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The Role of Multimedia Technologies in Fostering Students' Collaboration in English Class

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Abstract

This paper aims at investigating the role of multimedia technologies on students' collaboration. The researcher has adopted the descriptive and analytical methods. The population of the study was drawn from different Sudanese universities in Khartoum state. The questionnaires were used as a tool for data collection. The sample of the study composed of (50) teachers whom are teaching in different Sudanese universities and students whom are studying at Ahfad university for Women. The data were analyzed by SPSS programme . The study throw the light on the role of multimedia in EFL classrooms .Multimedia enhances the importance of interaction among students and between teachers and students .The researcher recommended that EFL teachers should be more cooperative and supportive to smooth the process and give students chance to be active and interactive.

Keywords: Multimedia, Collaboration, cooperative learning, social interaction

INTRODUCTION

Multimedia technology refers to computer-based interactive applications that use both the hardware and software, allowing people to share their ideas and information. It is a combination of text, graphics, animation, video and sound. The twenty-first century is the age of globalization and information technology as Harry Samuels argues, "Much more recent developments in social media and information technology are taking foreign-language education in new directions"

With the rapid growth of science and technology, the use of multimedia technology in language teaching has created a favorable context for reforming and exploring English language teaching models in the new age.

This trend features the use of audio, visual, and animation effects in the English language teaching classrooms. Multimedia technology plays a positive role in improving activities and initiatives of students and teaching effect in the classrooms.

Definition of Multimedia

Multimedia can be defined as an integration of multiple media elements (e.g., audio, video, graphics, text, and/or animation) into one synergetic and symbiotic whole that results in more benefits for the end user than any of the media elements can provide individually. Multimedia can be defined in multiple ways, depending upon one's perspective. Typical definitions include the following:

1. Multimedia is the "use of multiple forms of media in a presentation" (Schwartz and Beichner, 1999: 8).

2. Multimedia is the "combined use of several media, such as movies, slides, music, and lighting, especially for the purpose of education or entertainment" (Brooks, 1997: 17).

3. Multimedia is "information in the form of graphics, audio, video, or movies. A multimedia document contains a media element other than plain text" (Greenlaw and Hepp, 1999: 44).

4. Multimedia comprises a computer programme that includes "text along with at least one of the following: audio or sophisticated sound, music, video, photographs, 3-D graphics, animation, or high-resolution graphics" (Kozma, 1991: 181).

Multimedia combines five basic types of media into the learning environment: text, video, sound, graphics and animation, thus providing a powerful new tool for education. Here in this study, Multimedia refers to Graphics (Digital Images), Mp3 Players (Digital Audio Players), Video players (VCD, DVD players) and Animations.

Multimedia can appeal to many types of learning preferences – some students profi t more from learning by reading, some by hearing and some by watching, etc. In addition, the use of multimedia allows for different ways of working – students can decide on their own how to explore the materials as well as how to use interactive and collaborative tools.

The computer can support different forms of collaborative interaction depending on what form of collaborative activity is wished. When trying to solve a problem while participating in computer-based group work, the focus should be on a clear task structure and the provision of feedback on solutions made within the group (Howe and Tolmie, 1999, van den Brink et al., 2000). Multimedia offers unique opportunities for the production and representation of shared classroom experience

AIMS AND SCOPE OF THE STUDY

This study aims to:
1. Specify the advantages of multimedia technologies in activating active learning and collaboration in English class.
2. Raise teachers' awareness towards multimedia technologies.
3. Highlight the needs for a strong pedagogical support of using multimedia technologies in English class.

LITERATURE REVIEW

LEARNING ENVIRONMENT IN MULTIMEDIA

The interactive nature of multimedia provides the room to enhance traditional "chalk-and-talk" method of teaching with more flexibility to learners to adapt to individual learning strategy. Multimedia provides a technology based constructivist learning environment where students are able to solve a problem by means of self-explorations, collaboration and active participation. Simulations, models and media rich study materials like still and animated graphics, video and audio integrated in a structured manner facilitate the learning of new knowledge much more effectively. It enables both the educators and learners to work together in an informal setting. The role of educators and learners are extended. Furthermore, it encourages and enhances peer learning as well as individual creativity and innovation.

Multimedia technology empowers the educational process by means of increased interaction between teachers, students, and courseware also innovative ways to make learning more dynamic, longer lasting, and more applicable to the world outside the classroom. Throughout the 1980s and 1990s, the concept of multimedia took on a new meaning and plays as a good tool in educational technology. Furthermore the satellite, computers, audio, and video converged to create new media with enormous potential combined with the advances in hardware and software, these technologies were able to provide enhanced learning facility and with attention to the specific needs of individual users.

(Shirley Biagy, 1996) through his long experience with student teachers has found that:

1. Media provide huge information, they motivate students to speak and help them integrate listening, reading, talking and writing skills, through various kinds of activities.

2. A clear example are Power Point presentations which help students speak freely, eye contact, organize ideas. Through Media Presentations there is more communication and collaboration among

students, while working with the pages of a book is more individual, less collaborative and less interactive.

3. There is so much information available at the click of a mouse but at the same time you have the feeling that there is little memory space in the brain and students may forget everything, so, try to select the most important things and review and review till they are located in the long-term memory.

4. We can exploit a piece of learning materials offered by various Media in several different ways through: analyzing a text in the book, reading and generating ideas from a text in the newspaper or magazine, watching and discussing a TV program or a movie, classroom presentations, exercises and activities using various kinds of Media, pair and group work, reconstructing the text based on the above information brought from different Media, engaging students in useful writing and revision activities, etc.

Tools such as computers and software can enhance learning opportunities in the classroom while promoting new methods of learning. Through the use of technology, students are given the opportunity to better understand content in powerful ways by collaborating with others and being actively engaged in learning (Li, 2007; Park & Ertmer, 2007). According to the U.S. Department of Education (2008), educational technologies have been shown to enrich learning environments and enhance students' conceptual understanding. Most educators and parents consider technology an integral part of providing a high quality education (Greenhow, 2008; U.S. Department of Education, 2003b). Spires, Lee, Turner and Johnson (2008) found that students felt that technology was an essential part of their lives and is what engaged many of them to achieve in school.

Technology promotes interaction and communication among students and teachers while enabling teachers to change the traditional role of an educator in the classroom (T. Levin & 2 Wadmany, 2008). According to Li (2007), a technology-enhanced environment can "force teachers to change their role from knowledge dispensers to facilitators" (p. 379). This can redirect teachers from traditional ways of teaching. In a recent study, students revealed that technology "enabled diverse approaches in teaching and learning, sometimes in ways that could not be achieved by the traditional-textbook methods" (Li, 2007, p. 383). Going beyond the textbook can provide real-life experiences, better preparing students for the future. By integrating technology in the classroom, students become more motivated to be active in the learning process (Clausen, Britten, & Ring, 2008; Cuban, 2001; Digital Learning Environments, 2008, Lemke & Martin, 2004).

Collaborative interactions around computers

According to the complexity between variables such as group size, group composition, and the nature of the task it is impossible to establish causal links between the conditions and the effects of collaboration (Littleton, 1999). This has led to a more process-oriented investigation style, which considers talk and joint activities of learners working together on a task as a social mode of thinking (Littleton, 1999, p. 180). Other authors focus more on classrooms as communities while working with computers (Crook, 1999), or on the important role of conflict, which can help to increase pupils' individual understanding of science (Howe and Tolmie, 1999).

Brown et al. (1989) state that learning occurs through cooperative action and that cognitive concept is progressively developed through action. According to Bruner (1985), learners' potential for learning is revealed by studying with others.

Additionally, the development of interaction between learners is highly influenced by the type of multimedia material used during interaction. When using trial-and-error software, i.e. with large number of choices available, pupils tend to adopt a risk taking behavior. In an investigation by Littleton (1999), pupils did not reflect on their current situation and their forthcoming activities. They only focused on carrying out the work as fast as possible and obtaining good marks.

Mercer and Wegerif (1999), who investigated collaborative working while using educational multimedia, promoted a set of ground rules for collaborative talk, which were accepted by the children (10-11 years of age). The rules were taught through modeling and learned through practice. The rules included mutual respect, careful consideration of everyone's ideas and opinions and finally reaching an agreement on a group idea after discussion. By practicing these rules, the children were learning how to learn together and they created a collaborative community.

Collaborative learning with multimedia materials

The computer can support different forms of collaborative interaction depending on what form of collaborative activity is wished. When trying to solve a problem while participating in computer-based group work, the focus should be on a clear task structure and the provision of feedback on solutions made within the group (Howe and Tolmie, 1999, van den Brink et al., 2000). Multimedia offers unique opportunities for the production and representation of shared classroom experience.

'Computer technology will never replace communication between learners; rather it holds the potential to resource their collaborative endeavor in new and exciting ways' (Littleton, 1999, p. 193).

Multimedia material supports pupils' involvement in conversations with partners with whom they can exchange ideas and articulate general conceptual issues about the presented subject. 'The interactive character of modern technology can support reasoning by amplifying the nature and boundaries of scientific models of objects and events. But the full realization of the potentials of such experiences will still rely on pupils' access to conversation partners who carry on discussions in which these models and concepts are validated. The creation of knowledge is essentially a matter of learning to argue, and no technology will ever replace the need for learners to participate in ongoing conversations with partners sharing interests and commitments. Technology should not be seen as replacing such communication but rather as providing a resource for supporting it' (Säljö, 1999).

In accordance to socio-cultural theories, learners need support from responsive and more competent others to think through the many problems to achieve progress (see also the results in van den Brink et al., 2000). In this sense, cognitive development increases largely because the child gets hints, prompts and assistance from others (i.e. school teachers and classmates) when he/she needs it and can also benefit from social interactions. Teachers can support students' interactions around digital technologies in different ways (van den Brink et al., 2000). They can encourage and enable learners to practice critical thinking in the classroom by having an exploratory talk (discourse talk). The teacher can act as a model – a discourse guide – 'a crucial mentor for pupils' initiation into culturally based discourse practices' (Littleton, 1999, p. 191). According to Watson (1997), it is very difficult for teachers to build up a culture of collaboration in the classroom. This demands a working partnership between teachers and learners. Furthermore, from teachers it requests a deep trust in the creative competencies of children and young people.

Social networks

A definition of social networks: 'Social networking refers to the aspect of Web 2.0 that allows users to create links between their online presence such as a webpage or a collection of photos. These links may be through joining online groups or by assigning direct links to other users through lists of 'friends' or 'contacts' (Green and Hannon, 2007, p. 13).

Learning by social interaction in Web 2.0

The term Web 2.0 is used in connection with interactive and collaborative applications of the World Wide Web. Easy-to-handle applications enable Web 2.0 users to create, edit and distribute content within a virtual community.

Web 2.0 applications include wikis, blogs, social networking sites and podcasts.

Solomon and Schrumm (2010) present, among other things, a number of crucial aspects when working with Web 2.0 applications:

Communication. Students can post and share their work and get feedback from a global audience or a selected group of users. Communication with a real audience motivates students to work harder on their projects.

Collaboration. With the help of different applications, students can work together on the same website, provide feedback to each other, discuss concepts and project stages, share research, etc. (see Chapter 5). Peer editing becomes another important dimension of real time collaboration.

Connectedness. According to Stephen Downes, 'knowledge is distributed across a network of connections and therefore learning consists of the ability to construct and traverse those networks. Knowledge, therefore, is not acquired, as though it were a thing. It is not transmitted, as though it were some type of communication.'

Learner communities. Social networks can be used within the classroom. Schools can create learning communities around specific topics in order to give students the opportunity to deepen their knowledge and expertise through ongoing communication.

Contextualization. In order to construct new knowledge, students need to integrate new information or experiences or practices into the framework of already existing and connected knowledge. Using the web for this reason seems to support the view that new and existing knowledge are extremely connected with each other and knowledge in one subject (literature) can be easily used in another one (history).

In order to establish collaboration not only as a pedagogical method or a strategy but as a culture of living together and a certain state of mind, we need to look at what makes cooperative learning work.

According to many authors (see for example Slavin, 2010), learning in groups collaboratively almost always improves affective outcomes – students love to work together, they make friends, they become more tolerant. When it comes to achievement, the organization of collaborative learning seems to be very important. Research has shown that two aspects are crucial: group goals and individual accountability (Slavin, 2010, Webb, 2008). It seems that group members need to achieve common goals or to earn rewards or recognition and that group success should depend on individual learning processes of each group member. If the group task is a certain learning outcome of each student, so every group member should be interested in spending time and effort to explain the concepts to be learned to other group members in order to be sure that everybody understands them. According to Webb (2008), students who give and receive elaborated explanations are the

ones who profit most from collaborative learning environments. It seems that these two aspects (group goals and individual accountability) motivate students to find explanations and to take seriously the learning needs of themselves and other students. Furthermore, in this research, giving and receiving answers without elaborated explanations correlates negatively with understanding.

Slavin (2010) states that cooperative learning generally works equally well for all types of students, even for high achievers, due to the fact that giving elaborated explanations to others leads to asking more questions and to deepening the existing knowledge base.

Slavin (1995) summarizes effective cooperative learning in the following way: group goals which are based on learning processes of all group members leads to social cohesion. These processes should establish different forms of motivation such as the motivation to learn, to encourage groupmates to learn and to help groupmates to learn. These motivational aspects lead to elaborated explanations (peer tutoring), to peer modeling, cognitive elaboration, peer practice, and peer assessment and correction, which finally enhances learning of all group members.

Research shows that even if teachers use more and more collaborative learning, it seems that these practices are used in an informal way and not within the framework of common goals and individual accountability (Slavin, 2010). Teachers need trainings and follow-up support for different methods of collaborative learning.

The human brain seems to be primed for learning in social interaction (Hinton and Fischer, 2010). Our proper experiences and research have shown that the human brain is tuned to experience the experiences of others by empathy. When we are deeply engaged in the observation of others – for instance, during a football match or a romantic movie – the so called mirror-neurons simulate the experiences of others. These special neurons are thought to be crucial when it comes to build up relations and when people learn in a social situation. These research findings – our relatedness to others and learning from others – propose that positive relationships facilitate learning; therefore learning should be community-oriented (look for more explanations on Google: mirror neurons video).

Web 2.0 tools for the classroom

Blogs

A blog (the combination of the words web and log) is a kind of website, where the blogger (the person or the persons who created the blog) publishes regularly short texts of just a few paragraphs (and additionally other data). This can be a personal journal or a site focused on a certain topic. In most

cases, blogs are public and readers are welcome to post comments there. Blogs are based on an easy-to-use online application or a hosting platform.

Due to the predominant use of short texts, blogs can be used as an effective medium to develop writing competencies. The potential audience – teachers, classmates, friends, random visitors – seems to be a stronger motivating factor than in the case of writing only for one teacher. These public characteristics of blogs force students to think carefully about what they are going to write, to reflect deeply on the content and their way of communicating their ideas. Short texts oblige the authors to express their ideas clearly and concisely. Well-chosen images or other media can enhance posts. Students can interact with each other as peer reviewers.

Blogs can also be used as sources of information. However, before using a blog as information resource, it is necessary to evaluate its validity and reliability. This can be a good exercise for students: they need to find out whether they can trust information sources and evaluate them as valid and reliable. Common techniques are finding out as much as possible about the blogger, his/her reputation, expertise in the field, etc. This can lead students to critical thinking and reflection.

Online social networks function according to the interests and/or activities, and goals of the members of the social networks. Social networks are seen from many young people as a virtual social space to meet, to exchange, to hang around together. Dodge, Barab, and Stuckey (2008) assume that social networks are 'third spaces... informal public spaces such as coffee houses affording novelty, diversity, and learning. Unfettered by school protocol or family emotions, third spaces allow groups to meet in generous numbers, and while no individual constitutes the third space, close friendships can be developed unlike those found at home or school' (p. 229). Using social networks in classrooms is built on the assumption that individuals creating their own network might be better able to organize, protect and define the goals of that 'space'. Ning (www.ning.com) is an example of such platform that provides individuals with an opportunity to create their own social network. The advantages of such social networks are evident: small groups can collaborate with each other, members can post questions and ideas, classroom activities can be stored or reflected on, absent students can catch up on work, and work can be shared with others.

Pedagogical use. Many students are used to be members of social networks such as Facebook, MySpace, Friendster, etc. in order to communicate with their friends (friendship-based use of social networks). However, another motivation lets students be members in a social network: their specific personal interests, which allow them to explore the Internet and its social networks on specific subjects (interest-based use of social network. Using this voluntary student habit as a pedagogical tool in the classroom

seems to create a rather positive motivating ambiance due to the familiarity with the Web 2.0 environment. According to the US-American school boards Association, in 2007 almost 50 % of students using social networks discussed their homework or other school related topics in their networks. This means that students use networks for educational reasons.

'Network learning is committed to a vision of the social that stresses cooperation, interactivity, mutual benefit, and social engagement. The power of ten working interactively will invariably outstrip the power of one looking to beat out the other nine' (Richardson, 2010).

Wikis

Wikipedia is the most known and used wiki on the Internet. Wikis are websites whose contents can be read, created and edited directly online by web users (with the help of wiki - software). The main idea of wikis is a collaborative work on one text (complemented by images or videos) aiming at expressing the experiences and knowledge of the authors. Wikis can be open to everybody (like Wikipedia) or to a restricted group of people. Due to the fact of being open to alteration, wikis are prone to vandalism and the editing of false information but the same characteristics allow a quick fixing of the wikis.

Pedagogical use of wikis. Wikis allow students to create, edit, and add multimedia elements for collaborative projects. All participating students share the responsibility for the quality of their wiki – they research, analyze, sum up the needed information and coordinate the project while ongoing evaluation and editing of each other's contributions takes place. Students can access the wiki from every connected computer, they can also engage into discussions after the school hours. This work demands higher order cognitive thinking competencies (critical thinking, organization, reflection, problem solving, etc.) as well as collaborative competencies (evaluating the work of others, agreeing on a common scope, on meaning or on relevance of contributions, discussion competencies, etc.) due to the fact that the process of creating wikis is democratic – everyone can edit, delete, add, or change content. Problems can appear, when students are encouraged to change or delete the work of their classmates.

In order to avoid such situations, teachers should create a high collaborative environment from the beginning so that each student has the sense of belonging to group and will not get angry, when his or her personal contribution will be changed or partially deleted. The assignment of a wiki project should also be treated collaboratively (see portfolio assignments). It is possible that the teacher can track students' work (their contributions and corrections of others' work) – this might motivate all students to do their work and avoid situations when some students do all the work and while others

take advantage of them. Furthermore, by taking ownership of their contributions and the joint product, they can learn to accept and respect the work of others.

In order to avoid vandalism from outside, class wikis can be restricted to only class experiences and not open to a larger audience.

Another opportunity to work with wikis in the classroom is to use already existing wikis on the web. If students work hard on a certain topic, they can look at wikis – for instance, in Wikipedia – and evaluate and edit an existing wiki, if they think they can add a useful contribution. Within the process, students can follow what happens with their entry if other wikipedians change their entries or not. Because students are very engaged in the process, this can be a strong learning experience.

MATERIALS AND METHODS

The sample of this study composed of (50) teachers whom are teaching in different Sudanese universities and (50) students whom are studying at Ahfad University for Women .

TOOLS OF THE STUDY

The researchers used a questionnaire as a tool to gather the data of the study. The questionnaire was delivered to (50) teachers whom are teaching in different Sudanese universities and (50) students whom are studying at Ahad University for Women. The data were analyzed by SPSS programme .

THE ANALYSIS OF THE QUESTIONNAIRE IN RELATION TO THE HYPOTHESIS:

H: Multimedia technologies give students opportunity to collaborate.

Statement (1): Implementing multimedia in the classroom promote students' collaboration.

Table (1): Implementing multimedia in the classroom promote students' collaboration.

Answer	Number	Percent
Strongly agree	35	70.0
Agree	15	30.0
Total	50	100.0

According to the table above the result show that there are (35) respondents in the study's sample with percentage (70.0%) have strongly agreed with the statement. There are (15) respondents with percentage (30.0%) have agreed

on that .This indicates that all of the respondents support the implementing multimedia in the classroom promote students' collaboration .

Statement (2): Integrating multimedia (audio-visual) in EFL classes improve interaction among students and between teachers.

Table (2): Integrating multimedia (audio-visual) in EFL classes improve interaction among students and between teachers.

Answer	Number	Percent
Strongly agree	10	20.0
Agree	25	50.0
Undecided	5	10.0
Disagree	6	12.0
Strongly disagree	4	8.0
Total	50	100.0

It is noticed from the above table and figure that there are (10) respondents in the study's sample with percentage (20.0%) have strongly agreed with the statement. There are (25) respondent with percentage (50.0%) have agreed on that and (5) respondents with percentage (10.0%) have undecided about that, and (6) respondents with percentage (12.0%) are disagree about that and (4) respondents with (8.0%) have strongly disagree about that. This indicates that the majority of the respondents think that integrating multimedia (audio-visual) in EFL classes improve interaction among students and between teachers.

Statement (3): In multimedia EFL classroom students collaborate with their classmate to complete a project in a relaxing environment.

Table (3): In multimedia EFL classroom students collaborate with their classmate to complete a project in a relaxing environment.

Answer	Number	Percent
Strongly agree	33	66.0
Agree	17	34.0
Total	50	100.0

According to the table and figure above the result show that there are (33) respondents in the study's sample with percentage (66.0%) have strongly agreed with the statement. There are (17) respondent with percentage (34.0%) have agreed on that .This indicates that the majority of the respondents support the statement.

Statement (4): Bringing short films and videos in EFL classes improve students' pronunciation and interaction.

Table (4): Bringing short films and videos in EFL classes improve students' pronunciation and interaction

Answer	Number	Percent
Strongly agree	13	26.0
Agree	30	60.0
Undecided	4	8.0
Disagree	3	6.0
Total	50	100.0

It is noticed from the above table and figure that there are (13) respondents in the study's sample with percentage (26.0%) have strongly agreed with the statement. There are (30) respondent with percentage (60.0%) have agreed on that and (4) respondents with percentage (8.0%) have undecided about that, and (3) respondents with percentage (6.0%) are disagree about that. This indicates that the most of the respondents support the statement.

Statement (5): Lectures with multimedia provide students with opportunity to represent and express their prior knowledge.

Table (5): Lectures with multimedia provide students with opportunity to represent and express their prior knowledge.

Answer	Number	Percent
Strongly agree	16	32.0
Agree	24	48.0
Undecided	4	8.0
Disagree	3	6.0
Strongly disagree	3	6.0
Total	50	100.0

The table and figure above show that there are (16) respondents in the study's sample with percentage (32.0%) have strongly agreed with the statement. There are (24) respondents with percentage (48.0%) have agreed on that and (4) respondents with percentage (8.0%) have undecided about that, and (3) respondents with percentage (6.0%) are disagree about that and (3) respondent strongly disagreed about that. This indicates that most of the respondents support this statement.

REPORT DISCUSSION

The data collected were analyzed in relation to the hypothesis of the study. The date were collected by the questionnaire which has been distributed to university teachers in Khartoum state. After analyzing and comparing the results with the main hypothesis, the results have shown that university level teachers confirmed that multimedia technologies give students opportunity to collaborate.

REFERENCES

1. Biagi Shirley (1996), Media Reader, Wadsworth, New York
2. Brooks, D. W. 1997. Web-teaching: A guide to designing interactive teaching for the World Wide Web. New York: Plenum.
3. Brown, J.S., Collins, A., and Duguid, P. 1989. Situated cognition and the culture of learning. Educational Researcher, 181, pp. 32–34.
4. Clausen, J., Britten, J., Ring, G., (2008). Envisioning effective laptop initiatives. Learning & Leading with Technology, 36(2), 18-22.
5. Greenhow, C. (2008). Who are today's learners? Learning & Leading with Technology, 36(2), 16-17.
6. Greenlaw, R. and E. B. Hepp. 1999. In-line/On-line: Fundamentals of the Internet and the World Wide Web. Boston: McGraw-Hill.
7. Howe, C. and Tolmie, A. 1999. Productive interaction in the context of computer- supported collaborative learning in science. K. Littleton and P. Light (eds). Learning with Computers, London, Routledge, pp. 24–45.
8. Kozma, R. 1991. Learning with media. Review of Educational Research 61: 179–211
9. Lemke, C., & Martin, C. (2004). One-to-one computing in Indiana: A state profile (Preliminary Report). Retrieved December 12, 2009, from http://www.metiri.com/Soultions .Research.htm
10. Levin, T., & Wadmany, R. (2008). Teachers' views on factors affecting effective integration of information technology in the classroom: Developmental scenery. Journal of Technology and Teacher Education, 16(2) 233-263.
11. Li, Q. (2007). Students and teacher views about technology: A tale of two cities. Journal of Research on Technology in Education, 39(4) 377-397.
12. Littleton, K. 1999 Productivity through interaction: an overview. K. Littleton and P. Light (eds), Learning with Computers. London, Routledge, pp. 179-194.
13. Mercer, N. and Wegerif, R. 1999. Is 'exploratory talk' productive talk? K. Littleton and P. Light (eds), Learning with Computers, London, Routledge, pp. 79–101.
14. Schwartz, J. E. and R. J. Beichner. 1999. Essentials of educational technology. Boston: Allyn and Bacon.
15. Slavin R.E. 1995. Co-operative Learning. G. McCulloch and D. Crook (eds). International Encyclopedia of Education. Routledge, Abongton, UK.
16. Slavin, R.E. 2010. Co-operative learning: what makes group-work work? H. Dumont, D. Instance and F. Benavides (eds), The Nature of Learning. Using Research to Inspire Practice. OECD, Centre for Educational Research and Innovation, OECD Publishing.
17. Solomon, G. and Schrum, L. 2010. Web 2.0 How-To for Educators. Eugene, Or., International Society for Technology in Education.
18. van den Brink, K., Gómez Alemany, I., Prat Pla, A., Duarte, A., Ericsson, L. and Slack, R. 2000. Empirical Investigations on Children's Learning with Educational Multimedia. Official Deliverable of the PEDACTICE Project supported by the EC.