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Research of Art Students Practical Teaching, Organizing Interdisciplinary Groups with Computer Sciences Students

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Abstract

Do art students need interdisciplinary skills? Do art students learn different things and computer graphics from an interdisciplinary project work than from face-to-face lessons of computer graphics? How can a specific interdisciplinary project course be organized? This paper provides reflections about these questions, based on the experience gained through running a project-based interdisciplinary course a five years. Students taking the course work in teams of two, coming from art and computer sciences study programs. The learning goes on while carrying out real empiric tasks. There is no predefined project assignment. The authors seek to find out how students assess such collaboration, aid at preparing a specialist that was able to work in a new-knowledge society environment that encourages projective work in constantly changing teams. There is discussed five-year experience when there are applied trans-disciplinary action research projects while working with students from the Institute of Arts and ones from Computer science faculty. There are also discussed some research outcomes in interdisciplinary action research project as well as of students on their own. Problem: After having graduated from studies, major students who study in the specialties of art graphics and design, create multimedia products. The following research is usually carried out by diverse group specialists. The question is how to train a specialist who will be able to work in a new environment of knowledge society that encourages interdisciplinary action research in continuously changing teams.
Research methods: analysis of scientific literature and documents, qualitative empirical research, questionnaire and descriptive statistics.

Keywords: Art teaching/learning; e-learning, computer supported collaborative learning; trans disciplinary action research; group learning.

1. INTRODUCTION

Nowadays, one of the most significant tasks is to teach students to work in a rapidly changing information environment as well as to apply the most advanced technologies and provide with own work results in a catchy way. Not only will they become the participants of knowledge society, but they will be its designers too.

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During the dealing with a problem, a person in knowledge society appeals to completely different way of awareness and empiric behavior rules than in classical knowledge system that have been taken from a modern tradition. Not only have such variations of awareness been determined by predominance of technological actions, but by exchanged logics of an innovation that can be called as information rationality (Augustinaitis 2002). Thus it is significant to teach students during collaboration to reflect and comprehend the essentiality of learning throughout life – we are learning always and everywhere.

In the first part of the article there is provided the concept of the trans-disciplinary action research. In the second part of the article there is delivered the concepts of trans-disciplinary action research, collaborative learning and computer supported collaborative learning. In the third part there is presented the experience of four-year experience concerning the application of trans-disciplinary action research projects with the students in the Institute of Arts and Computer Science faculty. In the fourth and fifth part there are discussed some outcomes in qualitative and quantitative research of interdisciplinary action research projects.

Research object is interdisciplinary action research, the participants of which are students from Institute of Arts and the Computer Science faculty.

Research aim is to find out if interdisciplinary action research influences student's educational results and how students themselves assess such learning. How teachers assess such teaching and learning?

Problem: After having graduated from studies, major students who study in the specialties of graphics, art design, computer science and programming, create multimedia products. The following research is usually carried out by diverse group specialists. The question is how to train a specialist who will be able to work in a new environment of knowledge society that encourages interdisciplinary action research in continuously changing teams.

Research methods: analysis of scientific literature and documents, qualitative empirical research, questionnaire and descriptive statistics.

2.   PRACTICAL TEACHING/LEARNING THROUGH COLLABORATION

The application of ICT in education creates new objectives, the solution of which is innovative and topical for the training of future computer graphic artists. One way, related to the solution of this new objective, is interdisciplinary action in learning. Nicolescu (1997) defines the trans-disciplinarity (interdisciplinary) as a certain knowledge level that creates the discontinuous structure of trans-disciplinary (interdisciplinary) space, and the aim of which is to perceive this world under the aspect of the generality of knowledge and unification.

Bitinas (2006) defines action research as an educational process based on a new (or at least relevantly new, but topical) idea that is designs under the researcher's initiative and his collaborative efforts as well as participants'. According to Dick (1999) action research can be described as a family of research methodologies which pursue action (or change) and research (or understanding) at the same time. In most of its forms it does this by: using a cyclic or spiral process which alternates between action and critical reflection; in the later cycles, continuously refining methods, data and interpretation in the light of the understanding developed in the earlier cycles. In summary it can be stated that the projects, where art and IT students take part in; can be called interdisciplinary action research.

According to Batesel (1994), the group learning is a form of problem solution in a small group, while ensuring the application of different groups, individual responsibility and encouraging mutual positive dependence. The learning is a systematization of data, a cyclic interpretation, and the student has to perform the following activities independently on his /her own. Vasiliauskas (2007) highlights that during an active learning, a student obtains abilities in critical thinking, experience in mind broadening, changing of interests and learns to mobilize his/her efforts, i.e. develops and educates while acting universally. Chen (2011) states that "the fundamental responsibility of art design teachers is positioning students in real art design environments with proper forms, conditions, environments and guidelines of art design by participating in various activities. Students' active participation and teachers' proper guidance contribute to an overall process of art design teaching. With this kind of teaching concept, namely free-minded students enjoy restrictedly-free creation and study, and with the help of professional and proper guidelines, educators will produce many excellent applied talents who can fully adapt to the social practice."

Learning through collaboration is an active way of learning. The main necessity for successful group learning is cooperation. The work of persons gathered in groups can be a priori called cooperation as even working in one group everyone can work for himself to reach personal goals, whereas cooperation means working together and group achievement is more important than the outcome of its separate members (Tereseviciene, Gedviliene, 2003). It was indicated that is better to teach and learn easier when the work goes on in diverse groups (different sex, ethnic origin and different skills), and there is a democratic style of management. There are most frequently enumerated 5 following elements of group learning: individual responsibility, positive mutual dependence; direct (face-to-face) interaction, skills in interpersonal collaboration as well as in work of small groups and skills in group work (Siauciukeniene, 1997, Valatkiene, 1997).

While implementing ICT into a conventional teaching environment, the process of teaching changes into the process of learning. Students have to be prepared for the adaptation to a new style of learning, to become independent, in charge of themselves, learning and capable of adapting to a new interaction with peers and lecturers as well as be able to overcome the fear and stress of new information technologies. (Beresneviciene, 2001; Butrime, Marciulyniene, Valteryte, 2010). "In Knowledge society competence and expertise can no longer be described as the skills of one individual only, but are instead relying on the collaborative expertise of teams and networks, a socially shared cognition and capability... Computer – supported collaborative learning (CSCL) is focused on how collaboration and technology facilitate sharing and distributing of knowledge and expertise among community members" (Rubens, Dean, Leinonen at al., 2003).

In summary it can be stated that the environment while learning through collaboration will be enriched with information and communication technologies or CSCL (i.e. after having supposed the students to communicate in virtual environment), the lecturers "get far way", and students those in the conventional audience did not dear or were not ready to collaborate, behave more courageously or there are "forced" to put their contribution into the common project.

3.   PROJECT GROUPS

Our earlier study drew on focus-group interviews in which teachers and students discussed examples of 5 year successful practice in the Art institute (Butrime, Marciulyniene, Valteryte, 2010). After having graduated from studies, major students who study in the specialties of graphics and design, create multimedia products. The authors suppose that the students in Institute of Arts, who make works of computer graphics, are specialists in computer science. During the investigation of diverse software (websites, educational software, information systems, and student's practical work) it was noted that they can be divided into two groups: 1) Software that is simply nice and attractive to the user and that is primitive in regard to realized functions. 2) Well realized technical functional software that is unattractive in regard to the display of colors, elements and esthetics.

The first group authors most frequently people who possess an artistic training or attraction to artistic work. The authors of the second group software are usually programmers-professionals. The comfortable interaction of a human and computer has impact on the availability of information and service, and it has a crucial role while seeking for the aims of information society. Moroz Lapin (2004) states that the competitive battle is often settled on the first impression of application that is provided by a convenient connection. An inconvenient connection limits functional possibilities and beneficence of an effective program system. The question is how to train a specialist that could work in a new environment of knowledge society that will be able to create both functional and attractive to the user software products. After having highlighted such a problem, it was tried to unite student's practical work in Institute of Arts and in the faculty of Computer Science. There arose an idea to apply interdisciplinary action research, while making a prerequisite that common work of the mentioned specialists, aids at creating a product that will be not just functional, but attractive to the user too. The creation of such a product under the conditions of knowledge society is especially topical. The students-artists learn to design computer graphics (create a person or company that expresses the software user's interconnection and mood, i.e. design artistic work, related to digital application) and the students in computer science, learn to program.

The modern world is inconceivable without labour collectives or action research work groups, designed for the solutions of certain problems. In this case such action research groups are established under the basis of interdisciplinary action research, i.e. students from the faculty of Computer Science and in Institute of Arts, learn

to together in order to create a common product (Butrime, Marciulyniene, Valteryte, 2010). One of the effective ways of group learning there is learning while collaborating. The students were provided with the information concerning the task (the aim and how to perform it). During the educational process, students performed tasks (searched for necessary information, systematized it, created their new knowledge and performed tasks under its basis). At the end of work, students provided software, designed in common as well as reflections, concerning the research benefits. It was tried that students participated during the design and implementation of the research as well as during the analysis of its outcome. During the performance of work, the research participants had three levels of communication: communication between student groups and lecturers in virtual environment (Google groups for Institute of Art students); individual communication in interdisciplinary groups (telephones, e-mail and Skype); regular face-to-face meetings of all student groups and lecturers for discussing tasks, results and problems. They communicated while meeting in common student's discussions, in common students and lecturers' discussions, in common performers and customers' discussions.

In the methodological publications of post positive trend, the action research method is discussed as a full educational way for the cognition of reality. Consequently, interdisciplinary action and short-term research groups for work and learning, established under its basis could be investigated as a new educational technology that enables the training of a specialist for knowledge society. Good results are possible only in the case, when students learn in the group actively, deliver their individual opinion, participate in discussions and provide with some problem solutions (Butrime, Marciulyniene, Valteryte, 2010).

4.   QUALITATIVE RESEARCH

The students in the Institute of Arts and in faculty of Computer Science, have been performing common practical work since the year 2008. The students in Institute of Arts are provided with course paper tasks that are related to the certain students' bachelor thesis in faculty of Computer Science. The students collaborate for three or two semesters (Butrime, Marciulyniene, Valteryte, 2010).

In order to find out if interdisciplinary action influences the students' educational results and how students themselves assess such learning, there was carried a research. During face-to-face meetings the lecturers and students reflected: discussed what is acceptable and what not, and what is to be altered in such a learning process. Every year CSCL interdisciplinary action research was altered while taking into consideration the mentioned above reflections. During the first year there were a lot of face-to-face meetings. Every year there were fewer of them. During the fifth year and 2 semesters there were held 3 face-to-face meetings: 1) lecturers explained what CSCL is, and how the learning will be run; 2) the review of work, performed during the first semester. The discussion of the work process during the first semester; 3) discussion of the whole work process and work in the last meeting.

During the whole CSCL interdisciplinary action research, the students and lecturers communicated via Internet. Art students and computer science students worked independently in different way. The students of the fifth year in CSCL interdisciplinary action research had different learning experience. The computer science students frequently learn in virtual environments. All the people at the virtual meeting need to be trained and experienced in the technology, otherwise they will not participate. It was the first trial for the art students. Consequently, they had to learn the communication via electronic way: to participate in e-discussions, respond emails in time, create email box, etc. For the art students there was designed virtual environment (http://groups.google.lt/group/kompgraf?hl=lt&lnk=), where they constantly communicated with a lecturer and other students. In the following environment there were publicized the descriptions of all praxis work, supplementary aids for the performance of work. The students were encouraged to communicate and learn in a virtual environment. That was the first such an experiment in Institute of Arts. There was blended learning environment. The students learnt in both traditional and virtual learning environment. At the end of the first educational month, the students were asked to write reflection concerning the virtual learning environment. After having carried out the qualitative research in the students' point of view, it was possible to distinguish the following categories: (Table 1):

Table 1. First qualitative research: advantages and disadvantages of the virtual learning environment, noticed by the art students

Advantages	Disadvantages
The virtual learning environment is acceptable: it is possible to learn in an acceptable place and at the time when you wish	The communication takes longer than the direct one
It is possible to communicate and share the information with a lecturer and other students	A lack of experience
It is always possible to reach all tasks and information	There is no Internet connection at home
The learning in a virtual environment aids a better going deeper into a task	There sometimes occur misunderstanding during the virtual communication
	While learning virtually it is not always a success to force you to learn

The students enumerated more disadvantages than advantages. Two thirds of all students indicated the first advantage, thus there can be drawn a conclusion that most students noticed the essential advantage of the virtual learning environment (Table 1). Some more interesting points of view: "S1 ...at last it is possible to communicate virtually at our institute too…" "S5... In my opinion, in the very virtual environment there are no disadvantages. The disadvantages lie in me, as I did not always remember to join the virtual environment, but I hope to correct the following mistake at the end of the semester (at least partially)…it is sometimes difficult to adapt to novelties, but I am for the virtual learning environment…" "S10...a disadvantage – I cannot use the Internet..."

After having carried out the analysis of the reflections, the art students were suggested taking a challenge and participate in the integrated projects with computer science students. 4 from 17 students volunteered.

At the end of the educational year, together with students it was discussed how the last discussion of the whole year's CSCL interdisciplinary action research would take place in a traditional classroom. It was decided to carry out an express-interview. The express-interview was filmed. There participated 5 students from 11. One student sent his reflection via an email later. Thus there were proceeded 6 students' (2 art students and 4 computer science students) data. All students who reflected communicated via Skype. All students selected the means of communication on their own. They decided what is more convenient for them. During the qualitative research there were distinguished the following categories: 1) all group members –leaders; 2) they learned one from another.3) communicated tactfully and respectfully; 4) all the students who participated in the chat thought that there were not necessary more than three face-to-face meetings; 5) they liked to communicate in a virtual environment; 6) at the beginning of the communication it was a little bashful as it was necessary to get acquainted and communicate with a student in another occupation. Later the tension reduced; 7) while talking about group member's responsibility, al the programmer, who participated in the discussion acknowledged that they did not feel responsibility as they thought that the artist had to take higher responsibility as his/her work result is obvious; 8) the opinions concerning the motivation issue differed. Some said there had to be a stricter lecturers' control. Others said that the provided freedom degree was the very good one.

All the students who participated in the discussion think that such projects should be held further. Some more interesting points of view: "I1 ...at first it was bashful, as I had to communicate with a girl, I did not dare asking the telephone number…" "I2 ...when we started communicating, I have already done one variant. I showed it to an artist. He told me to throw away a lot of elements of design, and I surprisingly saw that he was right…" "D1 ...we did not argue, because our occupations are different. Everyone did his/her job. If there had worked two programmers or two artists, then there would have been some arguments…" In summary it can be stated that such a way of learning is acceptable to students.

5. QUANTITATIVE RESEARCH

The analysis of the students' work, who participated in interdisciplinary action research and worked without a partner, enables the conclusion that after having united the students' knowledge from the Institute of Arts and faculty of Computer Science, there have been designed not only functional products, but ones that are attractive to the user too. Some of authors' work, designed during the research work, have been implemented: the website of Kaunas School Librarian Methodological Council http://bibliotekos.kaunas.lt/, the website of the company MARK HUNT that produces frames and exhibition equipment, Information System for Personnel at Kaunas Military Hospital, the management system for e-booking in „Incas", private ltd, etc.

Major art students, who participated in the research, assessed their professional knowledge on the average. (Fig. 1).
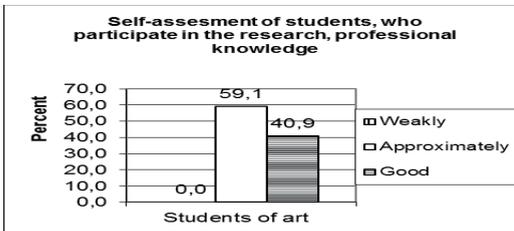

Fig. 1. The assessment repartition concerning the fact how students assess their professional knowledge
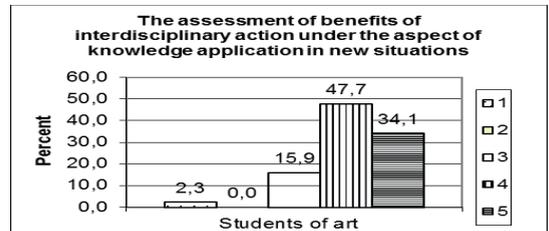

Fig. 2. The assessment of how students apply their knowledge in new situations

The students had to assess the benefits of interdisciplinary actions in points from 0 to 5.

After having surveyed the students, who participated in the researches, there can be drawn a conclusion that almost a half of students in Kaunas institute of Arts, assessed in full points the benefits of collaboration action in regard to the aspect of specialty (Fig. 4), application of knowledge in new situations (Fig. 2) collaboration (Fig.3).
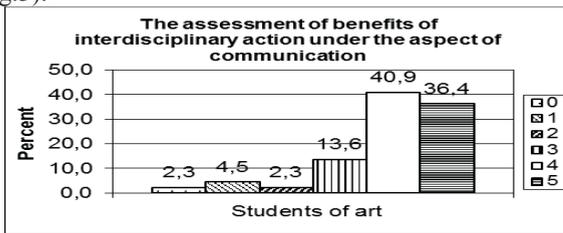

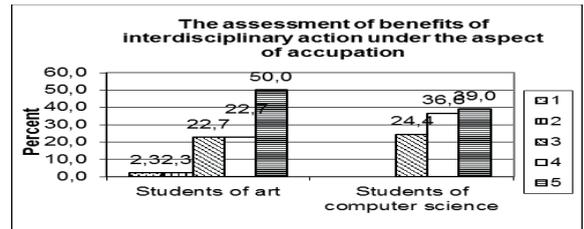Fig. 3. The assessment of the benefits in interdisciplinary actions in regard to communication aspect

Fig. 4. The assessment of students' interdisciplinary action benefit in regard to occupational aspect.

Just minor part of students (25% in Institute of Arts and 14.6% in faculty of Computer Science) had some doubts concerning general benefits of the research. Due to their point of view, they would have fulfilled work better individually. 54,5% artists and 46,3% computer science students claim that integrated work of both students in computer science and arts, provided with a better result (Fig. 5).
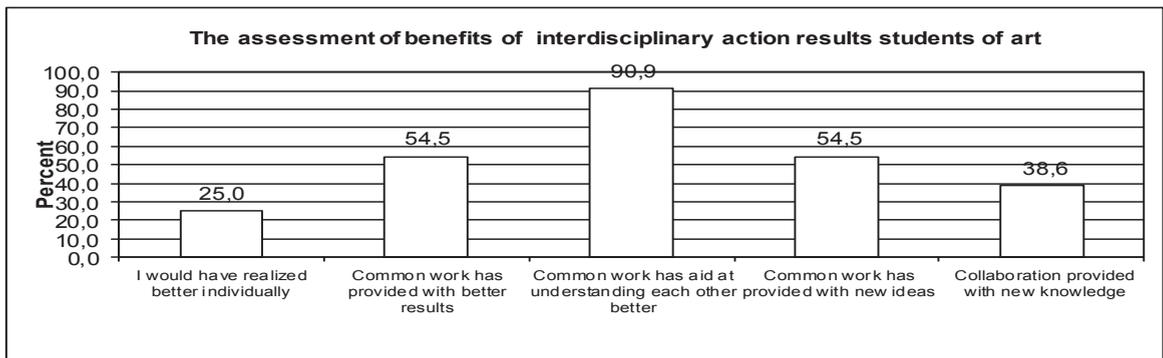

Fig 5. The assessment of students' outcome in interdisciplinary actions.

Art students think that joint research work was beneficial, as it aid at understanding each other better and provided with new ideas too. That is reflected in the research outcome (Fig. 5) and students' reflections. One of

the artists, who participated in the research, writes: „First of all, the research is certainly beneficial to a future designer, because the knowledge, obtained during practical work, is empirically applied. The use of Corel Photoshop evidenced during the processing of photos and completing separate work fields. Certainly, it would be more useful, if work was not so much regulated. In regard to this fact, the fulfillment of my thoughts was very limited, as my taste and interests and my partner's ones were not the same. Such a program would be useful to young designers, but not earlier than in the second course, as in the first one they would feel a lack of practical skills. I hope there will be provided possibilities to develop in this field in the future."

6.   CONCLUSION

The method of action research is discussed as a full-fledged way for the cognition of educational reality. Consequently, interdisciplinary computer supported collaboration and under its basis, established short-term research groups and learning groups, could be researched as a new educational technology that enables the support in order to train a specialist for knowledge society. This educational technology can be successfully applied to lifelong learning process; because students get skills to learn self-dependently using computer supported collaboration/communication tools.

After having analyzed five-year work experience and according to the research outcome it can be claimed that: 1) Students assess the results of interdisciplinary action research positively. Major of them pointed out that collaborative work provided with better results, new knowledge and aided at understanding each other; 2) Interdisciplinary action research influences the quality of students' work; 3) According to the five-year experience, there was realized CSCL interdisciplinary action research in a qualitatively new blended learning environment, where the teaching and learning occur in both traditional and virtual learning environment. Students regarded less communication in a conventional classroom.

REFERENCES

Augustinaitis, A., 2002. Trans-disciplinary learning structure of knowledge society, *Informcijos mokslai*, No. 23.

Beresneviciene D., 2001. Permanent Studies for Quality and Social Justice as Mission of University Education. ACTA PAEDAGOGICA VILNENSIA No 8. pp. 175-188.

Bitinas, B., 2006. *Edukologinis tyrimas: sistema ir procesas*. Kronta, Vilnius, Lithuania.

Butrime, E., Marciulyniene, R., Valteryte, R. 2010. Research on Computer-Supported Collaborative Learning in Transdisciplinary Groups. Learning and Instruction in the Digital Age. Edited by J. Michael Spector, Dirk Ifenthaler, Pedro Isaias, Kinshuk, Demetrios Sampson. Springer US, pp 159-174. ISBN 978-1-4419-1550-4.

Chen T. The Study on Practical Teaching Reform of Modern Art Design Education Based on Information Technology. Advances in Computer Science, Environment, Ecoinformatics, and Education. Communications in Computer and Information Science. Edited by Song Lin, Xiong Huang. Volume 217, 2011, pp 106-110.

Dick, B., 1999. What is action research? Available on line at http://www.scu.edu.au/schools/gcm/ar/whatisar.html.

Moroz Lapin, K., 2004. The Comparative analysis of the teaching of human-computer interaction. *Informacijos mokslai.* No. 30.

Nicolescu, B., 1997. The Transdisciplinary Evolution of the University, Condition for Sustainable Development. *Universities' Responsibilities to Society*, Bangkok, Thailand. Available online at http://nicol.club.fr/ciret/bulletin/b12/b12c8.htm.

Rubens, W., Dean, P., Leinonen, T. et al, 2003. *Innovative Technologies for Collaborative Learning*. Media Lab, Helsinki, Finland.

Siauciukeniene. L., 1997, Mokymo individualizavimo ir diferencijavimo raida bei virsmas Lietuvoje // Socialiniai mokslai, Edukologija. ISSN 1392-0758. Kaunas: Technologija, nr.3(12), p. 25-33.

Tereseviciene, M., Gedviliene, G., 2003. *Learning in Groups and Personality Change*. VDU leidykla, Kaunas, Lithuania.

Valatkiene, S., 1997. Grupinio mokymo metodo raida. Grupinis mokymas Siuolaikineje mokykloje. *Pradines mokyklos mokytoju rengimas*, Vilnius, Lithuania, pp. 5–15

Vasiliauskas R., 2007. The Role of Student Activity in the Context of B.Blooms Taxonomy of Learning Domains. Pedagogika, No. 85, pp.81-85.