BARRIERS IN DISTANCE EDUCATION BASED ON THE EXAMPLE OF COMPUTER SCIENCE STUDIES

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Abstract

The following work briefly presents a research project that aims at identifying barriers obstructing distance education. The research was conducted on the overall number of 158 distance students. The comparative group consisted of 430 traditional students. The attention was focused on the problems associated with Internet studies and there was a comparative analysis conducted on the perception of described factors by e-learning and traditional students (day and weekend studies). The results suggest that factors commonly perceived as the main disadvantages of distance studies are not more onerous than for traditional students.
Keywords: distance education, information tools, e-learning quality

1 Introduction

E-education was created as a way to train and convey knowledge within certain fields and disciplines prone to such a method of education. The main aim was to train employees in major corporations [6]. It influenced the tools and methods used in e-learning. Adopting the form of education for academic education requires overcoming numerous barriers.

The main element is the role of a teacher or, to be more specific, e-teacher. During virtual studies, teachers function in a completely different role in comparison to traditional classes. They have no direct contact with students and, through the usage of electronic tools (e-mail etc.), they should influence students in a way that would mobilize them to be active and to handle their end of term project assignments on time. In addition, teachers do not often have a chance to realize their own didactic concepts (which they do within traditional classes). They are limited exclusively to the topics and materials enabled by distance education systems.

Difficulties caused by e-learning for teachers [3, 2]:

- the amount of time necessary to prepare and implement courses
- motivating students

- expected active participation of students during on-line classes, which is connected to greater amount of work
- problems with students staying in different time zones
- copyright and neighboring rights issues
- potential conflicts against academic administration regarding the costs of courses and salaries for classes conducted in such a form
- lack of direct contact with other teachers,

On the other hand, there were also some advantages of on-line education identified [2]:

- The ability to teach while in a road, no necessity to commute for classes
- the comfort of working in a well-known environment

It has to be mentioned that traditional university is composed of not only professors, lectures and classes. It also consists of library visits, informal talks — among friends or with teachers, and taking part in a students' life. E-learning is drained of all those features. Hence, it takes a part of experience commonly connected to being a student away from e-students. On the other hand, contacts through the Internet and working on different discussion groups (so common in PUW) allow to use the knowledge of different students, not only the teacher as in traditional classes [1]. It is hard to imagine that students complete their knowledge in a library or correct presentations of a speaker during a lecture. Whereas on a discussion group such a situation is more than expected — a well-formed discussion topic should invite students to post their thoughts and to use their previous experience. Obviously, the role of a teacher, who usually acts as a moderator, is to verify such posts — in case they would differ from an actual state, and to supplement them — if the students' knowledge is insufficient.

An important element of contemporary education is group work — in theory, real-world meetings should be easier, but they tend to cause a lot of trouble for students. Groups that contact through the Internet from the very beginning are usually better organized and achieve better results [1]. People who teach traditional students in a regular form quite often see random groups, in which a meeting is a challenge itself, while drawing a conclusion and developing it into work — an impossibility. Difficulties in organizing group work or matching up terms of meetings are not a rule, but they occur often enough to disorganize the work of the groups. E-learning students rarely excuse their delays at work giving contact problems as the biggest difficulty while traditional students do that quite often [5]. It is possible that the cause is somewhere else — e-learning is a much more demanding form of studying and consequently the one that mobilizes more. Being prepared for an electronic contact from the very beginning facilitates the process of communication within a group — it is impossible to study online without checking your e-mail inbox daily, while traditional students might not have such habits.

The problems of distance students identified in literature [2, 4, 7]:

- greater frustration level
- the lack of satisfaction connected with studying
- insufficient level of interaction with teachers
- technical problems
- the lack of a "social life" among students
- higher probability of "giving up" learning
- the lack of compression with teachers,
- the lack of information about teachers' expectations.

E-learning will not supplant traditional education but it should become its supplementation. Unfortunately, among people not too familiar with Information Technologies (the people that need additional education, enabled by e-learning) distance studies are perceived as not serious enough, connected with entertainment rather than a tool that serves to build
a competitive economy. Especially most of Polish politicians do not see the changes — the aftermath of the popularization of PCs and the Internet. Overcoming this stereotype would have a beneficial effect on the development of the popularity of e-learning in our country and, consequently — an increase of the productivity of Polish economy, faster economic development and an improvement of living conditions of all dwellers of Poland.

Factors that might support and stimulate the development of e-learning [9]:

- educational institutions having experience in remote education,
- educational institutions with no previous experience in distance learning that see the chances in including on-line courses into their offer, especially including e-learning into the traditional education system,
- corporations using e-learning to increase qualification levels of their employees instead of traditional, time consuming and expensive (communication!) training sessions.

2 The Goal and the Method of the Research

During preparations of the following work, the goal of the authors was to identify the barriers occurring in distance education in comparison to traditional studies (weekend studies), and to compare the factors influencing the quality of education in both forms. To achieve the goal, the authors used the results from a survey directed to both virtual and traditional students, to compare both phenomena in each education form. The survey included a review of numerous factors that picture the quality of education on IT studies. Its aim was to identify different opinions and preferences of traditional and virtual students.

The research was conducted in academic years 2008-2009 and 2009-2010. The research was conducted on IT students who had finished 2nd year of Bachelor's Degree studies and all the Master Degree students. The students were divided into two groups:

1. Traditional students — day and weekend students of AHE (Academy of Humanities and Economics) in Lodz and day students of Technical University in Lodz.
2. Students using e-learning — so called virtual students (e-students) and PUW (Polish Virtual University).

An overall number of 430 valid surveys from traditional students and 158 valid surveys from virtual students were collected.

Table 1. The amount of surveys collected from students of particular academies.

e-learning	PUW	158	158
traditional	AHE day studies	40	430
	Technical University day studies	207	
	AHE weekend studies	183	

The following case study presents the results regarding an evaluation of factors that could become barriers in e-learning based education on IT studies, as presented by virtual and traditional (day and weekend) students. The following factors were chosen for the analysis:

3. Factors interrupting studying
4. Evaluation of schedules, specializations, terms of final exams and passes
5. Evaluation of communication at the academies
6. Evaluation of the information on organizing group work
7. Direct contact with teachers
8. Possibilities to exchange opinions with teachers
9. Using group work
10. Evaluation of the feedback regarding any improvement on studies — exam results.

3 Education system and e-learning method

The analyzed model of distance studies and the process of teaching was based on e-learning platform — R5 Generation made by Tieturi Vision (a Finnish company from Helsinki). The system, created in ASP VBScript, had been working under the WWW Microsoft Windows Server IIS.
The platform was initially based on the Microsoft SQL Server 2000 data base.

The implementation process began in February, 2002. The installation and configuration process was conducted by specialists from the academy in cooperation with Tieturi Visio employees [8].

PUW courses were well-prepared, the level of organization of the education process was very high, each subject was precisely planned and realized in accordance with appropriate guidelines and the materials were carefully prepared.

On the other hand, each modification of a spotted mistake required a long-lasting process. It was especially visible within the IT studies, as the technical progress was imposing changes of the content quite often. Most courses had been based on software that should have been regarded as archaic already in 2009, e.g. basing IT on materials using Windows 2000 or Office 97. These materials had not been updated since the very beginning of the IT studies within distance teaching platform.

Precisely planned courses, specific roles and functions for every single participant of a course left no space for teachers' ingenuity. They should have sticked to schedules and materials of a course and avoid communication through external channels, independent from R5 [10].

Discussion boards were the main work tool. It is a simple and universal method that creates countless possibilities. It is not ideal, though. A discussion board, as a way to exchange thoughts and ideas, worked well for students of humanist studies. It is hard to create an interesting discussion about algorisms or routing [10]. Especially if the participants do not have sufficient knowledge. Discussion boards worked better as a tool to improve one's qualifications – that is why among PUW students who had already had some basic knowledge did noticeably better.

Results (points gathered during studies) were presented in a form of a report. The report aggregated the points but did not give marks (it was a teacher's duty). The tool was constantly modified but some teachers treated it only as a help and still kept achievements records outside the platform. The report did not show the maximum amount of points one could have gained in particular categories (the maximum number of points was always 100). Therefore, it was impossible neither to define students' development nor to show which parts of material were more troublesome (it was possible in Lotus Learning Space).

R5 did not allow sharing group work tools, applications or trips around the Net. In comparison with the alternatives, R5 Generation does not look convincing. Nonetheless, prior to criticizing PUW platform, it has to be said that the IT studies were first introduced in 2002. At that time, an Internet modem was the primary Internet connection, and solutions quite common nowadays, like Web 2.0, social portals, video streams or voice communication, were things from the future. That is the reason of a rather small amount of multimedia in PUW environment and, from today's point of view, a bit coarse so-

lutions. Moodle and Blackboard are tools still in development whereas the latest version of Lotus Learning Space was released in 2007. For this type of tools, 5 years is like a lifetime.

The strength of the model was not a highly advanced platform — it was the precision in the realization of assumptions. Teachers, tutors, teams of educators and educationalists created possibilities to learn effectively within the R5 environment for e-students. Nevertheless, with time it became clear that the unchanged platform could not compete with different products of the same kind and its modernization would lead to designing all the courses once more, from scratch. That is why R5 will no longer be in use and all courses for PUW students will be switched to the Moodle platform since the beginning of the academic year 2010/2011. As IT studies were closed down a year earlier, there is no possibility to verify how they would function in the new realities. During the period 2002-2008, the solutions used on PUW were getting really good marks from students experienced with processes of e-learning implementation in other Polish academies.

4 Results

4.1 Factors interrupting studying — Chart 1:

Each student could choose up to four factors. The most popular answer among all the students was lack of time for studying — the option was checked by 23% of traditional students and 27% of virtual students. Other popular responses were: problems with gathering materials, incomprehensible material and difficulties in commuting to an academy (9% of both traditional and virtual students).

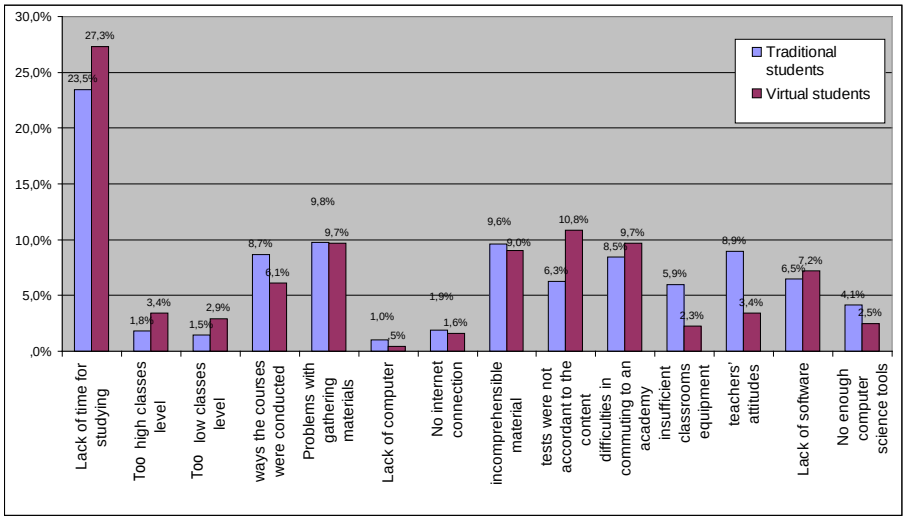

Chart 1. Check up to four factors that interrupt your studying:

Virtual students pointed out that tests were not accordant to the content — this might be a result of the organization of PUW studies, where students meet their teachers only during an exam. Quite popular choices among traditional students were insufficient classrooms equipment, teachers' attitudes and the ways the courses were conducted. The opinions vary within several per cent for a question. Hence, it is impossible to define disturbances connected mainly with one type of studies.

4.2 Evaluation of schedules, specializations, terms of final exams and passes — Charts 2 – 7.

A clear preponderance of virtual students — nearly 60% can plan their classes individually. Only 26% of traditional students answered affirmatively.

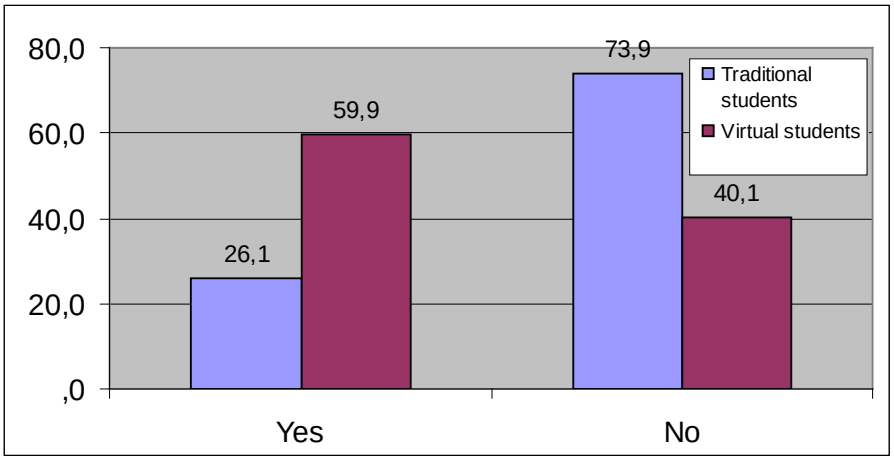

Chart 2. I have a possibility to plan my classes individually.

Again, answers from virtual students look better here, although this time the percentage of affirmative answers is below 50%.

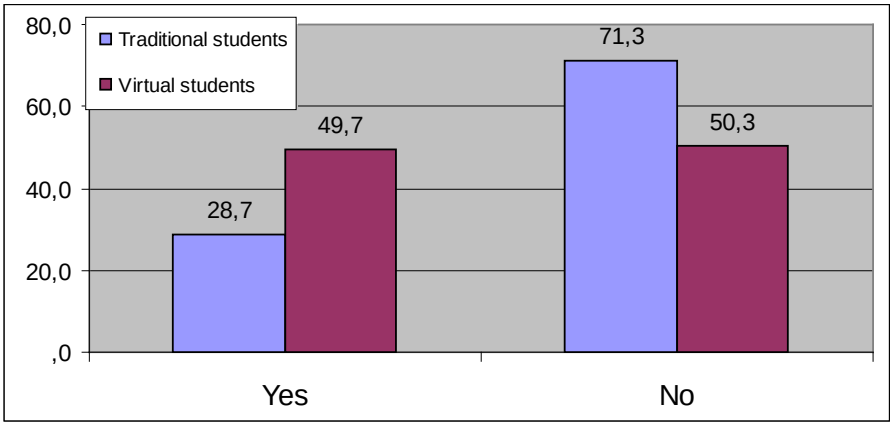

Chart 3. I do not experience any difficulties while preparing an individual schedule.

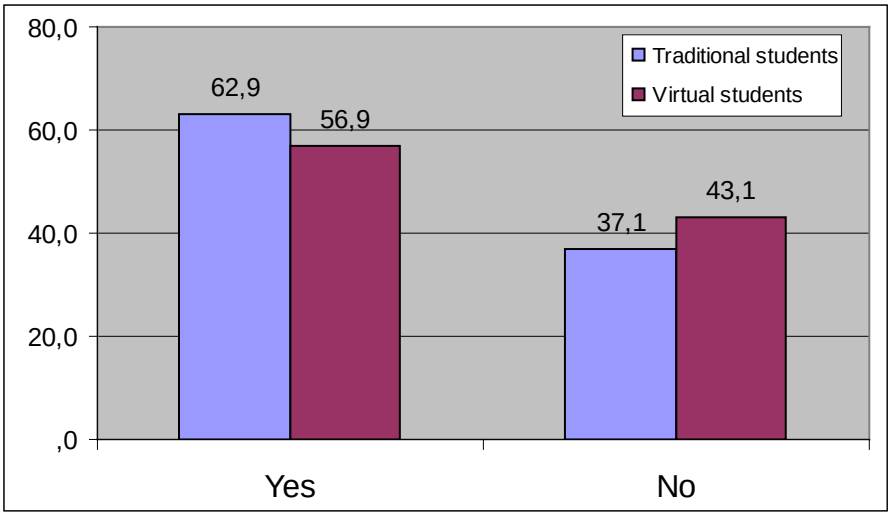

Chart 4. I mark the amount and the quality of information about terms of final exams and passes and formal requirements as good or very good.

One of the questions was related to the organization of work of Dean's offices — providing access to necessary information. The answers were mostly positive, although more affirmative answers were given by traditional students.

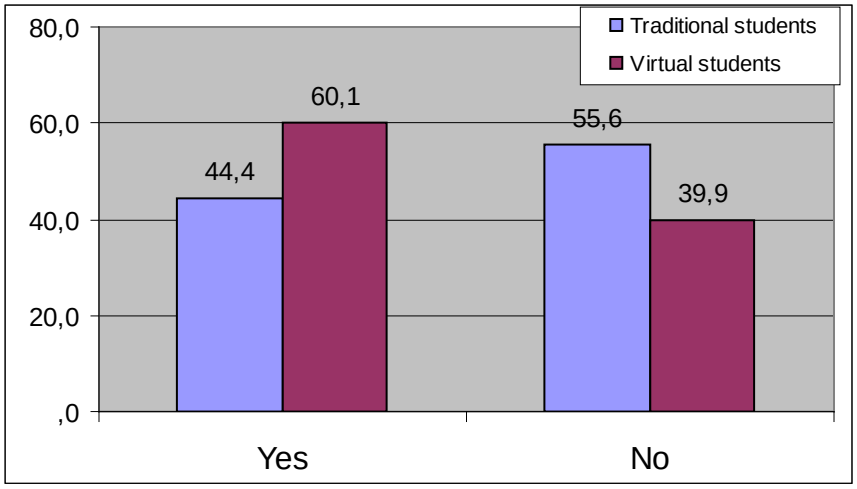

Chart 5. Schedules of classes, passes and final exams provide the comfort of studying.

Again, the question about schedules shows that virtual students are in a better position than their colleagues studying in a traditional form. Over 60% claim that schedules provided the comfort of studying, while the percentage of positive answers given by traditional students did not reach 50%.

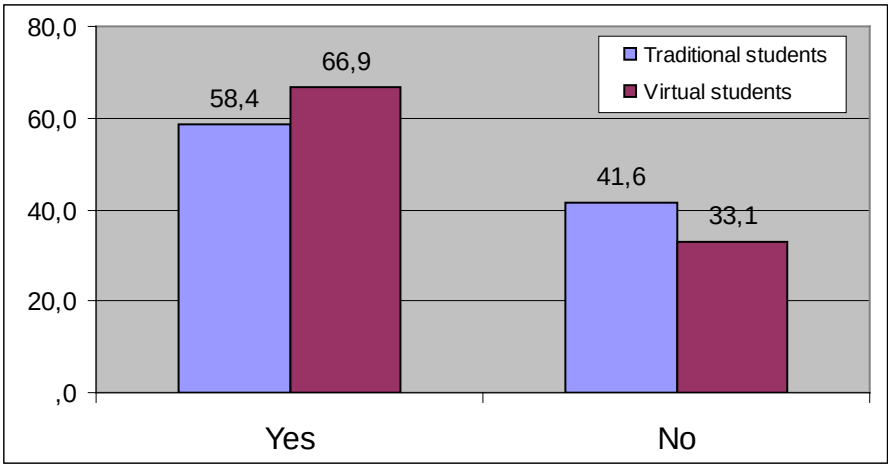

Chart 6. Access to information about specializations, their subject areas, organization, teachers and their expectations is good.

Information about specializations is positively marked by students of both forms. However, even here virtual students gave better marks — 66% of affirmative answers against 55% of those given by traditional students.

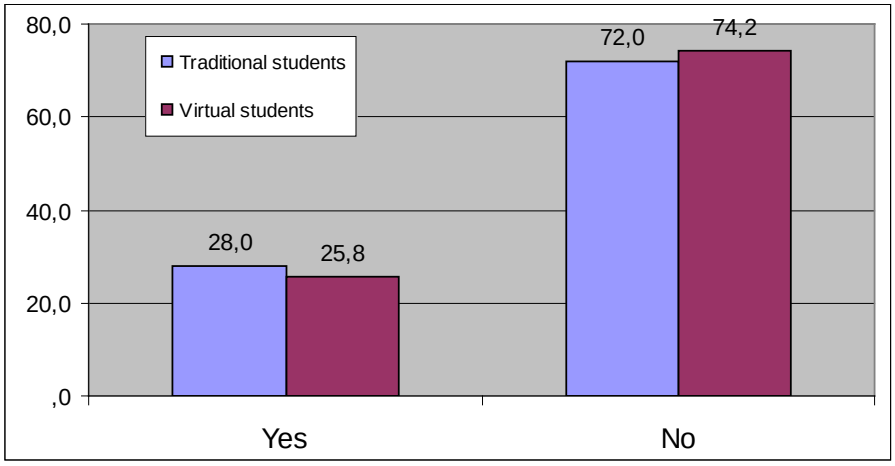

Chart 7. I had a noticeable influence on my final schedule (e.g. the choice of additional classes).

Virtual and traditional students agree — they do not have a noticeable influence on their schedules. Only about 20% of students believe they had a satisfying influence on their schedules.

4.3 Evaluation of communication at the academies — Charts 8 – 11.

Both virtual and traditional students do not have any difficulties in finding their exam results on the Web. There is a slight preponderance of virtual students.

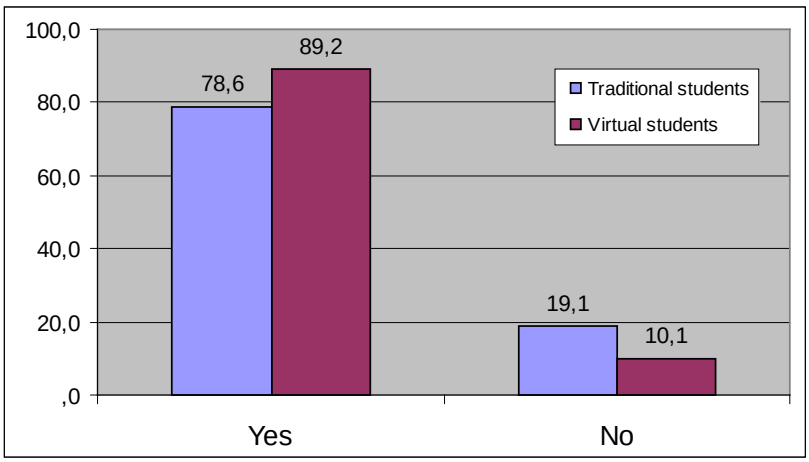

Chart 8. Exam results can be found via the Internet.

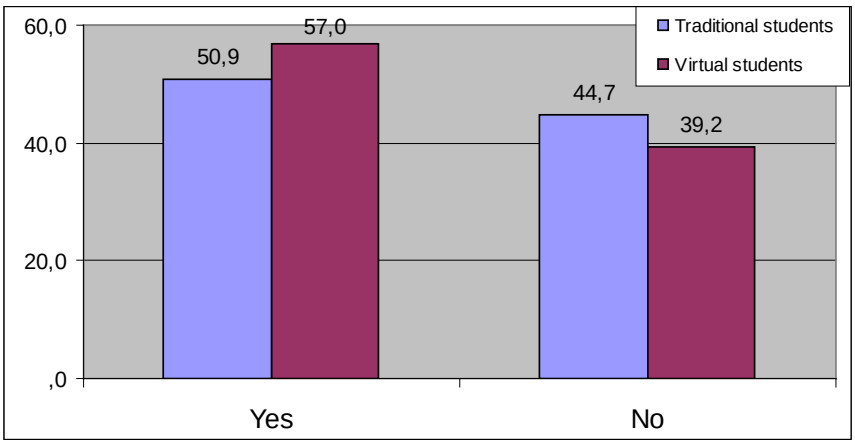

Chart 9. The amount and the quality of information passed directly (e.g. through Dean's offices) is good.

Answers to these questions are not enough affirmative among students of both forms —50% of positive marks is not a very good result. However, virtual students gave slightly better marks here.

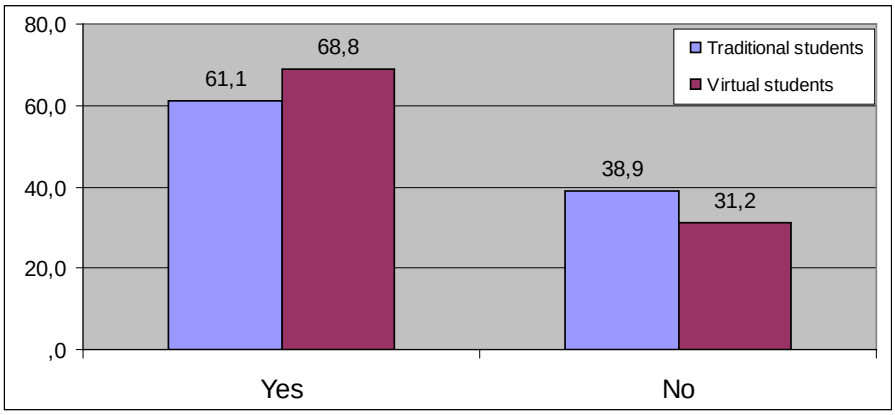

Chart 10. The amount and the quality of information passed through electronic ways (e.g. virtual room) is good.

The evaluation of information passed through electronic ways is good as well and also in this case virtual students gave more positive answers.

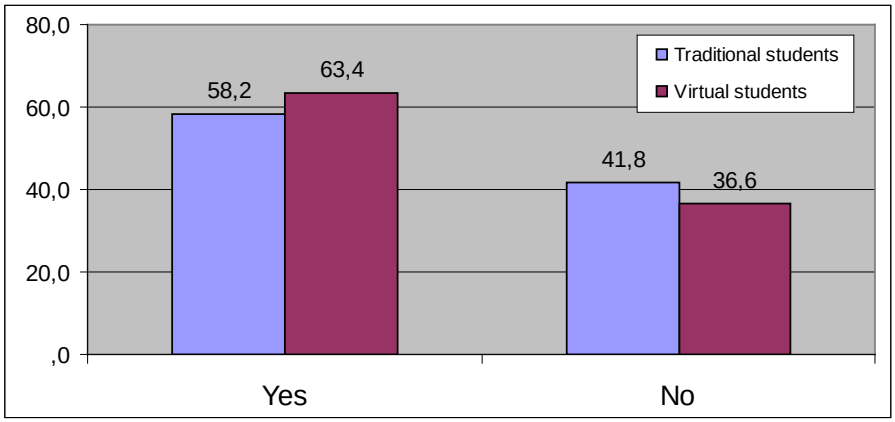

Chart 11. I can communicate with Dean's office through a sufficient number of communication channels.

The last of the questions was connected to the flow of information. Students are satisfied with the number of communication channels in communicating with Dean's office, although, again, answers from virtual students were better.

4.4 Evaluation of the information on organizing group work — Chart 12.

It might be discussed if the information about projects should be treated as connected with Dean's office, but the author's experience shows that the information about projects should be passed directly by teachers — people who will supervise the process of creation of such projects and then mark them. Here, students from both groups express similar level of satisfaction (over 60%) with a slight preponderance of traditional students.

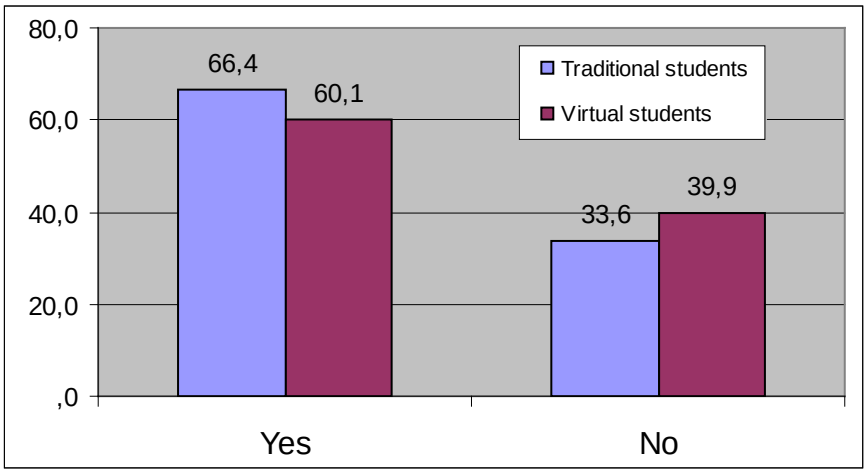

Chart 12. The amount and the quality of information on projects, their subject areas, organization, teachers and their expectations are sufficient

The two groups of questions described above (charts 8 – 12) show a certain trend: virtual students gave better answers to questions connected with the organization of academic activities (e.g. Dean's office), whereas traditional students — issues regarding the contact with teachers.

4.5 Direct contact with teachers — Charts 13 – 15.

Traditional students claim that they have a better access to teachers but the difference is rather small — 71% of virtual students do not signal communication problems.

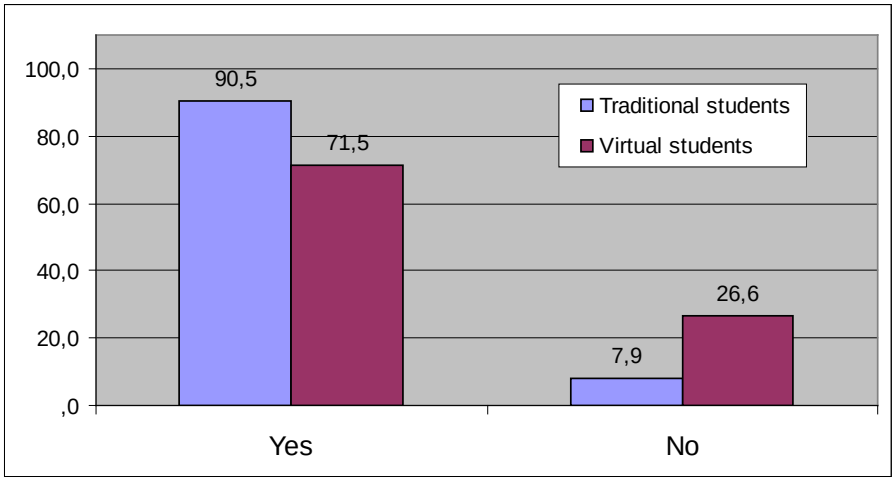

Chart 13. I have the possibility to talk directly to a teacher.

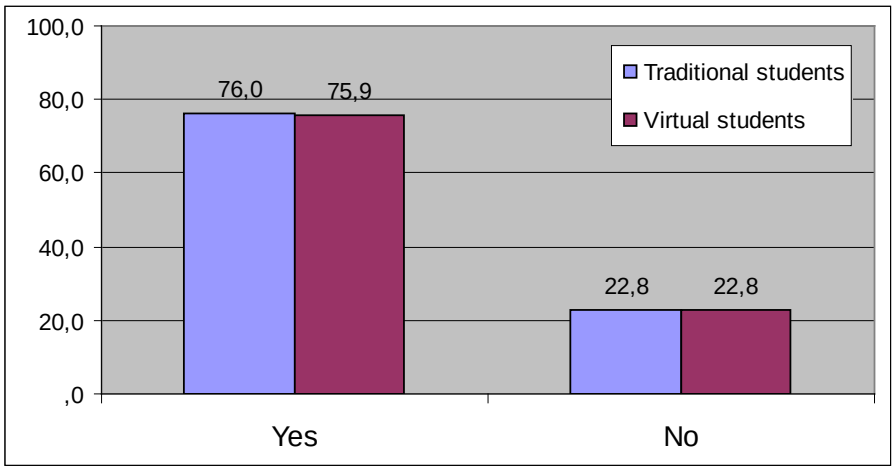

Chart 14. The possibility to talk directly to a teacher is useful during studies.

Students of both forms perceive the possibility to talk to teachers in a similar way — most of them believe it is useful.

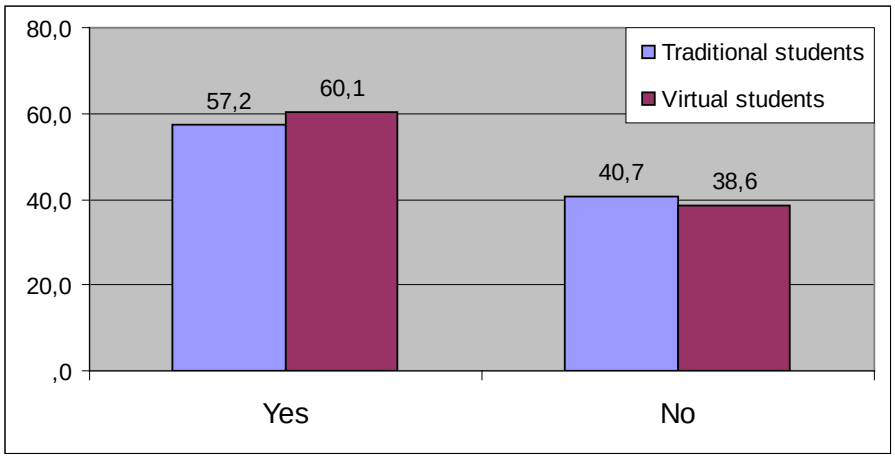

Chart 15. I experienced situations where I could not understand the content without teacher's assistance.

Again, students' opinions are nearly identical — most students were forced to ask teachers for help during studies.

4.6 Possibilities to exchange opinions with teachers — Chart 16.

Chart 16 shows that both traditional and virtual students do not have any difficulties in acquiring support from teachers.

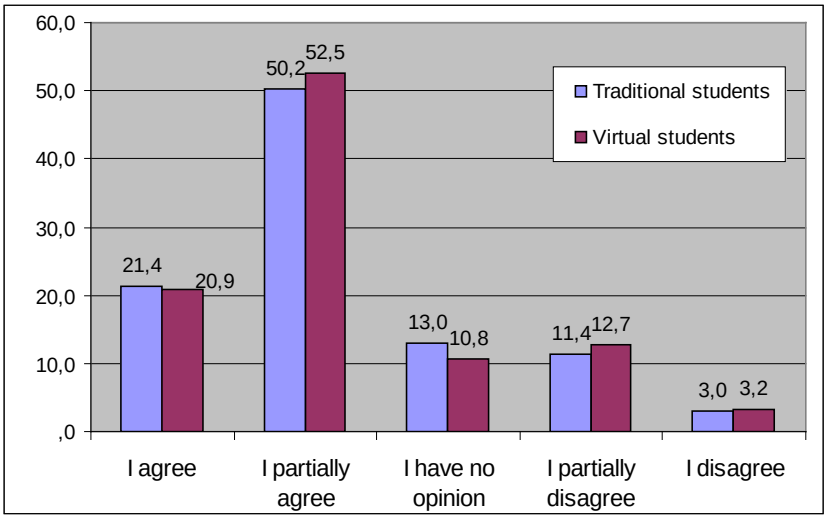

Chart 16. I have the possibility to discuss certain issues with teachers during classes.

4.7 Using group work — Chart 17.

Using work group visibly divides the answers from both groups of students, although there are some similarities originating from teaching style. Traditional students usually (24% of all the answers) work on projects in real groups during meetings. Virtual students also work in a similar way (projects are realized in virtual groups, 27% of all the answers), contacting others via the Internet. Another kind of group work is an informal meeting — real meetings in case of traditional students and external discussion boards in case of virtual students. An equal, in terms of popularity, form of group work is finding solutions to different tasks — during classes (traditional students —18%) or within a virtual group (e-students — 14%).

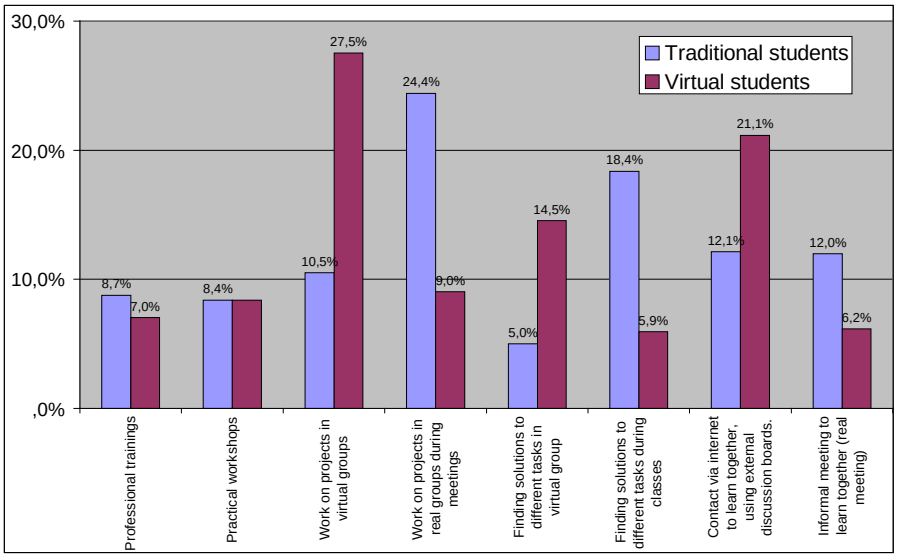

Chart 17. Using group work.

It is worth paying attention to the fact that each of the described teaching methods is represented among the answers — the lowest number is 5% — that was the number of traditional students who worked on tasks in a virtual group.

4.8 Evaluation of the feedback regarding any improvement on studies — exam results — Charts 18 - 19.

Exam results can be found via the Internet — described in Chart 8.

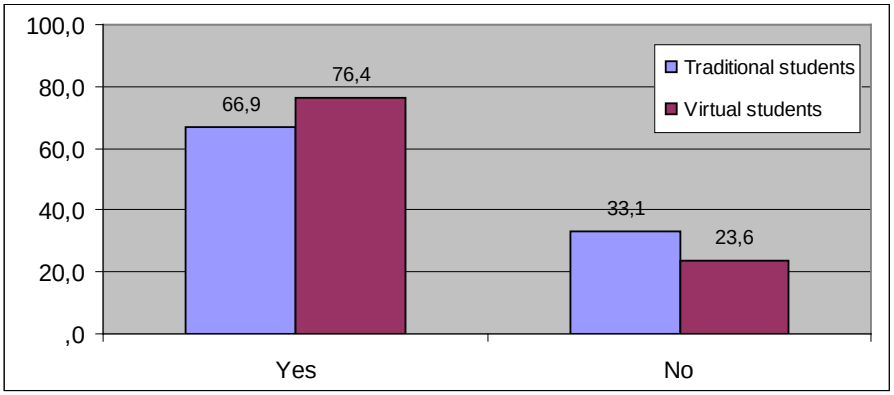

Chart 18. Exam results are known and shared shortly after an exam.

Most students do not complain about the time they usually wait for exam results, although virtual students are more satisfied.

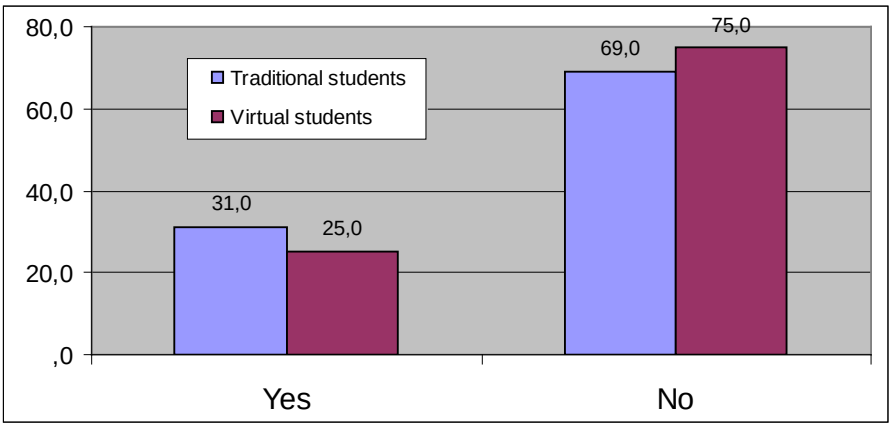

Chart 19. Exam results are carefully analyzed
— everybody can discuss their own mistakes

A majority of students (circa 70%) do not know what mistakes they made during exams. To change this fact should be one of the priorities for academies caring for the quality of education they provide.

5 Summary and conclusion

The described results create the following image:

1. There are no significant differences in evaluating factors obstructing the studying process (chart 1).
2. Evaluation of schedules, specializations, terms of final exams and passes:
   a) Virtual students give better marks to the classes planning system, the possibility to match schedule to their own needs (charts 2, 3), and schedules that improve the comfort of studying (chart 5)
   b) There were no significant differences regarding the information about dates of exams (chart 4), specializations — content and organization (chart 6), or students' influence on schedules (chart 7)
3. There were no significant differences in evaluating student – academy communication process — charts 8 – 11
4. There was a slight difference of opinions regarding group work (traditional students gave better marks) — the difference of 6% can be treated as statistically irrelevant, though.
5. A direct contact with teachers — traditional students have more possibilities to talk directly to a teacher (the difference was 20%), the mark given to the usefulness of such contact was identical
6. There were no differences between both groups regarding the possibility to discuss with teachers.
7. Using group work (Chart 17):
   a) virtual students realize their projects in groups more often and they contact via the Internet to study together
   b) traditional students realize their projects in real groups, contacting during or after classes more often. Virtual students do not have such an opportunity.
8. Evaluation of the feedback regarding any improvement on studies:
   a) Virtual students usually get their results shortly after exams (chart 18), and they are able to find the results on the Web (chart 8). In both cases the difference was 10%.
   b) Traditional students have better opportunities to learn about the mistakes they have made — most opinions were negative, however, the difference was still 6%.

To sum up, the following factors may be treated as barriers in distance education:

- The possibility to work in groups within real groups
- The possibility to talk directly to a teacher
- The possibility to learn about one's mistakes.

In all the remaining cases, the factors do not seem to be bigger barriers for virtual students than they are for traditional students. The following outcome may be reused for the popularization of distance studies.

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