Methodology of Computer-Assisted Cooperative Learning Based on the Materials of the Multicultural Collaborative Programme “STEP into the Global Classroom”

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Abstract
The article is dedicated to the scientific readiness of the computer-assisted cooperative learning theory in the foreign research activities. The author’s methodology being implemented within the bounds of the multicultural collaborative programme for the US and foreign teachers “STEP into the Global Classroom” is presented in the article (http://teamlearning.wikispaces.com/). The results of the study which was conducted on 79 non-native English speakers of pre-intermediate and intermediate levels are also described in the article.

Keywords: Computer-Supported Cooperative Learning, Methodical Algorithm, Computer-Supported Collaborative learning Script

1. Introduction
According to the results of the meta-analysis on the evaluation of evidenced-based practices in online learning conducted by the US Department of Education in 2009, the most effective online educational practices are hybrid courses, that blend in-class and web-based asynchronous group work including research and problem-based learning activities. Computer-assisted group learning is a possibility to develop such core competences as ICT literacy and teamwork competency simultaneously, which are highly required by employers as provided by the US Secretary’s Commission on achieving necessary skills report and the report prepared by the Centre of lifelong learning economy under the Government of the Russian Federation in 2006. Group learning can benefit by the use of ICT in the following ways:

- it removes the key problem of group learning concerning assessment of individual contribution to the whole group effort by the use of log files and pages’ editing history on wiki sites;
- it increases the degree of personal and group responsibility for the quality of learning performance, because all completed works are uploaded to the Net for the purpose of public reviews and discussions;
- the use of social networking services in the group-based instructional process begets such specific form of online communication as transparent interaction, that means passive form communication and sharing;
- it provides an opportunity to manage web-based group projects using collective file editing by the means of online word processors and presentation editors;
- it enables to organize cross-cultural learning cooperation between classes from all over the globe.
In spite of all benefits, there are not so many highly structured methodical algorithms, models and approaches implying effective implementation of computer-supported group learning process, among them are the following:
- the representational scheme of research artifacts (RESRA), the collaborative learning model SECAI (Summarization-Evaluation-Comparison-Argumentation-Integration) and their practical realization in the computer-supported collaborative learning environment (CLARE) (Dadong, 1993);
- the collaborative learning pattern-based visual design approach implemented in the Collage authoring tool (Hernández-Leo et al., 2007);
- the systems approach to cooperative computer-aided authoring and learning (Mühlhäuser et al., 1994);
- the English teaching model of cooperative learning in the network environment in higher vocational education (Jianwei et al., 2011) and etc.

The reason of such a restricted number of highly structured algorithms and models can be explained by the fact that the majority of educators specializing in computer-aided group learning differ the terms computer-supported collaborative learning and computer-supported cooperative learning. The development of computer-assisted group learning is mainly connected with the first term and so far as collaborative learning is considered to be less structured than cooperative learning, there is a lack of structured instructional computer-assisted group practices. However, according to the results presented in the dissertation of Sunyoung Joung (2003), highly structured online cooperative design is more effective than low structured collaborative one in the development of decision making skills, critical thinking and positive interaction patterns. That’s why we chose the scripting computer-supported collaborative learning approach as the theoretical base for the cross-cultural instructional project “The Way We Are” implemented within the bounds of the multicultural programme “STEP into the Global Classroom”, because the above-mentioned approach can be characterized as highly structured and very similar to the classic well-organized cooperative learning techniques. In the Russian theory of computer-assisted learning the term methodical computer-aided algorithm is used and its meaning is very close to the term computer-supported collaborative learning scripts. The methodical algorithms of Web 2.0 integration into the instructional process created by the Russian educators S.V. Titova and A.V. Filatova (2009) are very similar to the macro-scripts and such micro-scripts as the ArgueGraph, Concept Grid and RSC (Dillenbourg et al., 2007). For the effective implementation of the web-based project we worked out four methodical algorithms for computer mediation of the following classic cooperative learning techniques: Coop-Coop, Student Teams-Achievement Division (STAD), Teams-Games-Tournament (TGT) and G.A. Rivin’s method of working in variable composition pairs (MWVCP). The realization of the project was divided into three phases:
- the first one was conducted in cooperation with T. Erro and his class from Shasta High School, Shasta, California, USA from 01.11.2010 to 10.12.2011 (the project page: http://teamlearning.wikispaces.com/TASK+%26+DEADLINES+FROM+TONI+ERRO);
- the second one was performed in collaboration with S. O’Donnell and his students from Seneca High School, Erie, Pennsylvania, USA from 24.09.2011 to 01.12.2011 (the project website: http://twwaproject.wikispaces.com);
- the third one was implemented with the assistance of H. McGrath and her class from PSD Global Academy, Fort Collins, Colorado, USA from 03.10.2011 to 11.11.2011 (the project website: http://twwafortcollins.wikispaces.com).

The main purpose of the project realization was an adoption of the methodical algorithms and carrying out the student opinion survey on reasonability of ICT use in the group-based educational process.

Methodical algorithm of computer mediation is considered to be a synonym of the term instructional script, i.e. a pedagogical scenario used in a computer-mediated setting (Dillenbourg et al., 2007). The theoretical and methodical base of the algorithm being worked out within the bounds of the above-mentioned projects is presented by the following approaches: the theory of cooperative learning, the scripting computer-supported collaborative learning approach, G. Salmon’s five-stage model of teaching and learning online and e-tivity approach (Salmon et al., 2010), the collaborative learning pattern-based visual design approach implemented in the Collage authoring tool and A.V. Filatova’s methodical algorithms of Web 2.0 integration into the instructional process (Filatova et al., 2009). We chose the following pedagogical conditions ensuring effectiveness of computer-supported cooperative learning process:

- computer-aided instructional process should be organized according to the proper methodical algorithm including the following elements: aims, tasks, content, types of e-tivities and Internet services;
- educational process should be organized as a hybrid course blending in-class and web-based asynchronous cooperative group work;
- computer mediation of cooperative group learning should be divided into the following structural phases: introduction and organization, online socialization and motivation, information exchange and knowledge construction (Salmon et al., 2010);
- cooperative group activities should be technically supported by the means of Web 2.0 services providing a possibility of online collective file editing (wiki websites, Google Docs, EtherPad, social bookmarking services and etc.).

As mentioned above, four methodical algorithms were worked out within the bounds of the projects, in this article the algorithm of computer-mediated Student Teams-Achievement Division (STAD) technique will be described below as a sample. This algorithm consists of the following phases:

1. Introductory and organizational phase
   Aims:
   - acquaintance with the instructional technical platform and Internet services;
   - formation of cooperative learning groups.
   Tasks:
   - to define a level of students’ subject acquisition;
   - to acquaint students with technical potential of Internet services and motivate them to use these services actively;
   - to carry out a registration process;
   - to form cooperative groups.
   Key content:
   - writing an online entry test on the former topic with the use of Moodle platform;
   - uploading instructional materials to the server of distance learning, that should be completely relevant to the next test content;
   - formation of heterogeneous cooperative learning groups (from 3 to 5 participants for each group).
   E-tivities:
   - Goal definition e-tivity (Kovačić et al., 2007) providing an opportunity to set instructional goals for the whole future course and plan definite ways how to reach them;
   - ABCs of me e-tivity providing a possibility to introduce students to each other by the means of online poster creating services.
According to the G. Salmon’s e-tivity approach, each e-tivity has the following structural elements: introduction (spark), purpose, task, timeline and respond (Salmon, 2002). Here is a sample of self-introduction e-tivity, that was used in the above-mentioned projects:

**Figure 1. Self-introduction e-tivity**

Other e-tivities that can be used: Novelty, Citation and Interview, Self-introduction, Anecdote (Kovačić et al., 2007).


2. Presentation of new materials
   
   Aims:
   - presentation of new materials;
   - activation of teambuilding processes.
   
   Tasks:
   - to arouse students’ interest in learning;
   - to carry out a problem-based discussion;
   - to activate teambuilding processes;
   - to organize students’ independent work on structuring and categorizing new materials.
   
   Key content:
   - focusing on facts being relevant to the final test content while conducting a problem-based lecture;
   - motivating students to use online mental mapping services for structuring new materials and embed them to students’ blogs used as personal diaries of learning;
   - motivating students to make group wiki websites and post their group names, mottoes, anthems and logos there.

E-tivities:
- Funny Nobel Prize / Better without it obliging students to make annotated top lists of funniest or worst subjects (Kovačić et al., 2007).

Web 2.0 services: blogs, wikis, mental mapping services (http://www.mindmeister.com) and survey making services (http:// surveymonkey.com).

3. Team-based drilling of new instructional materials

Aims:
- immersion in online social cooperative process;
- organization of cross-cultural research activity.

Tasks:
- to organize asynchronous problem-based discussions with cooperative learning groups of foreign learners (here is an example: http://twwaproject.wikispaces.com/Discussion+1);
- to oblige students to do such web-based tasks as webquests in groups (the sample is available online: http://teamlearning.wikispaces.com/BTK-91_Quest);
- to motivate students to network actively.

Key content:
- carrying out research activities while drilling of new materials;
- conducting cross-cultural research work and problem-based discussions;
- motivating students to cooperate and discuss challenging issues in pairs;
- comparing results of group research work and making conclusions.

E-tivities: webquests, hotlists, multimedia scrapbooks, treasure hunt and subjects samplers.


4. Individual test writing and assessment process

Aims:
- assessment of cooperative group-based performance;
- making conclusions.

Tasks:
- to write a final test with the use of Moodle platform;
- to analyze results and correct mistakes;
- to reflect effectiveness and quality of cooperative group work;
- to motivate students to plan their further performance development;

Key content:
- writing an individual final test;
- summing up the difference between students’ past average quiz scores and their scores for the actual quiz;
- awarding a group, whose students exceed their earlier quiz performance to a considerable degree.

Web 2.0 services: blogs and wikis.

This algorithm of computer-mediated Student Teams-Achievement Division (STAD) technique was implemented within the bounds of the cross-cultural instructional project “The Way We Are” and one hundred fifty-eight students (79 students from Russian and 79 students from the USA) took part in it.

3. The Results of the student opinion survey on reasonability of ICT use in the instructional group-based process

79 ESL students of pre-intermediate and intermediate levels from the Siberian State Aerospace University (http://en.sibsau.ru/), Krasnoyarsk, Russia participating in the cross-cultural instructional project “The Way We Are” took part in the student opinion survey on reasonability
of ICT use in education. 13 of them studied in the computer-mediated Coop-Coop class, 31 students studied in the computer-supported STAD class, 12 of them studied in the computer-aided TGT class and 23 students studied in the computer-supported MWVCP class. The results of this survey are presented below in the Table 1.

Table 1. The Results of the student opinion survey on reasonability of ICT use in education

<table>
<thead>
<tr>
<th>Survey Questions</th>
<th>Computer-mediated cooperative learning techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coop-Coop</td>
</tr>
<tr>
<td>1. Is it reasonable to use ICT in education?</td>
<td></td>
</tr>
<tr>
<td>Yes, because:</td>
<td>85%</td>
</tr>
<tr>
<td>there is an opportunity to use supplementary audio-visual and text materials</td>
<td>62%</td>
</tr>
<tr>
<td>it provides a possibility to manage web-based collaborative projects</td>
<td>46%</td>
</tr>
<tr>
<td>this makes possible to do homework tasks in a more creative way</td>
<td>39%</td>
</tr>
<tr>
<td>it gives a chance to acquaint with other students’ works and present my own</td>
<td>54%</td>
</tr>
<tr>
<td>No, because:</td>
<td>15%</td>
</tr>
<tr>
<td>it’s complicated because of technical aspects</td>
<td>8%</td>
</tr>
<tr>
<td>it takes extra time</td>
<td>-</td>
</tr>
<tr>
<td>It’s unsatisfactory that other students can see my own works</td>
<td>-</td>
</tr>
<tr>
<td>I see no difference between paper-based and Internet materials</td>
<td>15%</td>
</tr>
<tr>
<td>2. Is it reasonable to manage group projects by the means of ICT?</td>
<td></td>
</tr>
<tr>
<td>Yes, because:</td>
<td>62%</td>
</tr>
<tr>
<td>this experience will be useful in my future career</td>
<td>39%</td>
</tr>
<tr>
<td>I prefer to work with a group of other students</td>
<td>8%</td>
</tr>
<tr>
<td>It’s new and exciting experience</td>
<td>31%</td>
</tr>
<tr>
<td>No, because:</td>
<td>58%</td>
</tr>
<tr>
<td>it’s complicated because of technical aspects</td>
<td>8%</td>
</tr>
<tr>
<td>it takes extra time</td>
<td>15%</td>
</tr>
<tr>
<td>I prefer to work alone</td>
<td>23%</td>
</tr>
<tr>
<td>3. Would you like to use ICT in education in the future?</td>
<td></td>
</tr>
<tr>
<td>If yes, what services will be more preferable?</td>
<td>85%</td>
</tr>
<tr>
<td>Wiki</td>
<td>46%</td>
</tr>
<tr>
<td>Blogs</td>
<td>15%</td>
</tr>
<tr>
<td>Google services</td>
<td>69%</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----</td>
</tr>
<tr>
<td>Digital media repositories</td>
<td>39%</td>
</tr>
<tr>
<td>Networking services</td>
<td>31%</td>
</tr>
<tr>
<td>No</td>
<td>15%</td>
</tr>
</tbody>
</table>

4. Is that more reasonable to organize research activities on the Net than in the traditional way?

<table>
<thead>
<tr>
<th>Yes</th>
<th>77%</th>
<th>81%</th>
<th>100%</th>
<th>96%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>23%</td>
<td>19%</td>
<td></td>
<td>4%</td>
</tr>
</tbody>
</table>

According to the results of the survey from 75% to 93% of the students suppose, that ICT use in education is reasonable and from 87% to 75% of them would like to use ICT in their education in the future. From 62% to 83% of the students think, that it is reasonable to manage group projects by the means of ICT and only from 17% to 38% of the students suppose, that it is not.

4. Conclusion
The described methodical algorithms of computer-mediated cooperative learning techniques were implemented successfully within the bounds of the cross-cultural instructional project “The Way We Are” and the whole project work was appreciated positively by the participants, but the experimental study of their effectiveness in relation to critical thinking, decision making skills, social competency and so on hasn’t been conducted yet and further research on the subject is definitely required.

5. References


