just the acquisition of knowledge or of consumption, it is also true that the means by

which speech is expressed does not have an effect negligible, if not primary, in the process of knowledge construction. That is how new techniques taking and enhancing the old into a growing process of fusion between the traditional techniques, usually identifiable by the media that spread the message from a center to a plurality of recipients (such as writing, printing, film and television), and the new, coincide with the so-called information and communication technologies (ICT), which are the fulcrum of change and more functional cognitive needs multidimensional and cultural meanings correspond to hyper complex, such that the pedagogy to reflect on their use in school and on the ways in which educational innovation are especially in tune with the new requirements/cultural demands (Blázquez & Alonso, 2006).

Already in 1967 w. Kenneth Richmond reiterated the viability of a revolution in teaching, first by searching in the changes strictly dictated by the drive technology of advanced societies, to relate to a renewable energy concept of educability, although its location, typical of many curriculum makers attracted by cybernetic yearnings of the middle of the last century, would seem to opt for a mechanistically productivism in background behaviorist in complying so rather extremist, thinking about the possibility of accelerating the steps of learning with effective and productive use of new techniques for education, by team-teaching to programmed instruction, communication systems, multi-media, educational objectives and pursuing a taxonomic hierarchical planning thus giving an interpretation, very personalized and not properly shareable instrumental conceptualism. Such a machine would own all the property to play what you would like to be an "ideal teacher", often powerless before the excess of information, and would be likely to change the behavior itself of the learner in order to make it work "more effectively"(Archee, 1993).

ICT means all kinds of technology used to exploit and manipulate information, so we have a combination of Technology with Information and Communication. ICT in education is understood as implementation of equipment and technological means in the learning process to register and process information digitally. The use of technology in schools has changed considerably in recent years. Thus, to equip students with the necessary technological skills, we should use new methods of learning compared to the methods used in traditional learning.

Technology and technological tools have become part of education in schools and the goal is to use technology in the classroom as a tool that develops and promotes further learning processes. By using these new tools and technological advances, learners have acquired

computer skills, which skills they can use in future at their workplaces. Schools in the education system have created a technological infrastructure, which optimizes the integration of technology in the educational process. Efficient use of new technologies supports the students' thinking process, increases their ability to do so focused on learning, improves comprehension, and transfers content to the long-lasting memory. Based on this reasoning, the intention is to reverse classrooms into classrooms conceived based on technology. This process requires that teachers be equipped with the right technological skills and learn to use new technological tools that support the teaching process, students and their progress (Archee, 1993).

Initially, teachers need to clearly distinguish between the use of ICT and ICT teaching program.

• We must know how to use technology before we study with its help.

• We use technology to learn the same things as before because ICT allows us to have a lesson more easily, faster, and more efficiently.

• Extend to a wider range of materials at the same time.

• We have to do also with the equality of choice and access to information. For example, students from isolated rural provinces should have the opportunity to access very valuable information for teaching.

Students should familiarize themselves with computers, computer keyboards, word processing, using the Internet and email addresses. They have to learn to use digital cameras, scanners, recording equipment as well as the extensive use of computers in general. The younger the children are, the sooner they will be able to learn the use of technology. Many children prefer the use of computers because of the fast way of communication that they enable.

Thus children acquire skills such as (Archee, 1993):

- ✓ Using information technology for obtaining information, summarizing, organizing and presenting information to others.
- ✓ Presenting their work visually through charts.
- ✓ Getting information from the Internet.
- ✓ Developing mathematical games and quizzes and comparing the results with other students.
- ✓ Sending and receiving messages.

- ✓ Spelling Control - Liberates students from the fear of spelling errors and helps them in writing essays with fewer spelling errors.
- ✓ Blocking movement, blocking deletion and formatting - Delivers students from recapturing texts and therefore facilitates the correction and editing with the use of computers.
- ✓ Accumulating - Students can cast their ideas in a non-permanent manner by: freeing them from fear of making mistakes; they can also throw their ideas into a permanent form so they are not afraid of losing their ideas nor of being blocked by perfectionism.
- ✓ High quality of reading and printing capability - It can enhance the pleasure and pride of students during the writing process; it can facilitate the students' development in terms of audience feeling; encourage more reading of the text and consequently more in-depth and top-level corrections.

The new technology is part of the social structure of the beginning of the new century. So, while a century ago we taught our students how to write a newspaper article, how to read or write in a foreign language and feel proud of their accomplishments, today one of the most important things for us is that they become as skilled in writing in a second language, to know foreign languages not only from a linguistic point of view, but also to know how to use the computer, write e-mails, receive and send information, etc (Archee, 1993)..

- ➢ **Benefits**

Effective technology use deploys multiple evidence-based strategies concurrently (e.g. adaptive content, frequent testing, immediate feedback, etc.), as do effective teachers. Using computers or other forms of technology can give students practice on core content and skills while the teacher can work with others, conduct assessments, or perform other tasks. Through the use of educational technology, education is able to be individualized for each student allowing for better differentiation and allowing students to work for mastery at their own pace.

Modern educational technology can improve access to education, including full degree programs. It enables better integration for non-full-time students, particularly in continuing education and improved interactions between students and instructors. Learning material can be used for long distance learning and are accessible to a wider audience. Course materials are easy

to access so students can access and engage with numerous online resources at home. Using online resources can help students spend more time on specific aspects of what they may be learning in school, but also at home. Many schools have made certain course materials free online (Blázquez & Alonso, 2006).

Although some aspects of a classroom setting are missed by using these resources, they are helpful tools to add additional support to the educational system. The necessity to pay for transport to the educational facility is removed. Students appreciate the convenience of e-learning, but report greater engagement in face-to-face learning environments. According to James Kulik, who studies the effectiveness of computers used for instruction, students usually learn more in less time when receiving computer-based instruction and they like classes more and develop more positive attitudes toward computers in computer-based classes. Students can independently solve problems. There are no intrinsic age-based restrictions on difficulty level, i.e. students can go at their own pace. Students editing their written work on word processors improve the quality of their writing. According to some studies, students are better at critiquing and editing written work that is exchanged over a computer network with students they know. Studies completed in "computer intensive" settings found increases in student-centric, cooperative and higher order learning, writing skills, problem solving, and using technology. In addition, attitudes toward technology as a learning tool by parents, students and teachers are also improved (Blázquez & Alonso, 2006).

The use of educational apps generally has positive effect on learning. Pre- and post- tests reveal that the use of apps on mobile devices reduces the achievement gap between struggling and average students. Some educational apps improve group work by allowing students to receive feedback on answers and promoting collaboration in solving problems; examples of these apps can be found in the third paragraph. The benefits of app-assisted learning have been exhibited in all age groups. Mobile devices and apps have also been shown to assist in the education of disabled students, with one study reporting increased engagement and accelerated comprehension and learning (Blázquez & Alonso, 2006):

a) Keeping and directing attention

The computer draws attention with the help of colors, voices and interesting photos. The attention is greater with computers as knowledge is gained through the game. Example: Pupils

who have behavioral problems (hyperactive pupils, those having learning disabilities) may have a longer attention span in front of the computer during classical instruction.

b) Satisfaction

The computer is a source of pleasure, which is an important factor for success. Every successful assignment for which the student gets praise gives him/her confidence and increases his/her desire for success.

c) Autonomy

The computer allows pupils to overcome some of the failures that usually occur when working with school supplies. The learner can accomplish any activity with minimum participation of the third person, who will help with work with tools. Example: The student with cerebral palsy has the difficulty of writing pencil in the notebook. He experiences obstruction and failure during the realization of this activity. With the help of assistive devices and computer writing, the student is faster and happier to successfully complete the activity.

d) Adequacy

The variety of support and technical tools allows to fit the tools and / or the content to different students. Example: Various devices and software assist and fit the needs, opportunities and capabilities of each student.

e) Feeling of appreciation

The computer offers a sense of appreciation and self-assessment to the student. This can be the source of taking responsibility and group participation and it contributes to stabilizing behaviors.

- **Disadvantages**

New technologies are frequently accompanied by unrealistic hype and promise regarding their transformative power to change education for the better or in allowing better educational opportunities to reach the masses. Examples include silent film, broadcast radio, and television, none of which has maintained much of a foothold in the daily practices of mainstream, formal education. Technology, in and of itself, does not necessarily result in fundamental improvements to educational practice. The focus needs to be on the learner's interaction with technology, not the technology itself. It needs to be recognized as "ecological" rather than "additive" or "subtractive". In this ecological change, one significant change will create total change. Technology does not guarantee “effective learning" and inappropriate use of technology can

even hinder it. With the Internet and social media, using educational apps makes the students highly susceptible to distraction and sidetracking. Even though proper use has shown to increase student performances, being distracted would be detrimental. Another disadvantage is increased potential for cheating. Smartphones can be very easy to hide and use inconspicuously, especially if their use is normalized in the classroom. These disadvantages can be managed with strict rules and regulations on mobile phone use (Blázquez & Alonso, 2006).

With just a few clicks on the keyboard, the Internet will revolutionize education and learning. This was the promise that initially accompanied the massivization of the Internet. But, a new study shows that the internet presence in the classroom is associated with lower scores on exams.

Michigan State University scientists have published a new study in the Psychological Science psychology magazine, which said lower grades and poorer scores were observed in the case of smarter and more laborious students.

In the study, scientists analyzed the time 127 students spent on computers during an elementary class of psychology. They concluded that on average, students spent 37 minutes on computers dealing with things that were unrelated to the teaching materials such as checking emails, their social media accounts, buying stuff through the internet, or watching videos (Blázquez & Alonso, 2006).

Their computer activity was controlled for this study by computer server monitoring. During the lesson hours for the 15 sessions that were included in the course, 83 of the experimental group spent more than half of the time visiting various Internet sites. Scientists discovered that time spent on the internet was an important factor in the score that students took in this subject (Blázquez & Alonso, 2006).

"*The adverse impact of using the Internet for activities that are not related to learning makes us questionable the practices that encourage students to bring personal computers to the classroom when the computer does not really serve the class*" says Susan Ravizza, Assistant Pedagogue of Psychology and chair of the study (Ravizza, 2017, 111). Even when students use the computer for learning-related activities, scientists found that it did not help improve the outcomes.

"This course did not have tasks to be met by using the Internet, so the online activity that was termed" related to the lesson "generally involved the opening of digital documents where

instruction books were recorded that helped to keep notes or to followed the course" said Mrs. Ravizza. She adds that keeping the records through the computer resulted from previous studies as less effective than holding notes manually.

"When students open the computer, they are attracted to other activities that are not related to learning." She adds that after this study, whenever she sees students who have taken the computer with them, she tells them to sit at the end of the classroom so as not to distract the attention of others.

The use of internet technology is also a necessity for facilitating the performance of work and it saves time. But, misuse and long use results in poor results.

"*The sad and lonely world is discovered in the cyber space" "Isolation increases with increased use of the Internet" (*Ravizza, 2017, 125).

These are some of the headlines found in the media; many researchers have seen that using the Internet can cause isolation, solitude and depression; the Internet can be detrimental to the psychological state of some people and that the growth in the Internet usage leads to diminishing human relationships and falling levels of happiness.

"*The child should be given what he needs, not what he asks*", this is an expression of Sami Frasheri[2] which takes a lot of place in today's reality where children are becoming more and more part of virtual environment. The way of life and our environment have changed a lot in the last decade. Road traffic and construction densities have increased. The development of technology has made children grow in a virtual environment taking educational information in an uncontrolled manner offered by technology. By the age of 18, young people are fond of what is now called media consumption, being too exposed to television and the Internet. But, what has become a phenomenon and concern for parents and specialists are video games or otherwise called computer games.

There is a variety of attitudes on this issue. Some researchers feel that video games affect the growth of intelligence and the improvement of children's grades. Others say they have a range of negative consequences, such as a bad body posture, problems in communication in the environment, social isolation, obesity, exposure to violence, etc. These problems are not local and there is an international spread.

[2] http://www.albanianhistory.net/1899_Konitza/index.html

Problems in communication as a result of excessive use of technology - Using technological equipment without control can cause dependence and isolation from family and society, and can also bring about shortcomings in communication. Excessive and uncontrolled usage by adults is often copied by children because access to the Internet and navigation are simple and many times unlimited. The usefulness and importance of the Internet in educational, cultural and educational development of students is not questionable because, apart from information, on the Internet there are also useful materials and games that can help develop the intelligence of children. The obtained results are owed mostly to improper use, prolonged internet hours and no control by adults By discovering the consequences of its use and, last but not the least, by accepting the main recommendations regarding the measures to be taken to avoid these problems educational institutions, family and society in general could improve this situation (Blázquez & Alonso, 2006).

Recently, the development of information technology, especially the Internet and the mobile phones, is having a significant and worrying impact on reorienting young people, especially students, creating learning and creating obstacles to communication. This is already called a phenomenon because it has taken as extensive coverage as it does not seem possible to intervene in in an organized manner by different social instances. It remains on the families to add to the care of their children at least by controlling the access to and the use of the Internet, because the secession from it now seems impossible and, moreover, an absurd requirement. From multiple family conversations, parents expressed concerns that the current trends in internet usage lead to uncontrolled access to it, and this inevitably decreases the interest in learning (Blázquez & Alonso, 2006).

Excessive use of technology and negative impact on students' health - Computers can certainly provide children with new opportunities for education, creativity and entertainment. Children are used to using computers at an early age and they are consuming more and more time before the screen watching movies, playing games or watching news shows. But, the time children spend in front of the computer removes them from interactions and communications with their peers, sports activities, exploration of nature, from artistic activities such as music, drawing, ballet, singing and many more. Here are some health hazards that have been identified during long-term use computer by the children (Blázquez & Alonso, 2006):

- Injuries:

When children use the computer for hours it creates a strain of muscles, tendons and the nerves of the neck, arms, and hands and puts these parts of the body under a threat that is called a "syndrome of recurrent movements". This syndrome also occurs in adults when they are subjected to long and tiring work on the computer. That can be painful and is particularly dangerous for their bodies.

- Problems with viewing:

Children may be jeopardized by strabismus when they stay in front of the computer display for hours without any detachment. Especially for the group of children up to 10 years of age it is absolutely not advised to stay in front of computer screens or even television sets for more than 1 hour a day; their visual system is in development, it needs real-world stimulation, visual experiences and an opportunity to see objects that are near and far, flat and 3 dimensional, stationary and mobile and with many different colors, etc.

- Lack of fitness and weight problems:

Children who spend a lot of time in front of the computer tend to spend less time doing physical activity. They need to exercise each day to improve their physical strength with muscle activation. Physical activity is also needed to burn calories. Children who do not practice physical activities are at risk of developing heart disease, obesity, diabetes and emotional problems dealing with issues of self-confidence and courage.

- Limiting Social Interaction and Exposure to inadequate Materials

Kids spend more time in front of the computer screen than chatting and interacting with their peers and adults. Children need interactions with other children and adults. In this way, they develop their social skills to learn how to respect and listen to others, communicate, give ideas, express their feelings, and play and work together.

- Exposure to inappropriate materials:

Often computers, video games and the Internet can expose children to the materials with sexual content and acts of violence. On the Internet children can also be made victims of sexual abuse.

II. RESEARCH METHODOLOGY

2.1 Research methods

In this data processing survey, the descriptive and conclusive statistics are used, and it presents the results with tabulated and graphical frequencies, including numerical frequencies, percentages, valid and percentage percentages, standard deviations. Then the calculated statistical Pearson correlation (the connection between two or more variables), the linear regression (the level of dependence between two or more variables) are actually the introduction to the linear regression line, as well as the statistical methods of averaging (Tuckey test type and independent t- test).

2.3 Research tool

In this research, for the students' views on Computer-mediated Collaborative Learning (CMCL) a closed type of questionnaire of the Likert scale type is used. The questionnaire consists of two parts: the first part contains the demographic characteristics of the subject, and the second part consists of 20 questions that assess the position of the subjects for using computer-mediated Collaborative Learning (CMCL) in the class and their opinion on the application and the use of technology in the teaching process.

2.4 Participants in research

As mentioned above, the population in this research or target sample are youngsters from Gostivar high schools, while the achieved sample will be adolescents aged 15-18, with random selection of 100 students in the four high schools, including the Gymnasium, the economic school, the technical secondary school and the secondary medical school in Gostivar.

2.5 Study Procedures

The first phase included the application of the questionnaire to the subjects and the classroom by obtaining permission from the leading bodies of the schools; this phase lasted two days; in fact, it required that we apply the questionnaire during one lesson, i.e. one day, two lessons. The second phase included starting the collection of results and their tabulation and statistical analysis in numeric and percentage forms. The third phase included delivering the

results into diagrams and their transfer into a scientific paper as an official document for research and their analysis, comparisons with previous research and conclusions, as well as suggestions.

2.6 Expectations from results of the research

As noted above, the importance of this research lies in sensitizing the broader opinion of the relevant subjects in the educational process for the influence of Computer-mediated Collaborative Learning (CMCL) on the quality of education; we can say that this research in the education segment is in the frameworks of numerous scientific research studies that aid the educational processes in compiling plans that are compatible with those of Western states and, on the other hand, are the basic sources of the development of human beings.

Thus we can conclude that the opinion of the students is unlikely to be in line with the opinion of the teachers by the fact that, according to the research, very few teachers use Computer-mediated collaborative learning (CMCL) in our schools, why is it foreseen by law and educational norms, while on the other hand the students are much closer to the new technologies and, as a consequence, they are inclined to learn things with the help of these technologies, so this fact reflects this discrepancy of attitudes. Therefore, it is assumed that the results of this research will reflect this reality and will be in line with relevant western research. Here the results of the research can be highlighted as general conclusions in the results published in the research "Use of computers and internet in the education system in Macedonia" in 2015, implemented by the Foundation for Sustainable Information Systems "Metamorphosis" and the Open Society Institute - Macedonia. The survey, conducted in the period May - June of this year, includes analysis of the context and initiatives to date for computerization of education, telephone polls with 2,240 respondents from all over Macedonia, focus group with teachers, parents and pupils from primary and secondary schools secondary schools, as well as interviews from relevant institutions for the "Computers for Every Child" (KCF) project. The usage of ICT in schools is not on daily basis, research shows. During its implementation in teaching, the traditional model is basis, although other types of learning are noticed, most often the designer type. Various subjects mark different usage of ICT, and the greatest usage is still in computer science. The usage in other subjects is self-initiative and depends on the teacher.

III. EMPIRICAL PART OF THE RESEARCH

3.1 Demographic characteristics of the sample

So, as mentioned above, the population in this research or target sample are the youngsters from Gostivar high schools, while the achieved sample are the adolescents aged 15-18, with random selection of 100 students in the four high schools, including the Gymnasium, the economic school, the technical secondary school and the secondary medical school in Gostivar.

Table 1 below shows the frequencies of surveyed students according to their gender, so in this research 51% of female students and 49% of male students were surveyed.

Table 1. Distribution of respondents by Gender

		Frequency	Percentage	Valid Percent[3]	Cumulative Percentage
Valid	Male	49	49.0	49.0	49.0
	Female	51	51.0	51.0	100.0
	Total	100	100.0	100.0	

The fact is that a large percentage of the high schools in the city of Gostivar have pupils coming from rural settlements where the conditions are more modest in the segment of school preparation with computer network; therefore, due to the higher objectivity of the research results, as well as the hypothesis content, Table 2 below also sets the frequencies of subjects surveyed by type of residence:

Table 2. Distribution of respondents by Residence

		Frequency	Percentage	Valid Percent	Cumulative Percentage
Valid	City	56	56.0	56.0	56.0
	Countryside	44	44.0	44.0	100.0
	Total	100	100.0	100.0	

[3] The valid percentage shows how many percentages are processed with the previous statistical operation

Another important segment for the objectivity of the research results was the age of students related to the level of using computers and the Internet for both teaching and communication.

Table 3. Descriptive Statistics of Age

Mean	16.51
Median	17.00
Mode	15[a]
Std. Deviation	1.141
Skewness	-.025
Kurtosis	-1.409
Minimum	15
Maximum	18

Table 3 above reflect student frequencies according to their age as well as the type of age distribution in the sample, so according to table 3 we have nearly a proportional distribution of students by their age groups in this research. So, according to this fact, in this random sample where all age groups of this population are involved, we will have objective and relevant results in this area.

As we emphasized in the methodological part of the research, to have an overview as objective as possible and the most relevant, pupils of different age groups of all high schools in the city of Gostivar will be surveyed. Thus, Table 4 below reflect the frequencies of students surveyed by type of school where they study:

Table 4. Distribution of respondents by School profile

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Gymnasium	28	28.0	28.0	28.0
	Economics	30	30.0	30.0	58.0
	Technical	28	28.0	28.0	86.0
	Medicines	14	14.0	14.0	100.0
	Total	100	100.0	100.0	

Here too we can say that we have a nearly proportional inclusion of surveyed students by the type of high school they study in, so 28 students were interviewed in the Gostivar high school, 30 in the economics school, 28 in the technical school and 14 in medical school, so for this problem we will have an overview at the level of the city of Gostivar.

The level of objectivity of the research results is also determined by the success rate of the students selected in the sample, so Table 5 provide a reflection of the frequencies of the respondents surveyed according to their last year's educational success.

Table 5. Distribution of respondents by Success

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Enough	9	9.0	9.0	9.0
	Good	30	30.0	30.0	39.0
	Very Good	28	28.0	28.0	67.0
	Excellent	33	33.0	33.0	100.0
	Total	100	100.0	100.0	

So according to the frequencies we have included successful students of all pedagogical levels where the students with excellent success (33%), very good 28%, good 30% and satisfactory 9% were surveyed.

The level of objectivity of student responses to the survey on this issue is also determined by the level of knowledge and use of computers by the students themselves, which level determines the Computer-mediated Collaborative Learning (CMCL) detection in the learning process. Table 6 below reflect the frequencies and the three statistical levels for the usage and familiarity of surveyed students for computers in general.

And by frequency, it turns out that 40% of the surveyed students are knowledgeable and are using computers at a medium level, 32% have high computer skills, and 28% of surveyed students have low levels of computer usage and knowledge in general .

Table 6. Distribution of respondents by level of Computer usage

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Lower	28	28.0	28.0	28.0
	Average	40	40.0	40.0	68.0
	High	32	32.0	32.0	100.0
	Total	100	100.0	100.0	

Table 7 below reflects the interlaced data according to the success and level of usage of computers by the type of secondary school where the pupil studies.

Table 7. Crosstabulation of Numbers of respondents by School profile according to success and computer usage

		Gymnasium	Economics	Technical	Medicine
Success	Satisfactory	1	5	2	1
	Good	8	6	14	2
	Very Good	10	9	8	1
	Excellent	9	10	4	10
Computer usage	Lower	8	9	5	6
	Average	13	9	15	3
	High	7	12	8	5

3.2 Distribution of the variable in the sample and interpretation of hypotheses

As noted above in the methodological section, the aim of the research is to analyze and verify a possible positive or negative correlation between Computer-mediated collaborative learning (CMCL) use in the secondary schools in Gostivar and the level of student satisfaction with this type of learning and interconnect the potential of this type of learning with increasing quality in education. And, normally, with this research we will be able to absorb the scientific side of a scientific research as future researchers; on the other hand, with this study, in fact with the conclusions of this study, we will be able to compare the data and conclusions with such studies in Western states.

So, for the interpretation of the hypotheses set out above in the methodological part of the research and according to their content as mentioned above, we will use graphical descriptive frequency graphing methodology and diagrams including numeric frequencies, percentages, the linear regression method (the level of severity between two or more variables), in fact, the introduction of the line of linear regression as well as the statistical methods of averaging (Tuckey test type Anova sample t-test and independent sample t-test).

Before concluding, statistical conclusions on the interpretation of hypotheses after collecting and processing data from surveys where the points or total sum of points are first collected according to the Likert scale where the maximum possible points are 50 and the minimum 20. Table 8 below reflects the distribution of research variables, Computer-mediated collaborative learning (CMCL) use in the secondary schools in Gostivar.

Table 8. Descriptive Statistics of total points of questionnaire for students perceptions

Mean	36.42
Median	36.00
Mode	36
Std. Deviation	5.760
Skewness	-.271
Kurtosis	-.378
Minimum	21
Maximum	49

So, according to the rankings of the average, moda and the mediana where their values are almost equal, we can say that we are dealing with a symmetric normal distribution or, in other words, most of the , in fact their attitudes, accumulate in the center (most) and some of them are also centered around the edges of the chart as the most extreme (non-significant part). Thus, most of the respondents according to the variance distribution have or have not yet formed accurate and relevant attitudes to the present phenomenon or Computer-mediated collaborative learning (CMCL) use in the secondary schools in Gostivar.

Now, with regard to the first hypothesis *H.1 Computer-mediated collaborative learning (CMCL) is applied and used in the secondary schools in Gostivar* according to the above mentioned frequencies we can say and **conclude that the respondents are knowledgeable and**

can detect the work of learning through computers and that in Gostivar high schools this method is being used and is perceived by students.

Concerning the second hypothesis *H.2 High school students in Gostivar have a positive attitude and are satisfied with Computer-mediated collaborative learning (CMCL)* which hypothesizes by content is also the underlying essence or the basic purpose of this research, i.e. what attitude the students themselves have concerning Computer-mediated collaborative learning (CMCL) use in the secondary schools in Gostivar. After collecting and processing the data according to Likert's scale, as noted above, Table 9 reflect the three potential levels of statistical student attitudes and the type of distribution of the above variable, we can say that the **dominant attitude is that of neutral students (54%) compared tp 38% of students with positive attitudes and 8% with negative attitudes concerning Computer-mediated collaborative learning (CMCL) use in the secondary schools in Gostivar.**

Table 9. Distribution of respondents by Level of Perception for computer mediated collaborative learning

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Negative Perception	8	8.0	8.0	8.0
	Neutral Perception	54	54.0	54.0	62.0
	Positive Perception	38	38.0	38.0	100.0
	Total	100	100.0	100.0	

As noted above, neutral attitudes are complementary to the lack of attitudes to something or simply the students are unable to appreciate the importance and role of Computer-mediated collaborative learning (CMCL) use in secondary schools in Gostivar as a teaching method for the purpose of increasing their intellectual capacity and the psycho-social aspect among them.

As for the third hypothesis *H.3 Pupils who have positive attitudes to Computer-mediated Collaborative Learning (CMCL) achieve a higher learning success (so Computer-mediated collaborative learning (CMCL) increases the quality of education)* according to its content should be analyzed by the statistical method of distinguishing the T-test medians (Anova sample t-test).

Thus, in Table 10 below, the third column reflects the student's averages for the points earned in the survey according to their level of success in school, so the intention is to see whether there is a statistically significant difference between the surveyed students and the success and as a result, the possible correlation between success (quality) and Computer-mediated Collaborative Learning (CMCL) in the secondary schools in Gostivar city is determined.

Table 10. Differentiation of perceptual averages according to success (T-Test)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Satisfactory	9	**34.44**	5.703	1.901	30.06	38.83
Good	30	**37.20**	5.991	1.094	34.96	39.44
Very Good	28	**36.25**	6.198	1.171	33.85	38.65
Excellent	33	**36.39**	5.279	.919	34.52	38.27
Total	100	36.42	5.760	.576	35.28	37.56

Table 11 below in the last column reflects the coefficient of significance for the above mentioned differences and, according to it, we can conclude that there are significant differences or, in other words, we can conclude that there is a statistically significant difference in the attitudes of students to Computer-mediated Collaborative Learning (CMCL) that stems from their level of success at school (0.048 <0.05 so, the signal is less than the second limit of confidence of 0.05).

Table 11. Significance for the above differences ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	54.209	3	18.070	.537	**.048**
Within Groups	3230.151	96	33.647		
Total	3284.360	99			

Table 12 below shows the differences between potential student groups according to success and, in other words, we can say that **students with satisfactory success have negative attitudes to Computer-mediated Collaborative Learning (CMCL) compared to good, very good and excellent-performing students in this research.**

Table 12. Multiple Comparisons

Dependent Variable: Total Points Tukey HSD

(I) Success	(J) Success	Mean Difference	Std. Error		95% Confidence Interval	
					Lower Bound	Upper Bound
Satisfactory	Good	-2.756	2.205	.597	-8.52	3.01
	Very Good	-1.806	2.223	.849	-7.62	4.01
	Excellent	-1.949	2.181	.808	-7.65	3.75
Good	Satisfactory	2.756	2.205	.597	-3.01	8.52
	Very Good	.950	1.524	.924	-3.04	4.94
	Excellent	.806	1.463	.946	-3.02	4.63
Very Good	Satisfactory	1.806	2.223	.849	-4.01	7.62
	Good	-.950	1.524	.924	-4.94	3.04
	Excellent	-.144	1.490	1.000	-4.04	3.75
Excellent	Satisfactory	1.949	2.181	.808	-3.75	7.65
	Good	-.806	1.463	.946	-4.63	3.02
	Very Good	.144	1.490	1.000	-3.75	4.04

To respond to the content of the hypothesis we now extract the Pearson correlation coefficient between the success rate of the surveyed students and the survey points (CMCL), as shown in Table 13 below:

Table 13. Pearson Correlations between success and CMCL

		Success	CMCL
Success	Pearson Correlation	1	**.553**
	Sig. (2-tailed)		**.043**
	N	100	100
CMCL	Pearson Correlation	.553	1
	Sig. (2-tailed)	.043	
	N	100	100

So, according to the Pearson correlation coefficient of 0.553 with significant statistical significance of 0.043 (0.043 <0.05), there is a significant positive correlation, which means that **with the increase of the success of the students results there is also an increase in the points gained in the survey or positive perception of Computer-mediated Collaborative Learning**

(CMCL) in general in the secondary schools in Gostivar. So the third hypothesis is verified in this research.

Concerning the fourth hypothesis *H.4 The level of computer-mediated collaborative learning (CMCL) use in secondary schools in Gostivar is determined by the type and status of the school* where it is clearly indicated that there is a potential difference in the use of Computer-mediated Collaborative Learning (CMCL) in schools of a high school type, so for the interpretation of this hypothesis we will use the Anova t-test to differentiate the mean of the students surveyed by the type of school they are taught in.

Table 14. Differentiation of perceptual averages according to school profile (T-Test)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Gymnasium	28	**35.25**	4.904	.927	33.35	37.15
Economics	30	**35.03**	6.300	1.150	32.68	37.39
Technical	28	**39.75**	4.934	.932	37.84	41.66
Medicine	14	**35.07**	5.512	1.473	31.89	38.25
Total	100	36.42	5.760	.576	35.28	37.56

In Table 14, the third column above, students' averages are averaged from secondary school type surveys, while in Table 15 below, the last column shows the significance for these differences of 0.003 <0.01 where it can be seen that the coefficient of significance is smaller than the first confidence limit of 0.01, that is, there is a statistically significant difference in the attitudes of students surveyed for Computer-mediated Collaborative Learning (CMCL), depending on the type of school they attend in Gostivar.

Table 15. Significance for the above differences ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	431.965	3	143.988	4.846	**.003**
Within Groups	2852.395	96	29.712		
Total	3284.360	99			

Thus, we can **conclude that there is a statistically significant difference in the attitudes of students surveyed depending on the type of high school and that the technical**

school pupils have more positive attitudes to Computer-mediated Collaborative Learning (CMCL) compared to secondary school students in Gostivar.

Table 16. Multiple Comparisons

Dependent Variable: Total Points

Tukey HSD

(I) School	(J) School	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Gymnasium	Economics	.217	1.432	.999	-3.53	3.96
	Technical	-4.500*	1.457	.014	-8.31	-.69
	Medicine	.179	1.784	1.000	-4.49	4.84
Economics	Gymnasium	-.217	1.432	.999	-3.96	3.53
	Technical	-4.717*	1.432	.007	-8.46	-.97
	Medicine	-.038	1.764	1.000	-4.65	4.57
Technical	Gymnasium	4.500*	1.457	.014	.69	8.31
	Economics	4.717*	1.432	.007	.97	8.46
	Medicine	4.679*	1.784	.049	.01	9.34
Medicine	Gymnasium	-.179	1.784	1.000	-4.84	4.49
	Economics	.038	1.764	1.000	-4.57	4.65
	Technical	-4.679*	1.784	.049	-9.34	-.01

*. The mean difference is significant at the 0.05 level.

From the above analysis we can say that the fourth hypothesis is verified.

As far as the fifth hypothesis is concerned, *H.5 The student's attitude to Computer-mediated collaborative learning (CMCL) is determined by its demographic characteristics (age, success, residence and level of computer use)*, we say that this hypothesis is in fact a controlling hypothesis for the basic purpose of the research and it determines students' awareness of responding to Computer-mediated Collaborative Learning (CMCL) in the educational process. Also, by means of the methods of distinguishing - the Anova t-test and the independent t-test, we will interpret the contents of the hypothesis in question:

Table 17. Differentiation of age according to the level of perception (T-Test)

Age

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Negative Perception	8	**16.88**	.835	.295	16.18	17.57
Neutral Perception	54	**16.67**	1.197	.163	16.34	16.99
Positive Perception	38	**16.21**	1.069	.173	15.86	16.56
Total	100	16.51	1.141	.114	16.28	16.74

In Table 17, the third column above is the age average for each level of residence (three levels) for Computer-mediated Collaborative Learning (CMCL).

Table 18. Significance for the above differences ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.799	2	2.900	2.283	**.047**
Within Groups	123.191	97	1.270		
Total	128.990	99			

In Table 18, the last column presents the significant significance for these differences (0.047 < 0.05). So, according to the coefficient of signaling, we can say that there is a significant difference in the attitude of students depending on their age.

19. Multiple Comparisons

Dependent Variable: Age Tukey HSD

(I) Total Points (Binned)	(J) Total Points (Binned)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Negative Perception	Neutral Perception	.208	.427	.877	-.81	1.22
	Positive Perception	.664	.438	.288	-.38	1.71
Neutral Perception	Negative Perception	-.208	.427	.877	-1.22	.81
	Positive Perception	.456	.239	.141	-.11	1.02
Positive Perception	Negative Perception	-.664	.438	.288	-1.71	.38
	Neutral Perception	-.456	.239	.141	-1.02	.11

Table 19 shows all the differences between the potential groups by age and position; we can **conclude that older students (16.88) exhibit more negative attitudes compared to**

younger students (16.67 and 16.21) in this research who exhibit attitudes that are more neutral or positive. So the attitude of the students is determined by their age in this research.

Interesting results are presented below in the potential differences of student attitudes depending on the level of knowledge and use of computers in general of students in this research. Table 20 below presents the averages for attitudes to the three statistical levels for knowledge and use of computers in general by students themselves:

Table 20. Differentiation of perception by level of computer usage (T-Test)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Lower	28	**37.39**	6.008	1.135	35.06	39.72
Average	40	**35.85**	6.015	.951	33.93	37.77
High	32	**36.28**	5.262	.930	34.38	38.18
Total	100	36.42	5.760	.576	35.28	37.56

While in Table 21 the last column shows the coefficient of significance for the above mentioned differences (0.041 <0.05), we can say that there are significant differences in attitudes of students depending on the level of knowledge and usage of computers.

Table 21. Significance for the above differences ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	40.113	2	20.056	.600	**.041**
Within Groups	3244.247	97	33.446		
Total	3284.360	99			

So, **there are statistical differences in the attitudes to Computer-mediated Collaborative Learning (CMCL) depending on the level of knowledge and the usage of computers in general, and that the average computer knowledge and usage of computers are more negative for Computer-mediated Collaborative Learning (CMCL) versus students with knowledge and high and low usage of computers in general in this research.** Thus, the fifth hypothesis is verified.

3.3 Discussion of results

- We conclude that the respondents are knowledgeable and can detect the work of learning through computers and that in Gostivar high schools this method is being used and is perceived by students.
- Dominant attitudes are those of neutral students (54%) compared to 38% of students with positive attitudes and 8% with negative attitudes for Computer-mediated collaborative learning (CMCL) use in the secondary schools in Gostivar, so for these two points above we can say that this reflected reality is in line with the results of the research published in "Use of computers and internet in the education system in Macedonia" in 2015, implemented by the Foundation for Sustainable Information Systems "Metamorphosis" and the Open Society Institute - Macedonia. The survey, conducted in the period May - June of this year, includes the analysis of the context and initiatives to date for computerization of education, telephone poles with 2,240 respondents from all over Macedonia, focus group with teachers, parents and pupils from primary and secondary schools, as well as interviews from relevant institutions for the "Computers for Every Child" (KCF) project. Research shows that the use of ICT in schools is not being applied on daily basis. During its implementation in teaching, the traditional model is basic, although other types of learning are noticed, most often the designer type. Various subjects mark different use of ICT, with which the greatest use is still in computer sciences. Usage in other subjects is self-initiative and depends on the teacher, so, in the secondary schools in Gostivar Computer-mediated Collaborative Learning is perceived by students in a positive way and accepted and welcomed by the students of the high schools in Gostivar.
- Students with satisfactory success have negative attitudes to Computer-mediated Collaborative Learning (CMCL) compared to those with good, very good and excellent-performing students in this research; this conclusion is most likely to be consistent with the results of the aforementioned research in the theoretical part of the research.
- With the increase of the students' success results there is also an increase in the points gained in the survey or positive perception of the Computer-mediated Collaborative Learning (CMCL) in general in the secondary schools in Gostivar.

- We conclude that there is a statistically significant difference in the attitudes of students surveyed, depending on the type of high school and that the technical school pupils have more positive attitudes to Computer-mediated Collaborative Learning (CMCL) despite secondary school students in Gostivar. From further analysis of the infrastructure and computer network of the high schools in Gostivar, we came to the conclusion that the technical secondary school is better equipped with technology, and the nature of the professional subjects as well as the plan of programs for them obliges the students to use Computer-mediated Collaborative Learning in this school compared to other high schools in Gostivar.
- We conclude that older students (16.88) exhibit more negative attitudes compared to younger students (16.67 and 16.21) in this research that exhibit attitudes more neutral or positive.
- There are statistical differences in the attitudes to Computer-mediated Collaborative Learning (CMCL) depending on the level of knowledge and the usage of computers in general, and the average computer knowledge and usage of computers are more negative for Computer-mediated Collaborative Learning (CMCL) versus students with knowledge and high and low use of computers in general in this research. This finding is interesting because of the fact that students with average computer knowledge and usage of computers have more negative attitudes to Computer-mediated Collaborative Learning (CMCL) than students with low and high usage skills and because other research does not yield any conclusions; such a segment can only encourage other researchers in this area to continue concise analysis to justify such conclusions.

IV. CONCLUSION AND RECOMMENDATION

4.1 Conclusion

Using computers or other forms of technology can give students practice on core content and skills while the teacher can work with others, conduct assessments, or perform other tasks. With the use of educational technology, education is able to be individualized for each student allowing for better differentiation and allowing students to work for mastery at their own pace. New technologies are frequently accompanied by unrealistic hype and promise regarding their transformative power to change education for the better or in allowing better educational opportunities to reach the masses.

To face the fundamental changes that are challenging education communities today, especially with the integration of Computer-mediated Collaborative Learning (CMCL) and ICT, it is more than necessary to draft policies and strategies with long-term educational goals and new educational achievements. It is also a tool for introducing new learning models. However, after a long study based on the analysis of the results presented, we have come to a conclusion.

There is no organized way of teaching in our schools with computers by students and teachers, so that students can access them easier in order to use computers for educational purposes. According to the results, some schools have computers and some not, but the mere presence of computers in schools is not what is important, but it is the fact pedagogical training is required for their appropriate usage by teachers, as well as for students.

There are two main categories of exploitation of computers: learning "from" computers and learning "with" computers. To achieve this, orientation is required and teacher instruction to stimulate students to use Computer-mediated Collaborative Learning (CMCL) for education. Many students have the ability to do so, but there is a distinct difference in between ICT skills and use of ICT for pedagogical purposes and Computer-mediated Collaborative Learning (CMCL). The lack of teacher's instruction for the integration of ICT into teaching was quite evident; this was noted during the analysis of the study. The students were missing more concrete information about the possibility of using computers for educational purposes as well; most of the computers students use for different games on the Internet, affecting spending their time on entertainment and also creating dependence in children.

The students' communication through Facebook was at the expense of the time for social conversation and there were no educational outcomes. Parents do not care enough to keep their children under control with what they watch on TV, what video games they play online, and with whom they communicate. This also concerns teachers, who were looking for more care for children, because this often causes bad behavior, affecting their lifestyle and success in school. During the study we noticed that teachers in schools do not provide students with knowledge about using ICT for the pedagogical need, because the teachers were missing focus on teaching strategies through ICT so teachers do not guide their students to research online for educational needs that would impact the fair education of ICT use. ICT created dependence in students and they were aware of this. In addition, they felt the need for their education for ICT. In a word, they wanted help to relieve their dependency on ICT, especially on the Internet.

So if the basic purpose of this research was to analyze and verify a possible positive or negative correlation between Computer-mediated collaborative learning (CMCL) use in the secondary schools in Gostivar and the level of student satisfaction with this type of learning and to connect the potential of this type of learning with an increasing quality in education. We can conclude that in Gostivar high school students are familiar with Computer-mediated Collaborative Learning (CMCL) methods and most of them have positive perceptions or have not yet formed a stand because so far no one has asked for their opinion in this segment and this method. The conditions and school infrastructure in Gostivar can be further developed and enhanced in order to increase the quality in secondary education, especially in secondary schools in Gostivar.

4.2 Recommendation

For Teachers:

- ✓ Teachers should apply different strategies of teaching, apply different visual methods through ICT and Computer-mediated Collaborative Learning (CMCL).
- ✓ Teachers should pay attention to students who have problems with bad behavior as this can be as the result of improper use of computers being used more for games than for learning.
- ✓ Teachers need to combine their work in class working in groups and integrating ICT based on collaborative learning, by developing activities that take place in the classroom and individual activities.

- ✓ Teachers should assess the effectiveness of Computer-mediated Collaborative Learning (CMCL) in teaching and learning and, based on that, they can increase productivity in professional practice.
- ✓ Teachers need to plan their curriculum, based on lessons through teaching technology, using a range of guiding strategies for students individually and in small / large groups.
- ✓ Teachers should guide students to provide information about the topic they have on the plan and in their curriculum using a variety of sources such as books, newspapers, magazines, videos teaching, websites, etc., by comparing the usefulness of different media coming from different sources.
- ✓ Teachers should encourage students to share information in the classroom that they received from various media sources (inside or outside the classroom), and then communicate to identify those resources and explain why they assess these resources as reliable.
- ✓ Teachers need to assign tasks to students and give them opportunities to choose which ways through Computer-mediated Collaborative Learning (CMCL) are the most effective for them when looking for information and fulfilling the assigned task.
- ✓ Teachers need to encourage students to write their duties using paragraphs, titles, subtitles, illustrations, tables, graphs, etc.
- ✓ Teachers should help students with the content on the Internet that misinterprets a topic or presents misleading or wrong information about a topic.
- ✓ Teachers should evaluate students by asking them to discern special things when they see video, audio, or photographic illustrations.
- ✓ Teachers should find cooperative opportunities for projects with community institutions (e.g. museums, libraries, galleries, forts, etc.) that will include students in analyzing or creating media messages.
- ✓ They should assist students to contribute to joining social networks in common e-mail addresses.
- ✓ Teachers need to allow students to reason beyond aspects and issues of the curriculum and identify different aspects of messages that they get from the Internet.
- ✓ Teachers should discuss texts or documents that students take from the internet and talk about them.

- ✓ Teachers should collect data that show the progress of students in every aspect of learning.
- ✓ They should cooperate with certain groups in the network through joint programs and productive tools to create learning outcomes.
- ✓ Teachers should evaluate information in cooperation with students through research and comparison of data from multiple sources.
- ✓ Teachers should stimulate students to use the Internet, email, TV and radio for their learning needs.
- ✓ Teachers should analyze the importance of using technology in everyday life for individuals of all ages and how the use of this technology affects the society;
- ✓ Teachers need to use electronic tools for online evaluation as well as online portfolios;

For Students:

- ✓ Students should become aware of using ICT from a functional point of view, whether concerning basic skills (reading, writing, drawing) or other habits still unmanaged.
- ✓ Students should talk critically in class about the role of the Internet in their lives.
- ✓ Students need to communicate and discuss via email and email forums for the purpose of learning.
- ✓ Students should judge with regard to their perspectives or thoughts about using the Internet.
- ✓ Students should be asked questions about what they read or watch on the Iinternet and what is written in the texts because this helps to draw a parallel between reading online and reading textbooks.
- ✓ Students need to find information about many examples from the respective unit, but also outside the teaching subject, which has to do with the educational aspect.
- ✓ Students should increase their communication with teachers via e-mail;
- ✓ Learners should be aware of texts from the Internet and other media that convey messages and values and they be able to interpret and make conclusions.
- ✓ Students should talk about the resources they have found on the Internet and then talk about why they appreciated those resources.
- ✓ Students should be involved in projects in schools and have the opportunity to use their computer skills.
- ✓ Students should use media forums, e.g. social networks, such as Facebook or groups at the addresses of shared e-mail to contribute together to learning outcomes.

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Appendix 1

QUESTIONNAIRE

Learner perceptions of Computer-mediated collaborative learning in High Schools in Gostivar

School_____

School profile a). Gymnasium b). Economic c). Tech d). Medical e). Other

Age _____

Gender a). Male b). Female

Last year's success a). Enough b). Good c). Very Good d). Famously

Residence (where he lives) a). City b). countryside

Level of computer usage (your ability according to you)

a). Lower b). Average c). High

1. Our school has enough computers connected to the network (internet)!

a). I disagree b). Neutral c). Agree

2. Classes and cabinets we teach are equipped with computers connected to the network!

a). I disagree b). Neutral c). Agree

3. Teachers (teachers) during the classroom use computers and the Internet!

a). I disagree b). Neutral c). Agree

4. Teachers suggest us to use computers and the Internet during teaching or home assignments!

a). I disagree b). Neutral c). Agree

5. In addition to classroom teaching (the professor lectures before us and we listen) in our school teaching is also practiced interactivity (the professor forms student groups for certain teaching activities and interacts with them) and active learning (pupils, in their own and group, develop learning activities in professor's presence - develop the lesson yourself)!

a). I disagree b). Neutral c). Agree

6. For teaching obligations and activities we use computer and internet for cooperation with suggestions from the professor himself!

a). I disagree b). Neutral c). Agree

7. The professor does not suggest us to use the computer and the internet for teaching obligations and activities, but it does not stop us from doing so!

a). I disagree b). Neutral c). Agree

8. Use of computer and internet in learning activities makes the lesson interesting!

a). I disagree b). Neutral c). Agree

9. The use of computer and internet in learning activities brings higher success in learning achievements for us (increases success)!

a). I disagree b). Neutral c). Agree

10. Using computer and internet in learning activities enhances student collaboration and brings success!

a). I disagree b). Neutral c). Agree

11. The use of computer and internet in co-operative learning activities strengthens the relationship and trust between the professor and the students!

a). I disagree b). Neutral c). Agree

12. Using computer and networking in teaching activities brings higher quality to teaching and strengthens reports during the educational process!

a). I disagree b). Neutral c). Agree

13. We feel pleased when we use computers and network during classroom teaching or activities!

a). I disagree b). Neutral c). Agree

14. Use computers and network in free learning activities!

a). I disagree b). Neutral c). Agree

15. Using our computer and network increases our knowledge of English!

a). I disagree b). Neutral c). Agree

16. Using computer and network increases our knowledge of technology in general!

a). I disagree b). Neutral c). Agree

18. According to you, the use of computer and network during the lesson should be increased and recompensed!

a). I disagree b). Neutral c). Agree

19. We have information that the use of computers and the internet is part of the teaching structure in the school (the teacher is obliged to use this method)!

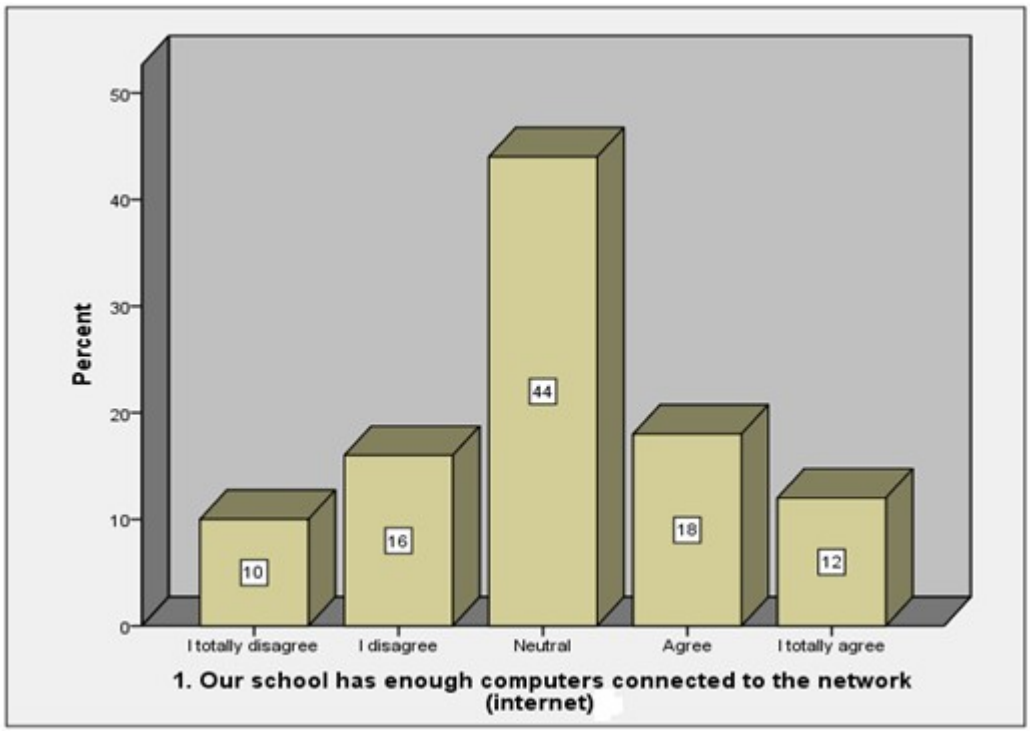
a). I disagree b). Neutral c). Agree

20. Using a computer in lessons is a collaborative learning that brings high success to students and teachers!

a). I disagree b). Neutral c). Agree

Thank You!

Appendix 2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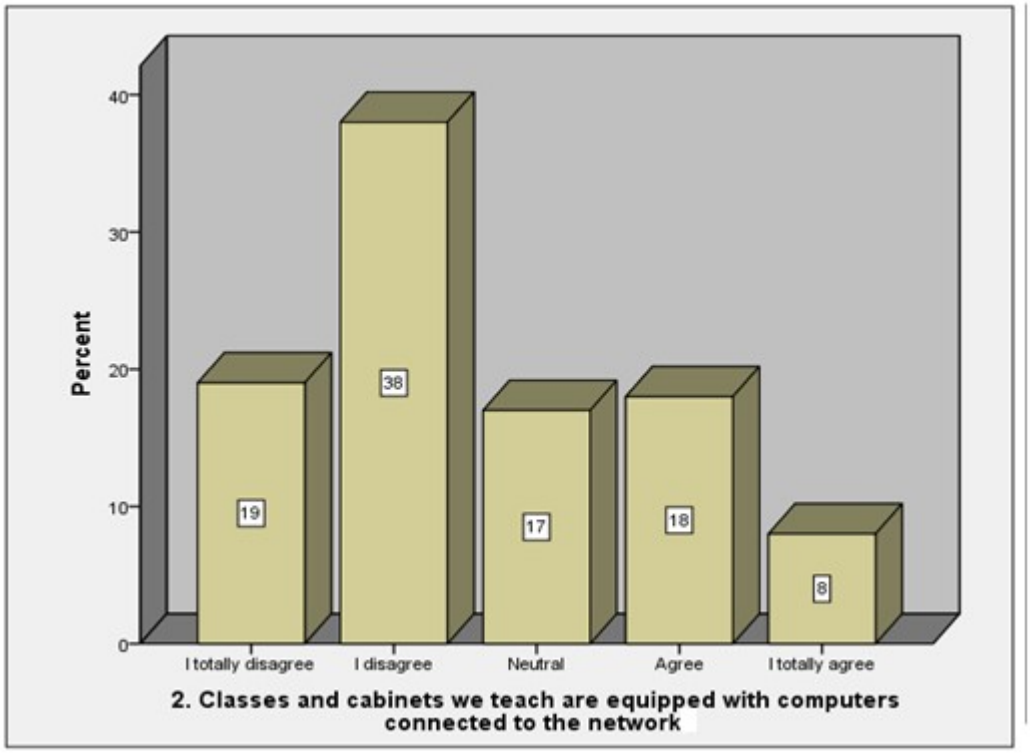
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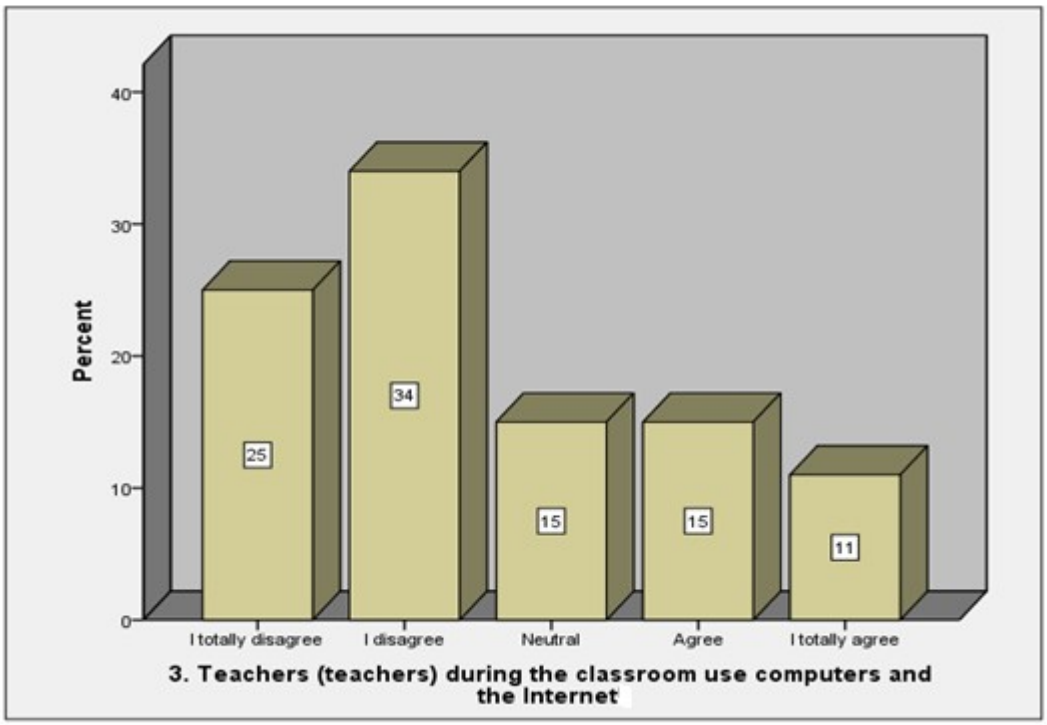
2. Classes and cabinets we teach are equipped with computers connected to the network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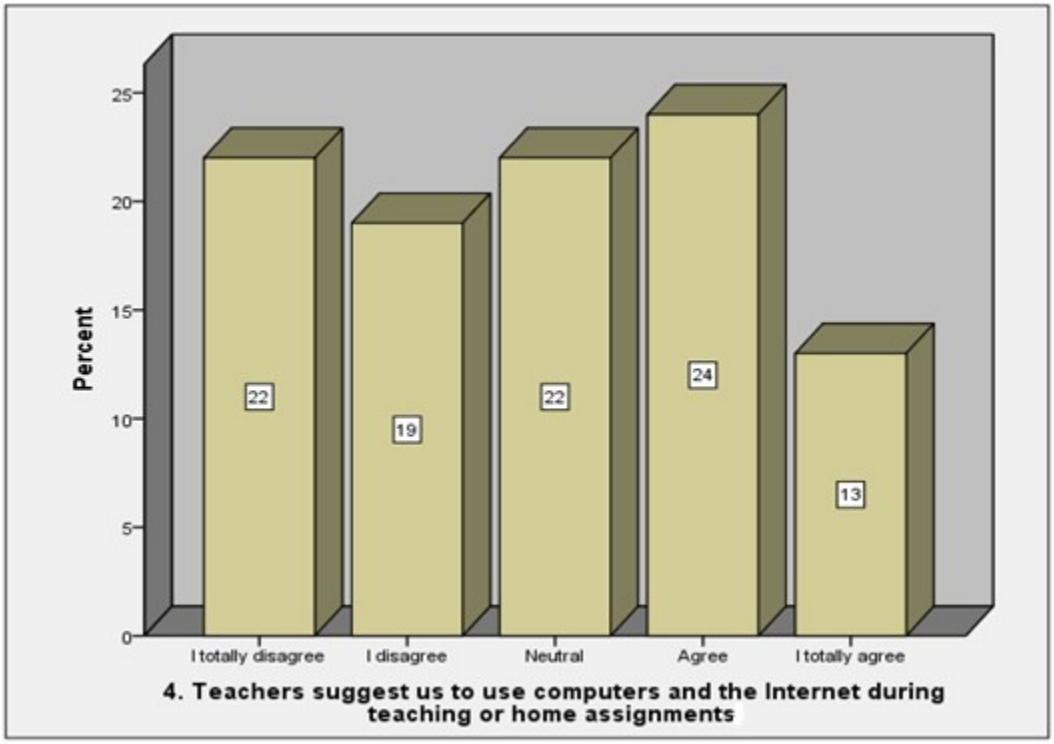
3. Teachers (teachers) during the classroom use computers and the Internet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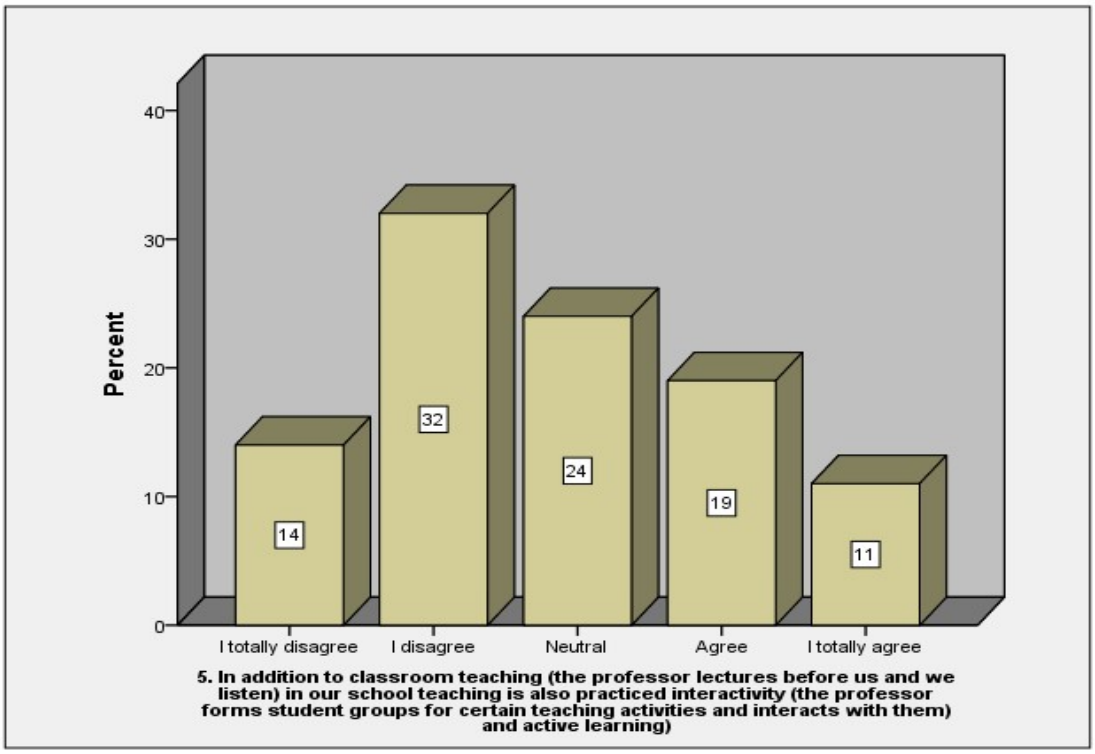
4. Teachers suggest us to use computers and the Internet during teaching or home assignments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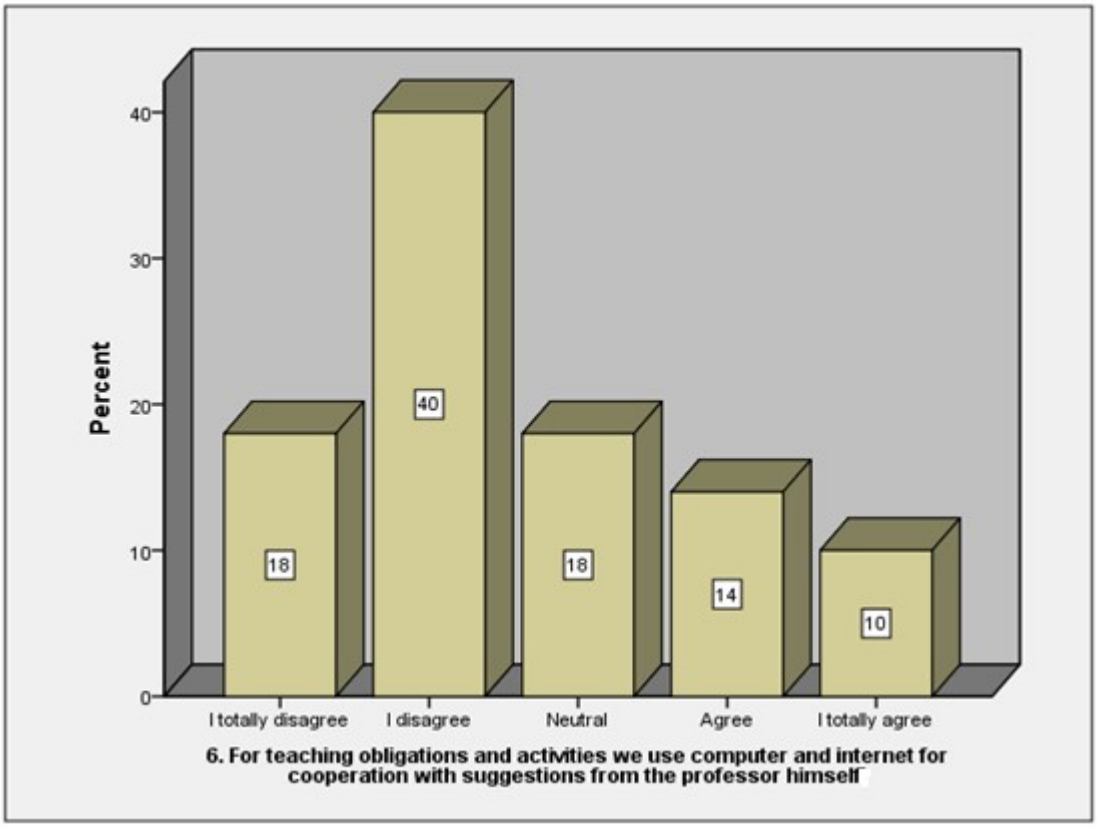
5. In addition to classroom teaching (the professor lectures before us and we listen) in our school teaching is also practiced interactivity (the professor forms student groups for certain teaching activities and interacts with them) and active learning)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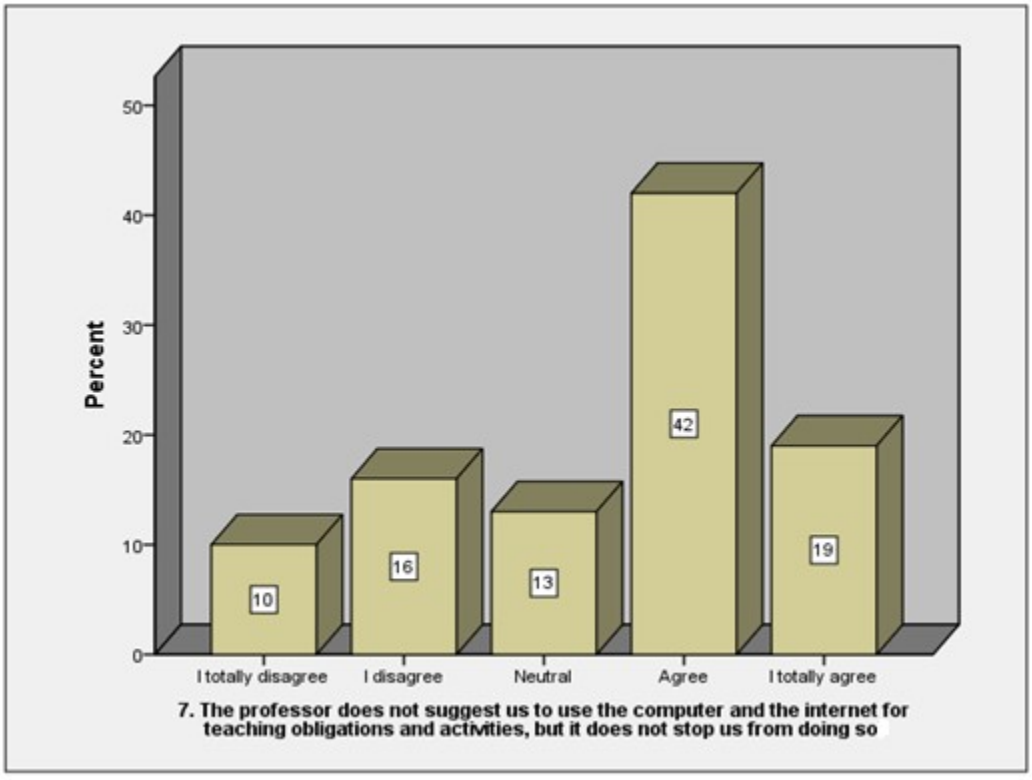
6. For teaching obligations and activities we use computer and internet for cooperation with suggestions from the professor himself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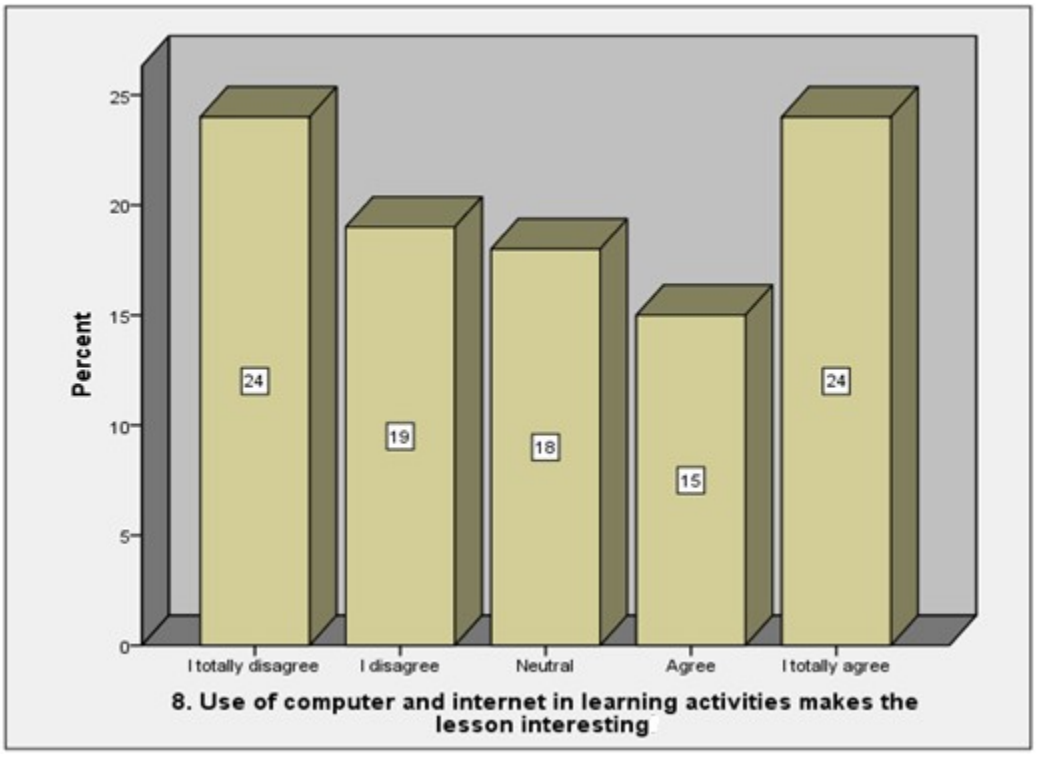
7. The professor does not suggest us to use the computer and the internet for teaching obligations and activities, but it does not stop us from doing so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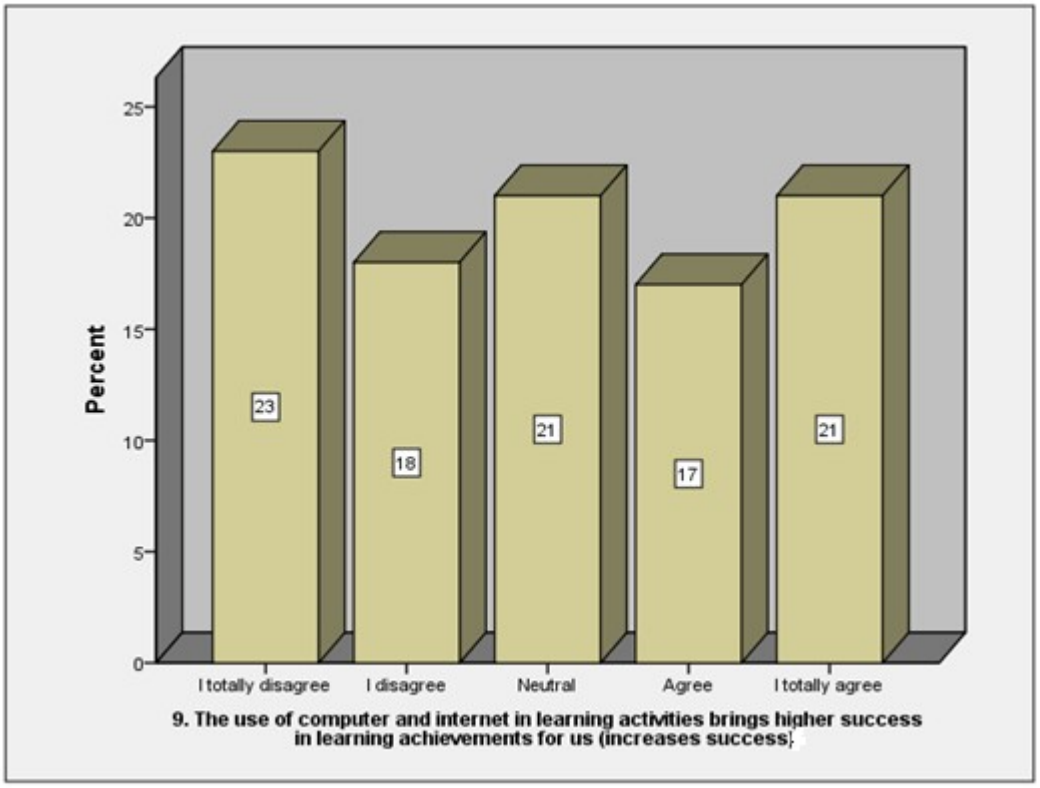
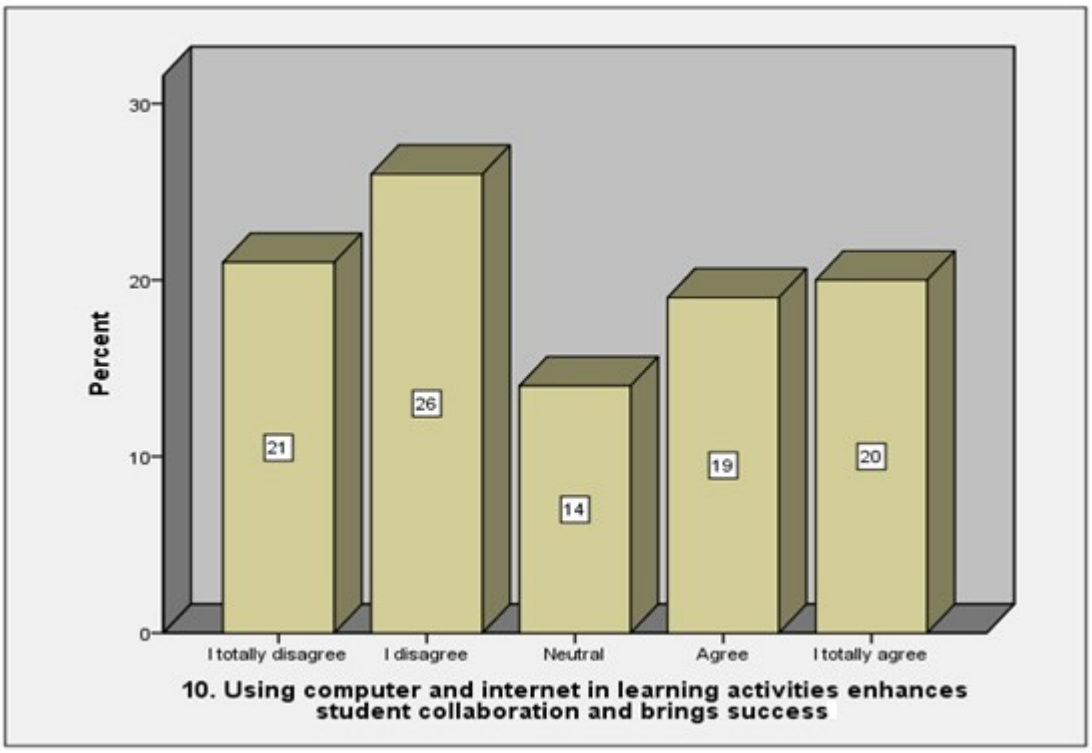
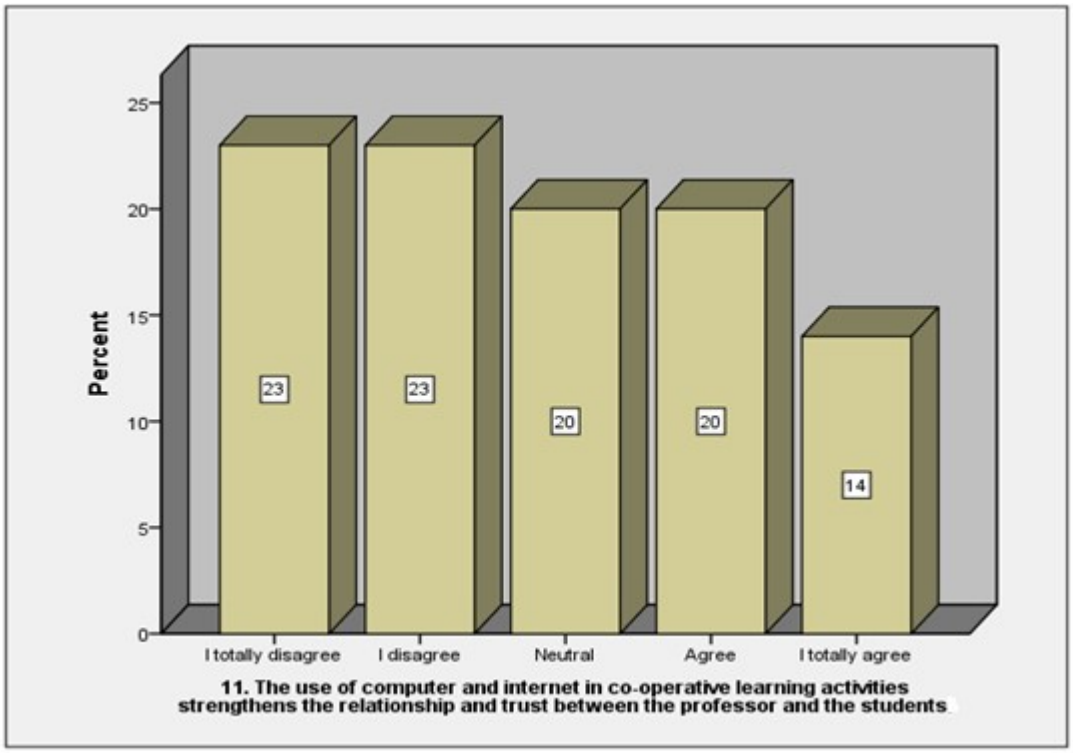
8. Use of computer and internet in learning activities makes the lesson interesting



9. The use of computer and internet in learning activities brings higher success in learning achievements for us (increases success)



10. Using computer and internet in learning activities enhances student collaboration and brings success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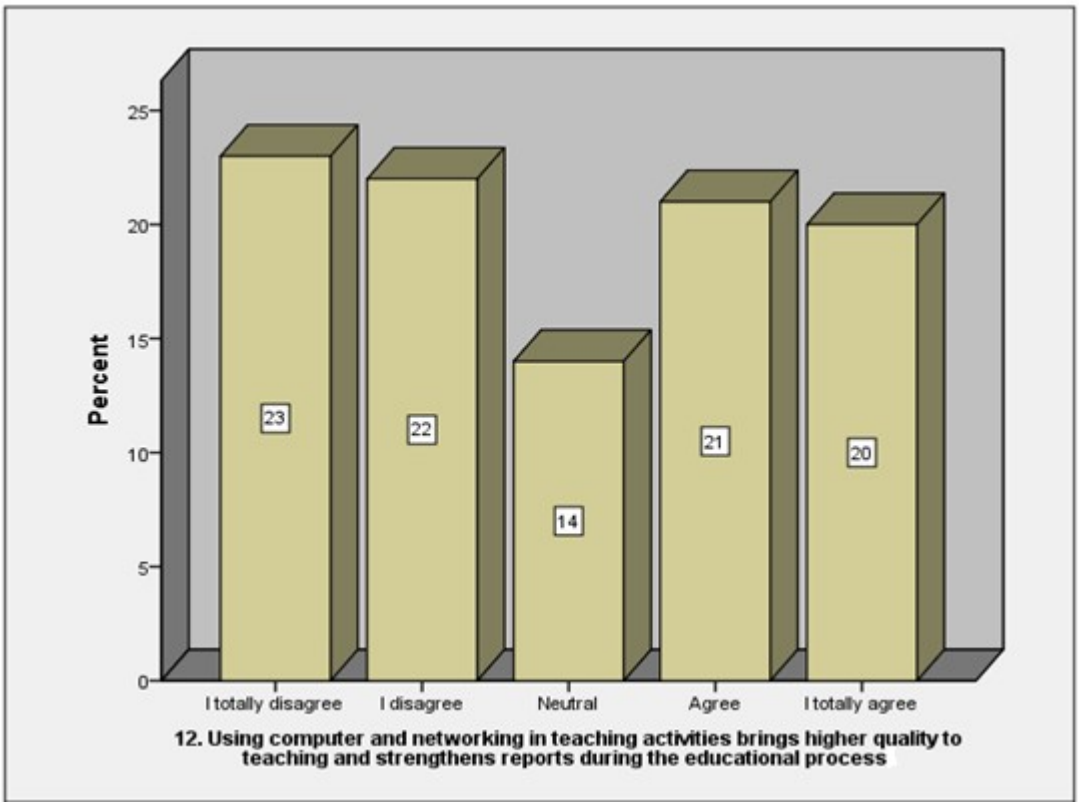
11. The use of computer and internet in co-operative learning activities strengthens the relationship and trust between the professor and the students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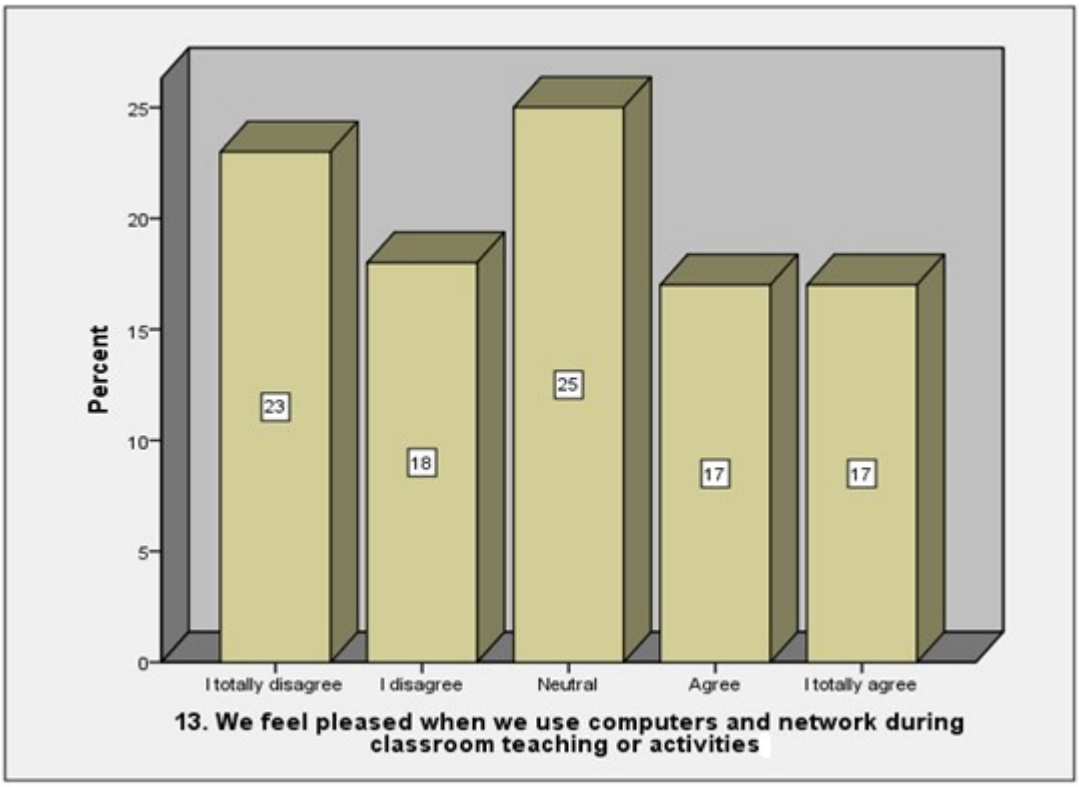
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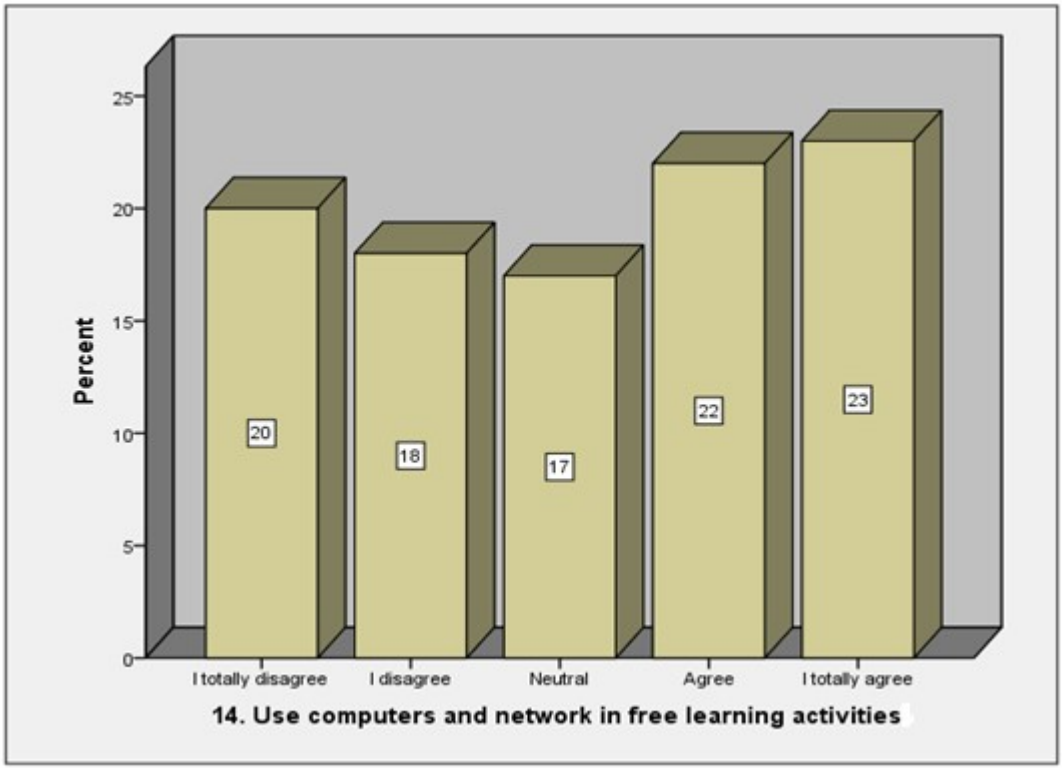
13. We feel pleased when we use computers and network during classroom teaching or activities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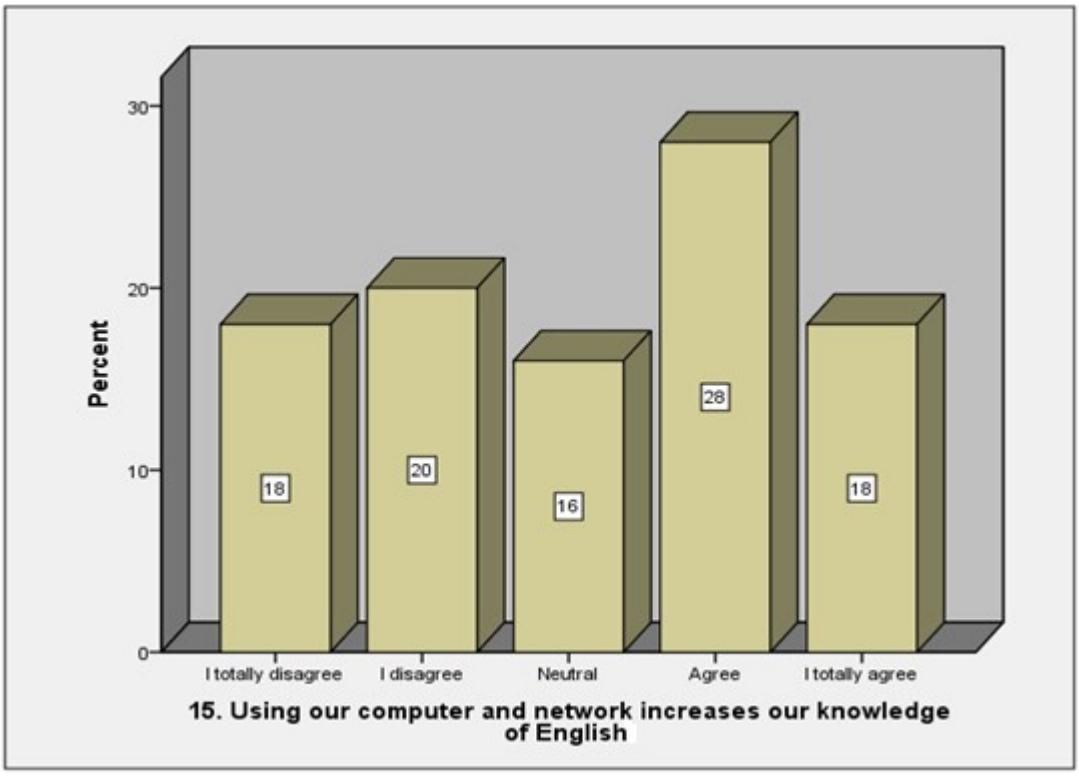
14. Use computers and network in free learning activities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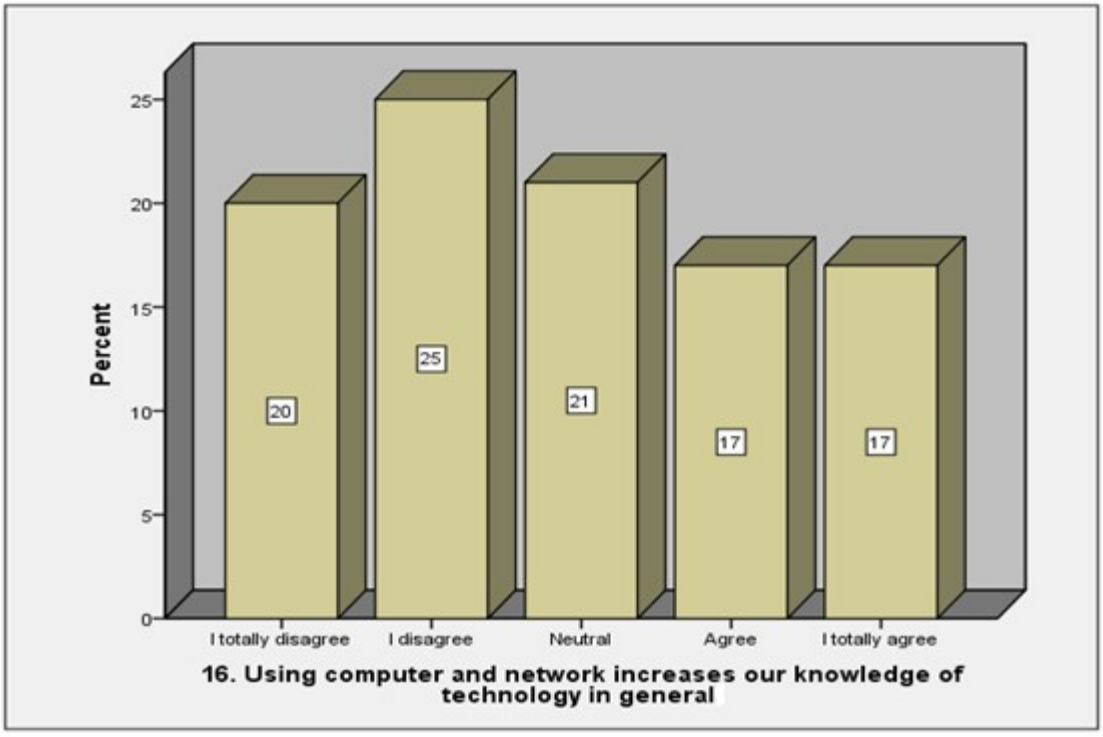
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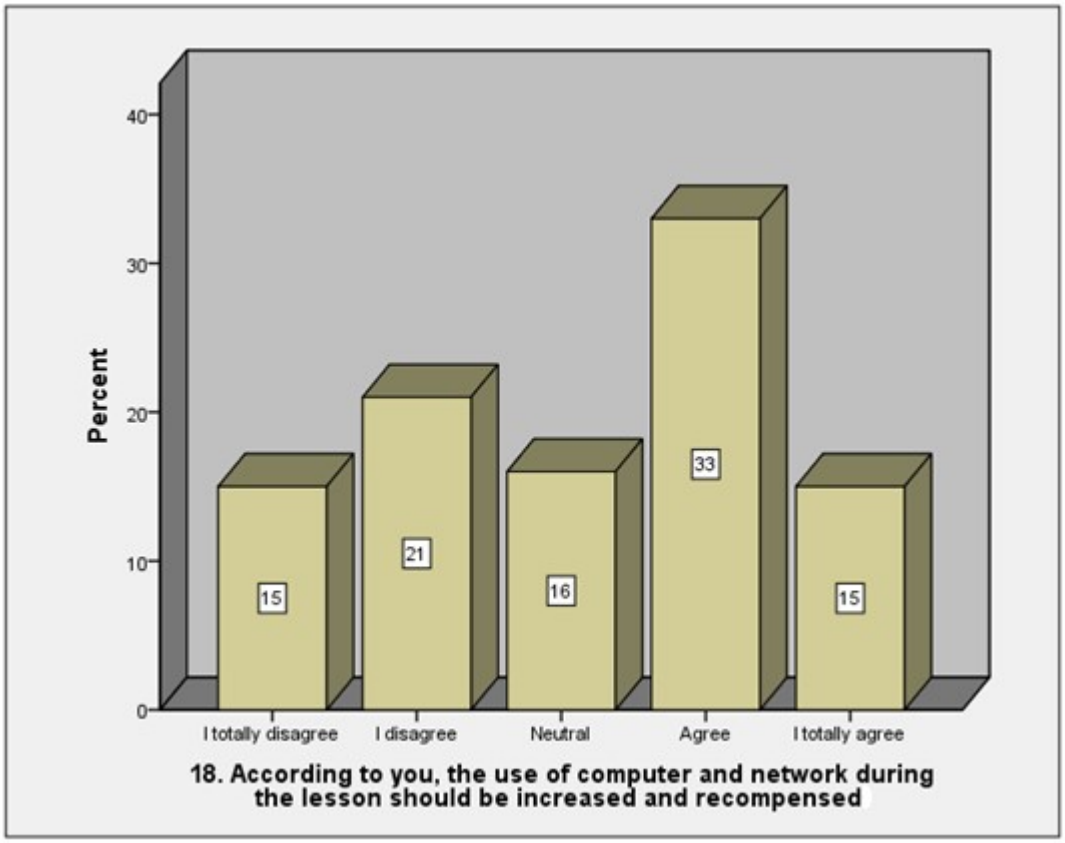
16. Using computer and network increases our knowledge of technology in general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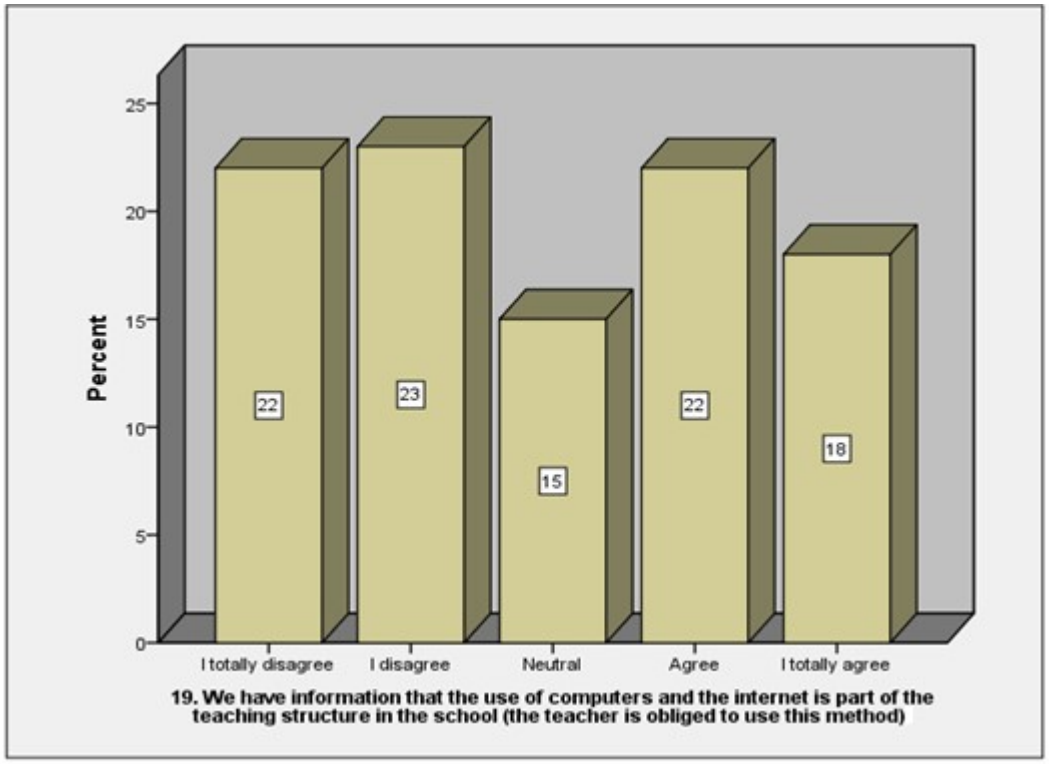
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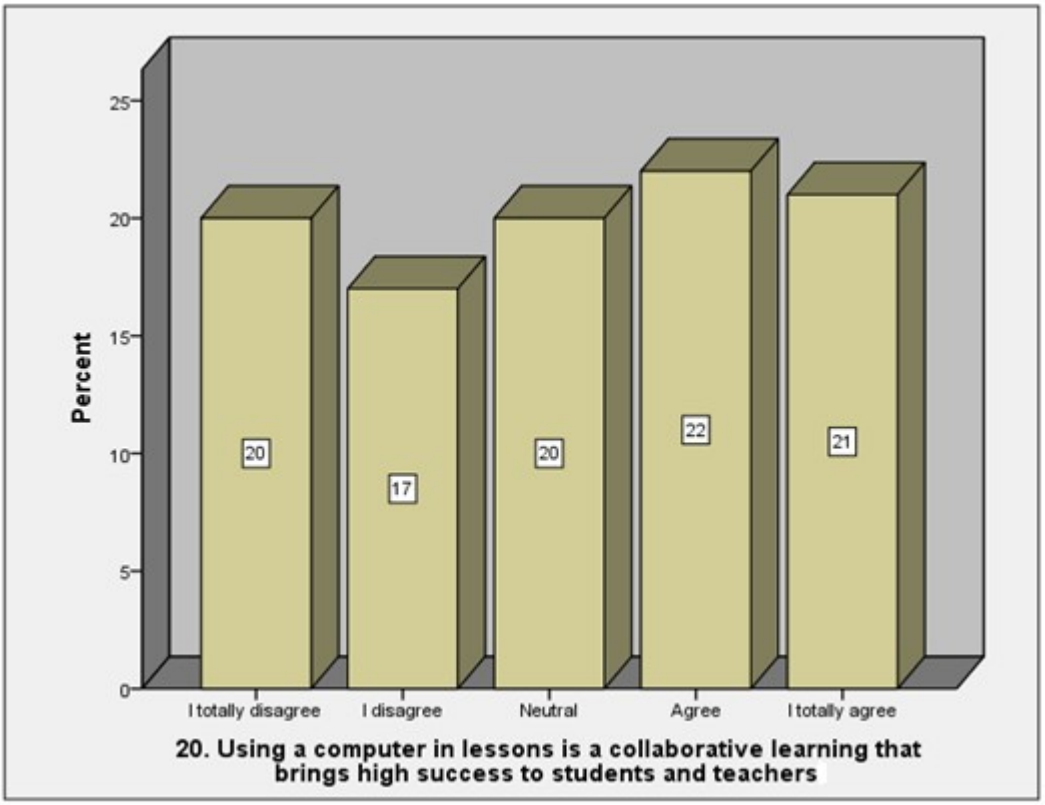
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20. Using a computer in lessons is a collaborative learning that brings high success to students and teachers