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The Impact of a Collaborative Learning Using New Informational Technologies on Personality Development

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Abstract

In our research we have captured both the opinions of teachers and students about the consequences they perceived following the use of new information technologies through collaborative learning by applying 1000 questionnaires in pre-academic education in Prahova and Cluj counties. These questionnaires, combined with direct observation guided by systematic observation scales and discussions with educational actors directly involved in the educational process that determines the development of individuals’ personality, led us to conclusions that highlight the advantages of using NIT and of the way of organization that involves collaboration, between students as well as between students and teachers and between teachers.

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1. Collaborative and cooperative activities

Teaching activity is based on cooperation and collaboration among students or between students and teachers. In all situations analyzed, teachers had in view the following:

\begin{itemize}
  \item Review of previously studied notions or introduction of new notions;
  \item Dividing students in working groups and establishing the roles;
  \item Presentation of the objectives and work tasks and students’ agreement to them;
\end{itemize}

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• Students’ agreement over working times;
• Students’ agreements over the roles;
• A work report compiled by students by filling in worksheets or drafting a document.[2]

2. The collaborative learning impact and the psychical processes development

The teaching strategy adopted by teachers is based on solving real life problems. One can talk about securing an adequate environment for thinking and learning by:
• Stimulating and capitalizing on student’s curiosity;
• Encouraging students to present their ideas, opinions and questions;
• Creating an opportunity for students to find, select, evaluate and compare information necessary for solving work tasks;
• Creating opportunities for students to present the results of their activity, to discuss them and evaluate them according to others’ results;
• Capitalization of every student’s answers and ideas by the teacher through feedback and knowledge retention;
• Promoting and encouraging active, complex, critical and creative thinking by the proposed activities.[2]

3. Methodological issues and collaborative learning consequences

Teachers had in view to obtain permanent feedback of students’ activity to appropriately conduct the activity, to mediate conflicts and to stimulate cooperation and collaboration of students.

As an overview of the lessons observed and of the training lessons using Websites we can conclude that this educational means can promote both individualized learning and collaborative learning. When it comes to individualized activity then we have evaluation, independent study for finding information, creating virtual experiments, watching processes that are difficult to observe in labs. If the evaluation activity is predominantly independent when it is about evaluation tests, the other teaching and learning activities can be run as collaborative activities. An example of collaborative activity is to verify tests using virtual experiments for the lesson Kirchhoff’s Laws which produce a rapid feedback and the dialog between team members clarify potential doubts. In this situation, more than with other lessons, one can notice the support students give to one another by teaching, in some situations, the notions that clarify the correct answer.[9]

Favorable results of learning by cooperation can be attributed to some influential factors. First, students can profit by having to coordinate their interactions by both explaining their reasoning to others and by understanding others’ way to react and argument. Second, cooperation leads to the so called socio-cognitive conflict that compels students to review knowledge when confronted with unknown or contradictory information from partners. Third, cooperation challenges thing processes because everyone has to support his view, to offer arguments, to reconcile their information with partners and to evaluate possible solutions to the issues. In other words, in a cooperative framework occurs much shared reflection.[3]

Learning by cooperation does not influence only the work tasks during the activity but also the students’ motivation regarding self-efficiency, orienting the goal of learning and the intrinsic evaluation of learning tasks. A prime factor that explains these effects is the positive motivational impact of the support given by peers in learning. It has been noted that when colleagues admit their success in learning depends on the success of their colleagues, those almost certainly offer emotional and professional support in learning. A second factor is the support given by the group when confronted with the difficulty
of the task. Cooperative groups have higher levels of self-efficiency regarding the task because every member is challenged by other members to resist difficulties and to persevere. A third factor is represented by group activities encouraging students to show a greater intrinsic consideration to the subject or the task. A fourth factor is the need to explain their own knowledge and hence to expose it to the group’s judgment. An increased motivation will increase the time spent on the task, one of the variables that most influence learning results.[5]

In the analyzed lessons we noted the active character of learning in that the use of websites in planning classic learning activities (independent activity, learning by cooperation, learning by problematization, learning by discovery, learning by models and learning by experiment) allows:

- The stimulation, exercise and development of students’ personal reflection emphasizing their critical, active, analytic, logic, creative, divergent and productive thinking;
- Providing a superior internal/intrinsic motivational support for learning and determines an active and interactive participation in the acquisition of the new;
- Placing students in problematic situations that stimulate their curiosity and interest, interaction and interactivity;
- Running activities in students’ own rhythm according to their intellectual potential, to their skills and abilities and obtaining immediate feedback to their actions;
- Running the students’ research activities under the supervision of their teachers;
- Ensuring socializing and learning skills outside classes;
- The interaction within the group of students to accomplish working tasks;
- The encouragement of an open and active attitude, of engagement for solving working tasks by selecting that information deemed useful for the set goal;
- The stimulation of the spirit of observation and exploration i.e. an active cognitive attitude;
- The implementation of creative thinking using comparison, analysis, synthesis, transition from concrete to abstract, from particular to general and vice versa, from theory to practice and vice versa by using virtual models;
- Teaching students the reasoning by analogy, making them familiar with scientific research and developing skills specific to the latter;
- Training students in creating mathematical problems starting from a given model and vice versa;
- The implementation of practical steps (using virtual measuring tools or virtual experiments);
- The practice of logical thinking by analyses, interpretations, comparisons between various analyzed experiments;
- The study of phenomena in various conditions which cannot be done in case of classical lab experiments;
- Transforming the student into a producer of documentary resources;
- The development of computer and Internet skills.[10]

Teaching concepts related to website building proves to be more a coordination and guidance activity, since Web applications used for learning are useful to teachers and students alike.

4. Activities results and their impact on learning quality

Summarizing the above we present the activities carried out in parallel with the impact on quality of learning as follows:
Table 1. The activities carried out and the impact on learning quality

<table>
<thead>
<tr>
<th>Activities</th>
<th>Impact on learning quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge acquisition</td>
<td>• Cognitive development of students reflected in high school performance</td>
</tr>
<tr>
<td>• Collecting information</td>
<td>• Learning centered on “know how”, on skills and abilities, capabilities and competencies</td>
</tr>
<tr>
<td>• Structuring and analyzing information, quantitatively and qualitatively</td>
<td>• Learning oriented towards goals and problems, situations and contexts and not towards individuals</td>
</tr>
<tr>
<td>• Problem solving</td>
<td>• Shifting focus from memorizing content to the ability to construct and create their own experience (building one’s own knowledge)[7]</td>
</tr>
<tr>
<td>• Simulations</td>
<td></td>
</tr>
<tr>
<td>Teacher oriented activities</td>
<td>• Active and conscious interaction, continuous and systematic reflected in the increase of networking skills, of the capacity to adapt easily, fast and efficient to socio-professional life[6]</td>
</tr>
<tr>
<td>• Presentation</td>
<td>• Adaptation to the learning rhythm of each student according to their individual and age particularities[11]</td>
</tr>
<tr>
<td>• Simulation</td>
<td>• Improving the focus which determines the optimal solving of the most diverse problems[4]</td>
</tr>
<tr>
<td>• Information</td>
<td></td>
</tr>
<tr>
<td>Knowledge communications</td>
<td>• Developing creativity, divergent thinking, the innovative spirit and critic spirit to develop a constructive attitude</td>
</tr>
<tr>
<td>• Creating and holding presentations</td>
<td></td>
</tr>
<tr>
<td>• Internet use</td>
<td>• Creation of an attitude of belonging to a community, the sense of belonging to a community, be it a virtual one</td>
</tr>
<tr>
<td>• Use of e-mail and chat</td>
<td></td>
</tr>
<tr>
<td>Collaborations via Internet and multimedia</td>
<td>• Developing a tolerant attitude, of openness and dialog through encouraging teamwork</td>
</tr>
<tr>
<td>• Group research projects, between groups of different ages</td>
<td>• Sharing information by using the same ethical and professional code, by sharing and disseminating it to the team, class, school and community</td>
</tr>
<tr>
<td>• Cross-curricular activities, thematic approaches</td>
<td>• Implementing partnerships between students, between classes, schools and communities through developing civic and pro-social attitudes</td>
</tr>
<tr>
<td></td>
<td>• Structuring student’s attitude and behavior based on social and individual needs through promoting values specific to a democratic society[12]</td>
</tr>
</tbody>
</table>

5. Discussions and opinions concerning the new technologies and the collaborative learning impact

The effort to support the above is necessary if we have in view the advantages brought by the use of Internet for the activity of students and teachers, for the fact that this technology facilitates and supports self-regulation, independence and constructivist learning, thus improving its quality. From among teachers opinions the following are to be noted:

• Using Internet is perceived as playing games by primary pupils. The fact that there is graphics, sound, text stimulates students to learn as many new things. Evaluation tests from the Internet are very well received by students.

• Both students and teachers exercise their critical thinking as they have to pick the useful information from amongst the rest and make sure it passes their own censorship to become knowledge.
The student explores, selects, creates, builds, communicates and develops social and professional skills that are useful in information society.

- Students communicate in writing, in English, with their peers, teachers or native speakers.
- Internet represents the largest database in which information can be found in all fields of activity. In History Internet can be used for every new acquisition lesson.
- Information on the Internet is available to all those with computer access and Internet connection. In other words it allows access to citizens irrespective of nationality, gender, religion, etc.
- The Internet offers gifted students access to additional sources of documentation and allows communication with scientists in the field.
- Weaker students are motivated and interested when they have work tasks in which they use computers and Internet.
- The lessons in which we used computers and those in which we used the Internet were the most attractive for students. Evaluation tests showed that students get better results when learning was based on team work and Internet resources.
- In classes where we used Internet resources students offered their help to one another with technical issues and best students “taught” weaker students so that their knowledge improve during the activity.

Analyzing their own activity teachers consider that Internet represents a useful tool for renewing specialized knowledge, that it allows communication with colleagues via e-mail, discussion lists and chat, that it is a useful resource for attractive lessons that motivates and stimulate students; allows publishing of didactic materials on the high school’s site; facilitates a better communication with students outside school thanks to e-mail and chat; facilitates a better communication with parents in case teachers are also class masters thanks to periodic newsletters about school results; allows participation in research projects.

- Internet fascinates me and pulled me out of professional routine offering me new teaching means and ideas for class activities.
- Due to e-mail I have reconnected with former university colleagues that teach in other high schools and we exchanged teaching materials.
- Together with students from Math-Computer science classes with intensive English I participated in collaborative projects where we met, through Internet, other students and teachers from the whole world. I have learned from my students how website pages are built and how to find desired information more quickly.
- Internet has helped me very much in my documenting activity. For English classes the use of Internet in teaching is a real support for English teachers considering there’s plenty of information in this language. I have used information from the Internet to prepare worksheets and evaluation tests that I applied in class.
- I communicate parents the results of their children; I announce the parent meetings; I plan occasional meetings with parents to discuss the situation of their children.
- Internet makes you known to the world, you can make your own website or publish your work, make your opinions known to the public.

One can notice the answers of the teachers above are related to the advantages captured by authors in specialty literature regarding the use of Internet in education.

6. Discussions and about the role of the Internet facilities in contemporary education

Starting from teachers’ statements and from our class room observation we can summarize and draw a parallel between traditional education and the one where computers and especially Internet are used:
Table 2. Parallel between traditional education and classes using the new ITC

<table>
<thead>
<tr>
<th>Actors</th>
<th>Education in the industrial era</th>
<th>Education in the information era</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>Isolated from society</td>
<td>Integrated in society</td>
</tr>
<tr>
<td></td>
<td>School information were not public</td>
<td>School information are available</td>
</tr>
<tr>
<td>Teachers</td>
<td>Initiate teaching</td>
<td>Support students to find the best way towards learning</td>
</tr>
<tr>
<td></td>
<td>Transmit information</td>
<td>Facilitate access to information</td>
</tr>
<tr>
<td></td>
<td>Evaluate students</td>
<td>Support students to evaluate their own progress</td>
</tr>
<tr>
<td></td>
<td>Develop communication skills to little extent</td>
<td>Focus on communication</td>
</tr>
<tr>
<td>Students</td>
<td>Passive</td>
<td>Active</td>
</tr>
<tr>
<td></td>
<td>Learn in school</td>
<td>Learn in different environments</td>
</tr>
<tr>
<td></td>
<td>Receive information</td>
<td>Ask questions and make adequate choices</td>
</tr>
<tr>
<td></td>
<td>Low interest for learning</td>
<td>High interest for learning</td>
</tr>
<tr>
<td></td>
<td>Students with learning difficulties were isolated</td>
<td>Students with learning difficulties come in contact with open learning environments</td>
</tr>
<tr>
<td></td>
<td>Gifted students were educated in closed specialized environments</td>
<td>Gifted students have access to information</td>
</tr>
<tr>
<td>Parents</td>
<td>Not involved in the educational process</td>
<td>Actively involved in the educational process</td>
</tr>
<tr>
<td></td>
<td>Do not represent a model for lifelong learning</td>
<td>Are themselves models for lifelong learning</td>
</tr>
</tbody>
</table>

In item 4, section 5 teachers have noticed some **limitations** to the use of Internet and in item 5 they suggested solutions that they applied during teaching. Those with greater experience in this field stated that for particular lessons the traditional teaching method is more efficient. Internet, as well as computers should be used only when they contribute to stimulate thinking, develop creativity and support learning.

All teachers noticed that **students are inclined to surf other sites** than those recommended for the lesson. Therefore teachers consider more useful the activities carried out in smaller groups than individual ones. Another problem related to surfing is the **time allocated** to finding information. If students are not guided by a teacher a tendency to “drifting” into cyberspace was noted. Therefore teachers suggest as solutions to minimize or eliminate this disadvantage **guiding students on previously evaluated sites** and **restraining search freedom**. This working method eliminates also the possibility to use incorrect information considering that the materials published are oftentimes not updated and uncensored.

The **direct contact remains very important**. In many aspects of the educational process there are moments when the need for a teacher is felt, be it as moderator or as guide, in order to offer support with content or procedural issues. (O.B., Theoretic High School „Grigore Moisil”, Bucharest)

Also related to the temporal dimension teachers noted that if modern means of information and communication are used, classes take **longer than traditional ones**. A **review of school curricula** to render them more adequate to the use of these new teaching means becomes a necessity.

In case of collaborative projects and communication between teachers and students outside classes, the project coordinator or the teachers are “flooded” by the number of messages. Teachers recommend setting rules for communication and behavior in the virtual environment (netiquette).

The occurrence of technical issues such as those related to the lack of Internet connection or to sites that are slow to load can bring major inconvenience to classes. A recommended solution is to download sites on the local servers or on CD-ROM. Even in this case issues can arise like insufficient space on local servers, insufficient funds to buy CDs or the lack of CD drives installed on workstations. The only viable solution is to **prepare alternative activities**.
From the discussions between teachers and parents emerged a concern of the latter for the time their children spend on using the computer and the Internet which led to students’ isolation in the family. In this situation, parents as well as teachers consider that students should be prepared to understand the risks embodied by the Internet and they should be educated in the spirit of using computers and Internet only for useful activities from which they can obtain valuable items on the intellectual, moral or emotional level.

7. Discussions about students’ self-evaluation

The questionnaire was applied to capture the students’ attitude regarding the use of Internet in teaching. The sample of students we interviewed was same as the initial one.

All students (except for sixth graders) belonged to Math-Computer science classes because the lessons run involved skills in computer and Internet use. 40% of the secondary level students declared that they have a computer at home and 15% of those also have Internet connection; 100% have access to a computer at school, whereas all students in the high school sample have home PCs but only 80% also have an Internet connection. Following a self-evaluation of the activities or disciplines they are highly skilled in, over 65% of their choices were reading, writing, communication with others as well as sciences and mathematics. The lowest ranked were theatrical abilities (4.62%) and musical skills (5.64%). The most attractive activities were considered those taking place in a lab (much + very much=100%); those in which computers and Internet are used (much + very much=98.46%) and the activities in smaller groups (much + very much=91.79%). The lowest ranked are the lessons in which teachers teach and ask questions (18.46%) and the independent discussions with a teacher (24.62%).

Among the teaching resources used in class students consider that handbooks are 90% useful for subjects in the curricular areas “Language and communication”, “Mathematics and sciences”, “Individual and society”. The less useful are considered to be those for “Art” and “Technologies”. Equally useful is considered the information on CD-ROM, video and Internet. Encyclopedias are considered very useful to study science whereas online information is considered useful for subjects in the area "Language and Communication" and "Technologies". Drawing and presentation applications are seen as necessary for the study of arts and disciplines in the area of "Technology".

High school students consider they are able to find information, learn new information, to use knowledge to write, read, work in groups of students, to participate in discussions by sharing their opinions. The higher the educational level the more interesting the development of projects is to students and they consider themselves prepared in this direction.

Information related to computer use has focused primarily on the frequency of its use in different places or situations. 75% of students consider they use computer in the laboratory to find information and to organize and present it. The lowest rate was recorded for computer use in the classroom and libraries (20%).

High school profile (mathematics – computer science) majorly influenced statistics regarding the use of computer applications in schools, programming languages being choosing with an 84.6% rate (middle school sixth graders do not study programming languages). 100% were online applications, 43% were simulation programs whereas encyclopedias and other options have not exceeded 10%. A large proportion was held by word processors, spreadsheets and software for learning keyboard typing.

Students in high school believe that the highest skills they have are in using their reading and writing knowledge (90%); using Internet to connect with others (100%); and finding information, pictures, sound effects (100%). In a small percentage students believe that they have skills for learning new information (43%) and for doing homework (32%). The use of email to communicate with others is considered a skill for 67% of students. Sixth graders considered that the main skill they have is to use their reading, writing
and calculus knowledge and to find information; fewer than 10% of them believe they have skills for other activities.

Computer and the Internet is a useful means to access information, as deemed 88% of the surveyed students and to make friends (25%). It is remarkable the distrust of the students in the use of these modern means of information and communication to become employed or find a job. Of the 30 twelve graders only 6 considered it a very useful tool while 20 considered it less useful or not used at all. Computer and Internet use for learning new information is considered very useful by 62% of students. To be observed and noted that none of the students considered it useless but only useful or less useful.

8. Final considerations

In the same way as teachers, students considered that among the constraints in using computers and the Internet in school the most common are time, lack of adequate equipment, poor Internet connection and the subjects’ peculiarities. Inadequate guidance from teachers is often regarded as a nuisance but it is not very common. For secondary school students using computers and the Internet at school does not exceed five hours per week (one hour is required for information technology) whereas, 40% of those who have a home PC, spend between five and ten hours at the computer considering the hours spent using the Internet for those who have connection.

Their responses indicate that while in school, computer and Internet is less used in ninth grade and more in twelve grades, their use at home is inversely proportional.

For the present study we were interested in student opinion on the use of new information and communication technologies to stimulate and support advanced students in using this technology but also to encourage those who are unable to develop user skills outside school.

The answers converge to the following suggestions:

• The use of the new technologies in class in many varied ways;
• Implementation of projects to use the resources of the new technologies and elements of programming;
• Encouraging students to develop software applications and websites dedicated to school subjects;
• Encouraging students to offer explanations to colleagues in fields in which the latter lack skills (teaching activities between students);
• Creating online lessons and evaluation tests available from home.[1]

For the second situation mentioned the answers were numerically reduced. This may be because the sample of students in high school attends intensive Computer science classes which give them an advanced user status. The following suggestions were made:

• Additional number of classes;
• Providing a room equipped with computers and permanent access;
• Placing students with lower skills next to those with high skills;
• Assistance from the teacher throughout the lesson.

During lessons the enthusiasm and joy manifest by students were obvious when using Internet resources or when working on the computer. Nevertheless, when asked “What you disliked about the classes taking place in the computer lab?” students considered that:

• There is too much noise during the class;
• The time allocated to computer activities is insufficient;
• Equipment is insufficient;
• Not all of them may work at the computer;
• “Skilled” students take over the activity at the computer;
• Accessing other sites leads to not finishing work tasks;
• Internet connection is not always fast enough and loading pages takes too much;
• Delays in the response time of the teacher due to simultaneous requests from students (especially when chat is used).[12]

However, efficiently managed by teachers, and taken into account during lesson planning, the disadvantages highlighted by students and teachers can be minimized and eliminated or even turned around into advantages (for ex. the developed user skills of some students can be capitalized by creating teaching tasks allowing knowledge being passed from them to colleagues with undeveloped skills) [8].

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