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PROBLEMS OF DISTANCE EDUCATION

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ABSTRACT

Distance learning and e-learning have significantly developed in recent years. It is also due to changing educational requirements, especially for adults. The article aims to show the advantages and disadvantages of distance learning. Examples of the 20-year use of the distance learning form of computer science describe the difficulties associated with the implementation and implementation of this form of teaching. The results of students in the full-time and distance form of teaching in the bachelor's study of computer science are compared. Long-term findings show that distant students have significantly lower scores in the first years of study than full-time bachelor students. In the following years of study, the differences diminish, and students' results are comparable. The article describes the possibilities of improving the quality of distance learning.

KEYWORDS

Distance learning, education, e-learning, Learning Management System, t-test.

1 INTRODUCTION

In recent years, the need for distance and combined forms of education has grown increasingly. It is mainly due to increased demands for tertiary education and the need for frequent changes in vocational education. Traditional full-time teaching can often not be used in employee training. The problem of distance learning is that most participants have no practical experience with this form of teaching. This leads to worse results for distance students. Students need not only to prepare quality teaching materials but also to adapt their teaching methods (Van de Vord 2010) (Klímová 2015). It turns that distance learning is difficult for the students. The most important problem lies in abilities of students to manage their studies. Part of students is unable to plan a well-proportioned schedule for learning. They often start to learn at the end of the semester before course exam. They are requested to finish successfully courses and that why they don't have enough time to complete all course requirements, and often they fail in the whole study (McPhee 2012). The first semester of a study is the most problematic period of studies. There are many such students that interrupt their studies on this period. One of the reasons is wrong information and incorrect idea about the distance learning (Levy 2007) (Shachar, Neumann 2003).

2 DISTANCE LEARNING AT THE DEPARTMENT OF INFORMATICS AND COMPUTERS

The Department of Informatics and Computers at the University of Ostrava started to deal with the realisation of the distance learning form using information and communication technologies for the first time in 1998. This was a distance study of the Bachelor's degree in Applied Informatics, preferably for hearing impaired students. The demand for such a form of the study came from the secondary school for the hearing impaired. Ten students enrolled in the study. These were students from all over the Czech

Republic. To ensure the unique requirements of the deaf students, the services of sign language interpreters were used, which took part in all the tutorials. The high demandingness of the study, the specific form of study and, above all, the inadequate preparation of secondary school students caused only two students to complete the study.

Interest in distance learning also increased among students without health disabilities. After the bachelor study program Applied Informatics, the distant form of teaching was added in the Bachelor's degree program Informatics as well as in the follow-up master program of Informatics.

Each course has learning materials in the LMS Moodle, to which both distance and full-time students have access. In addition to LMS, two to five tutorials are available for each course in the semester. They aim to consult on unclear and more complex topics.

Within 20 years, different technologies and methodologies have been tested to improve the distance and combined forms of teaching. When introducing distance learning, there was a need for teachers to undertake distance learning courses. None of the teachers had experience with this form of teaching. In the early years, Lotus LearningSpace was used to install Lotus Notes Client to create and manage courses. The system was later replaced by the IBM Workplace Collaborative Learning commercial product. However, this system was designed for the corporate sphere. IBM Lotus Workplace Collaborative Learning Authoring Tool was delivered to this LMS. The application was unnecessarily complicated for most teachers and did not allow some functionality, such as randomly generating test questions and answers. That is why the system was replaced by Tutor 2000 and ToolBook Instructor, which better responded to didactic requirements. Its disadvantage was that the courses created were not common websites and required the presence of certain plugins. Therefore, all of these systems have been replaced by LMS Moodle, which has proved to be the most appropriate system for teaching at the university.

To improve the quality of teaching, the study materials were gradually developed. In addition to teaching texts and presentations, video recordings of lectures and seminars and other multimedia teaching materials were gradually created. MediaSite was used to record video lectures in which the video captured by the teacher synchronised with the slides of the presentation. Distant students appreciate the opportunity to play video from lectures, seminars or tutorials. Video helps them better understand learning themes.

Experience with distance course management shows that it is essential to motivate students to work actively on a continuous basis. Students who work continuously during the semester usually have better results. Continuous activity can be assured, for example, by assisting with regular tasks that students have to develop, for example, once every 2-3 weeks. A more extended period between correspondence tasks proved to be inappropriate. Students were only studying at a glance, and many of them have dropped out of their studies early. Because they left their assignments for the credit week, they found that they were not able to handle everything. A significant role is played by distance learning in communication. Due to the minimal presence of face to face communication, it is necessary to support and develop other communication tools. It was very advantageous to evaluate the activity in the electronic conference of the course. Students asked and helped each other with ambiguity. Online communication tools have been used less, due to the different time capabilities of course participants (Okaz 2015). Experience has shown that attendance tutorials are also important for distance learning. It is essential, however, to explain to students that tutorials do not take the form of a lecture but a consultation. Students who attended regular tutorials usually had better results.

3 ADVANTAGES AND DISADVANTAGES OF DISTANCE LEARNING

Distance learning requires students and teachers to have a completely different approach than regular daytime lessons. As demonstrated by practical experience, this is a very demanding form of education. Fundamental issues and difficulties include:

- Students and many teachers have little or no experience with this form of teaching,
- teachers feel they can use the same pedagogical and didactic practices as in full-time teaching,
- teaching requires students to be highly motivated and able to deal with time efficiently,
- complex and demanding preparation of teaching and study materials,
- the need for thorough technical security.

As opposed to full-time teaching, it is necessary to provide an extensive preparation for the distance and combined forms. Students must already have all study materials, assignment of correspondence tasks, technically prepared control systems, means of communication, and so on. However, this requires a lot of work both technically and methodically and didactically.

We surveyed among students of distance learning forms. As the reason for choosing distance learning, students are most likely to study at work. Other causes include efforts to expand qualifications, increase chances in the labour market, increase awareness of information and communication technologies (Hannay, Newvine 2006).

The most common advantages of distance learning are given by students:

- Opportunity to study at work,
- the possibility to study in time, which the student determines himself,
- the possibility to individually plan the work and study mode,
- not to attend school daily,
- the ability to process and forward tasks over the Internet.

On the contrary, as the fundamental disadvantages and practical problems of distance learning, students stated:

- Limited personal contact with the teacher and other students,
- missing classical lectures and seminars,
- occasional lousy communication with some tutors,
- self-study occasionally escape information, which the student would have recorded during his / her attendance,
- the difficulty of organising the time correctly,
- more considerable difficulty in understanding some terms,
- to retain motivation for the study.

Many students thought that distance learning would be more comfortable and less demanding for students. That was not true, of course. Graduates of the full-time and distance forms of studies must have the same knowledge and skills. Nearly no student had any practical experience with distance learning.

As can be seen from the monitoring of distance learning, the educational institutions influence the quality of distance learning by two primary factors. The first is the level of distance learning curricula and online courses. The other is the way and the quality of the teaching process management. Another factor influencing students' success is their motivation and discipline. The distance and combined form of teaching place much more emphasis on these factors than in daytime lessons where students are under the direct supervision of the teacher.

A significant problem of distance and combined forms of teaching is the ability of students to devote themselves to their study affairs. A certain number of students are not able to correctly plan their studies during the semester. It is often the case that the lessons are devoted to just before the exam period. Since they have more than one course of instruction, they do not have enough time to complete all the tasks and often end their studies. Therefore, the role of the tutor, which has the task of activating students and encouraging them to work continuously, is significant.

In each learning process, the role of the teacher is significant. It not only mediates new knowledge and skills but mainly leads and guides the learning process. Helping students with problems, evaluating them, and communicating. However, in the distant form of teaching, these roles need to be significantly reduced, especially as regards the methods and forms of the teacher's work.

The role of the teacher - the tutor moves from the grantee of the new knowledge mainly to the control element of the learning process. Much more tutor needs to be involved in managing communication, assessing students' work, supporting their motivation, and guiding the learning process rather than explaining the new curriculum. Many educators who begin with this form of learning do not realise these experiences and try to apply their experience from the day-to-day lessons to the distance education. From the knowledge gained in our department, we have come to the fact that it is appropriate for the teacher himself to test the role of the student in a practical e-learning course.

4 COMPARING THE SUCCESS OF DISTANCE AND FULL-TIME STUDENTS

Already from the beginning of the implementation of distance learning, it has been shown that distance students have more difficulty in completing individual courses. By improving the quality of teaching materials and learning itself, the success of distance students has improved but is still lower than that of full-time students. It is especially noticeable at the beginning of the Bachelor's degree program.

We compared the results of students in courses. We used statistical methods. For comparison, the results of the two groups (distance and full-time students), we used the T-test: Two-Sample Assuming Equal Variances. Two sample t-test is used to compare the difference between two populations. This parametric test assumes that the variances are the same in both groups. This assumption we tested by the F-Test Two-Sample for Variances. For analysis of the results in each item was measured as having detected data variability. We used a coefficient of variation. To interpret the results of the second stage classification was done the t-test. For evaluating the results were used MS Excel and statistical software Wizard for the operating system Mac OS X and statistical software Statistics Visualizer for iPad (Řehák, Brom, 2015) (Chráska 2007) (Švaříček, Šeďová 2007).

We have set up the hypothesis that describes study results in courses:

H1 - Distant students have worse study results than full-time students.

The results

The following part of the paper describes the comparison of results of full-time students and distance students. Distance learning puts students at much higher demands than studying full-time. This is reflected in the results of the students. We can observe the differences between the group of distance learners and a group of full-time students. The difference is mainly in the first semester. The success rate of full-time students is 64% in the first semester. The success of distance learners is only 39% in the first semester (Figure 1).

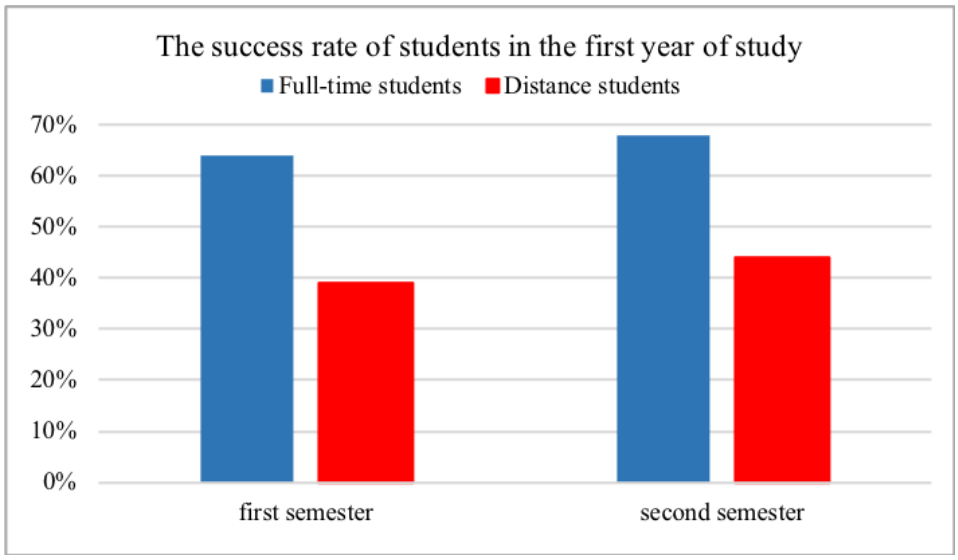

Figure 1 The success rate of students in the first year

We've compared the results in courses: Basics of programming (typically first semester), Architecture of hardware and Fundamentals of operating systems (typically first semester), Programming in C/C++ (typically third semester) and Object-Oriented Programming (typically third semester). Each student can receive a maximum of 100 points. For the success of the course, he must gain at least 51 points.

The following chart (Figure 2) shows a comparison of the success of distance students and full-time students in course Computer architecture and Fundamentals of operating systems. Students usually study this course in the first semester. Results show differences in the past eight academic years. The graph shows that the results of distance learners are worse than those full-time students.

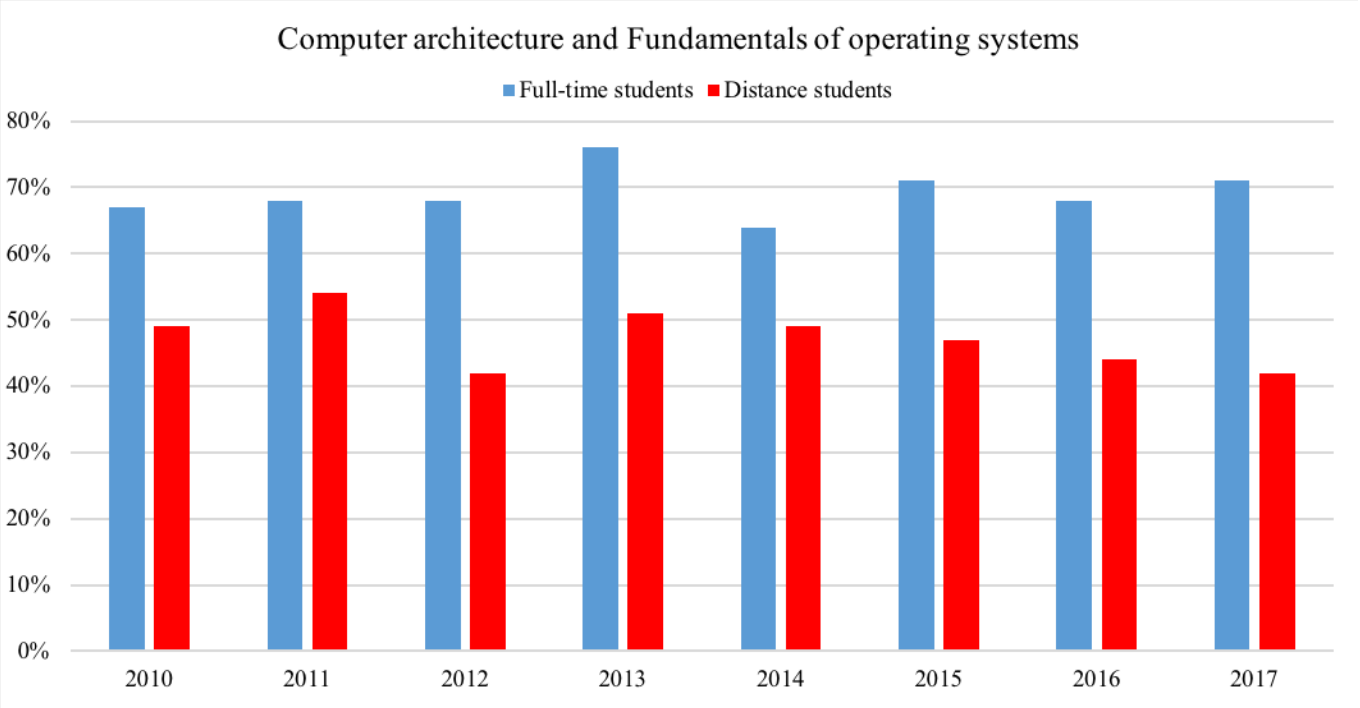

Figure 2 The average of successful students in course Computer architecture and Fundamentals of operating systems (typically first semester)

For courses Architecture of hardware and Fundamentals of operating systems, Programming in C/C++ and Object-Oriented Programming F-test confirmed compliance variances. Therefore, was further carried t-Test: Two-Sample Assuming Equal Variances. The results in table number two show that we must reject the null hypothesis. Distant students had worse results than full-time students.

Table 1 T-Test: Two-Sample Assuming Equal Variances for course Architecture of hardware and Fundamentals of operating systems

t-Test: Two-Sample Assuming Equal Variances	**Distance students**	**Full-time students**
Mean	39,05	54,95
Variance	1643,70	1020,12
Observations (number of students)	76	94
P(T<=t) one-tail	0,00239	
t Critical one-tail	1,65397	
P(T<=t) two-tail	0,00478	
t Critical two-tail	1,97419	

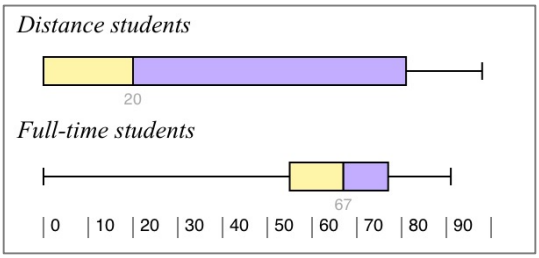

Figure 3 Successful students in course Architecture of hardware and Fundamentals of operating systems

We conducted F-test that we ensure that the variances in the two groups are identical. The test showed the great diversity of variances, so we made t-Test: Two-Sample Assuming Unequal Variances. The course Basics of programming: we can reject the null hypothesis based on the results in the table. The average number of full-time students are pointing higher than for distance learners. The results, of course, show that we reject the null hypothesis. Distant students had worse outcomes than full-time students.

Table 2 T-Test: Two-Sample Assuming Unequal Variances for course Basics of programming

t-Test: Two-Sample Assuming Unequal Variances	**Distance students**	**Full-time students**
Mean	28,06	54,83
Variance	1366,06	829,06
Observations (number of students)	52	66
P(T<=t) one-tail	0,00002	
t Critical one-tail	1,66123	
P(T<=t) two-tail	0,00004	
t Critical two-tail	1,98552	

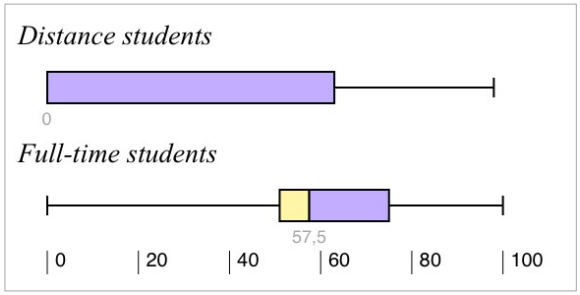

Figure 4 Successful students in course Basics of programming

Figure 5 shows a comparison of the successful completion of the Basic Programming course in the last three years. While attendance students successfully scored on average 74%, then distance students only 40%.

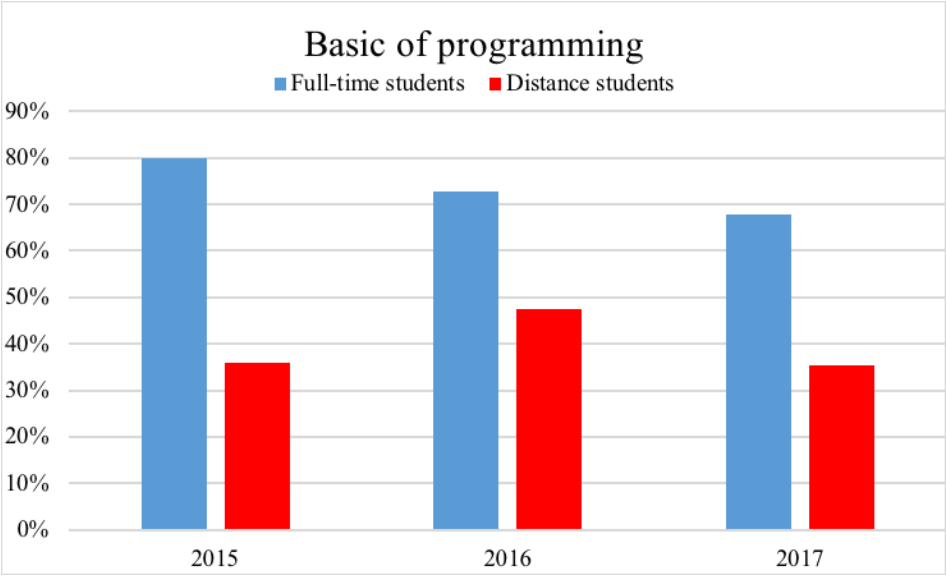

Figure 5 Successful students in course Basics of programming (typically first semester)

Figure 6 shows the percentage of students in course Programming in C/C++. Students typically study in this course in the third semester. The average of successful students in distance learning is 69% and in the full-time study is almost 75%. Differences between the two groups are not so pronounced. Distance students in higher semesters are more successful study and do better organise and manage.

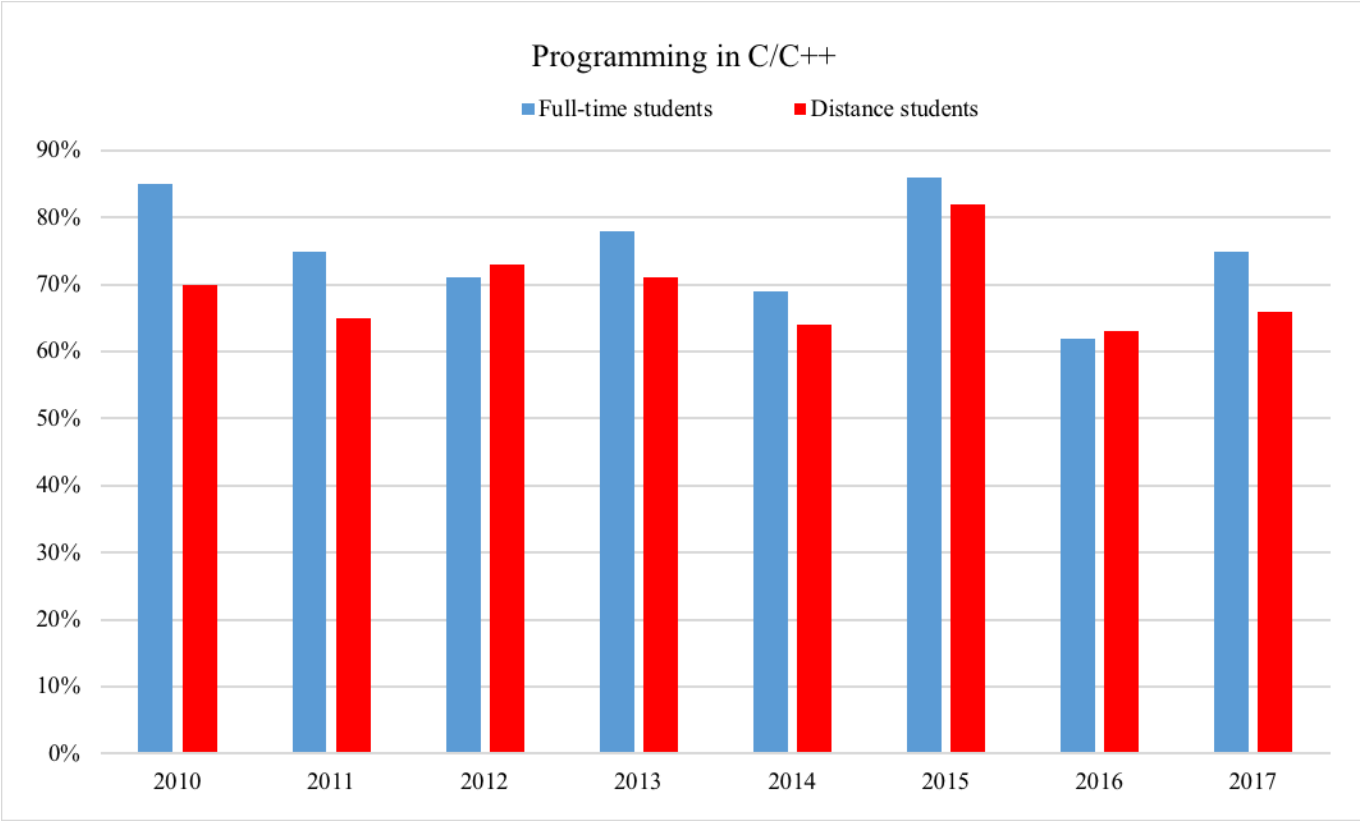

Figure 6 The average of successful students in course Programming in C/C++ (typically third semester)

The results for the course Object-oriented Programming show that it is confirmed null hypothesis. Full-time students had about the same results as distance students. But in the group of the spacer, it is also part of students who acquired zero or very few points (Figure 7 and Table 3).

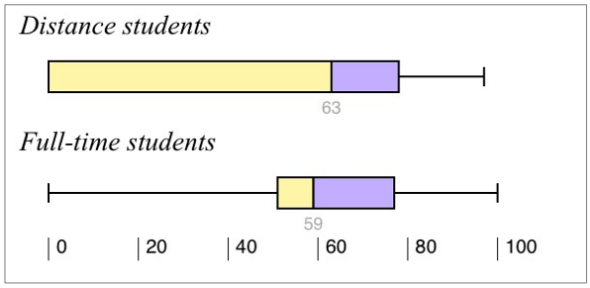

Figure 7 Successful students in course Object-oriented Programming

Table 3 T-Test: Two-Sample Assuming Equal Variances for course Object-Oriented Programming

t-Test: Two-Sample Assuming Equal Variances	Distance students	Full-time students
Mean	45,79	54,93
Variance	1421,21	880,62
Observations (number of students)	28	55
P(T<=t) one-tail	0,12	
t Critical one-tail	1,66	
P(T<=t) two-tail	0,23	
t Critical two-tail	1,99	

Previous results demonstrate the integrity of the hypothesis H1. At the beginning of their studies, distance students have the significantly worse results than full-time students. A large part of distance students not complete the first year of study successfully.

The survey shows that it is necessary to focus more on distance students in the first year. It is not enough just to prepare study materials. Multimedia and interactive materials can facilitate self. Experience shows that it is necessary to motivate students to regular work. We can achieve more frequent correspondent assignments, tests and projects (Cavanaugh, Gillan 2004).

CONCLUSION

Distance learning is currently being requested. It allows students to study at work or a great distance. This corresponds to the requirements for frequent change of professional knowledge and skills. Distance learning in conjunction with information and communication technologies brings new opportunities and benefits. At the same time, however, this form of teaching brings new problems. The research results show that distance students have worse outcomes than full-time students. Students, especially in the first years of distance learning have significantly poorer success rate than full-time students. Many distance students in the first semester will not come to the exam. It is necessary to improve the quality of studies, offer quality learning materials and ensure good governance study. To a considerable degree of improvement contributes use e-conference rate and increase students' activity during the semester. It is advisable to insert solved examples, video tutorials and video lectures into online courses. The most important problem lies in abilities of students to manage their studies. Part of students is unable to plan the well-proportioned

schedule for learning. They often start to learn at the end of the semester before course exam. They are requested to finish several courses successfully and that why they don't have enough time to complete all course requirements, and often they fail in the whole study. Nearly 60% of the distance students do not complete the first year. Full-time students are more successful than distance students. 66% of full-time students completing the courses. Differences between the groups are small in subsequent semesters.

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