UNIVERSITY OF NOVI SAD
TECHNICAL FACULTY "MIHAJLO PUPIN"
ZRENJANIN
REPUBLIC OF SERBIA

INTERNATIONAL CONFERENCE ON

INFORMATION TECHNOLOGY AND DEVELOPMENT OF EDUCATION ITRO 2014

PROCEEDINGS

MEĐUNARODNA KONFERENCIJA

INFORMACIONE TEHNOLOGIJE I RAZVOJ OBRAZOVANJA ITRO 2014

ZBORNIK RADOVA

ZRENJANIN, JUNE 2014

Organiser of the Conference:
University of Novi Sad, Technical faculty „Mihajlo Pupin", Zrenjanin, Republic of Serbia

Publisher:
University of Novi Sad, Technical faculty „Mihajlo Pupin", Djure Djakovica bb, Zrenjanin, Republic of Serbia

For publisher:
Milan Pavlovic, Ph. D, Professor, Dean of the Technical faculty „Mihajlo Pupin", Zrenjanin

Technical preparation and design:
Ivan Tasic, Ph. D, Assistant Professor
Dijana Karuovic, Ph. D, Assistant Professor
Marjana Pardanjac, Ph. D, Assistant Professor
Erika Eleven, M.Sc, Assistant
Dusanka Milanov

Lecturer:
Erika Tobolka, Ph. D, Professor

Printed by:
Printing office DIGINET ProStudio, Djure Jaksica street, no. 14, Zrenjanin

Circulation: **60**

ISBN: 978-86-7672-225-9

By the resolution no. 114-451-970/2014-03, Autonomous Province of Vojvodina Provincial Secretariat For Science and Technological Development donated financial means for printing this Conference Proceedings.

The Conference is supported by the Autonomous Province of Vojvodina, the City Administration of Zrenjanin, The National House of Mihajlo Pupin, Idvor and Organizing Committee for the Anniversary of the "Mihajlo Pupin year".

CIP – Каталогизација у публикацији
Библиотека Матице српске, Нови Сад

37.01:004(082)
37.02(082)

INTERNATIONAL Conference on Information Technology and Development of Education (2014 ; Zrenjanin)
Proceedings = Zbornik radova / International Conference on Information Technology and Development of Education, ITRO 2014, Zrenjanin, June 2014 = Međunarodna konferencija Informacione tehnologije i razvoj obrazovanja, ITRO 2014 ; [organiser] University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin. - Zrenjanin: Technical Faculty "Mihajlo Pupin", 2014 (Zrenjanin: Diginet ProStudio). –
VII, 441 str. : ilustr. ; 30 cm

Tiraž 60. – Bibliografija uz svaki rad .

ISBN 978-86-7672-225-9
1. Technical Faculty „Mihajlo Pupin" (Zrenjanin)
a) Информациона технологија – Образовање – Зборници b)

Образовна технологија - Зборници
COBISS.SR-ID 287020807

CONTENTS

S. Plachkov, N. Tsankov, A. Tsvetkova
STUDENTS' TRAINING THROUGH THE BLACKBOARD LEARN E-PLATFORM 1

M. Gogova, N. Koceska
THE USE OF QR CODES IN EDUCATION 7

B. Sobota, F. Hrozek, Š. Korečko, Cs. Szabo
EXPERIENCES WITH VIRTUAL REALITY TECHNOLOGIES IN EDUCATION PROCES 11

I. Stojanova, I. Kocev, N. Koceska, S. Koceski
MOBILE INTERACTIVE APPLICATION FOR EDUCATION SUPPORT OF PRESCHOOL CHILDREN 16

T. Popkochev
STANDARDS FOR DISTANCE LEARNING (EXPERIMENT OF THE SOUTH-WEST UNIVERSITY "NEOFIT RILSKI", BLAGOEVGRAD) 20

V. Bashovski, N. Koceska, S. Koceski
MULTICAMPUS DISTANCE EDUCATION BASED ON VIDEO-CONFERENCING SYSTEM 25

Cs. Szabó, Z. Havlice, V. Szabóová, J. Vízi
ON THE ROLE OF USER STORIES IN SOFTWARE ENGINEERING EDUCATION 29

M. Kocaleva, I. Stojanovik, Z. Zdravev
RESEARCH ON UTAUT APPLICATION IN HIGHER EDUCATION INSTITUTIONS... 34

E. Panayotova Petkova
EFFECTIVENESS OF THE EVALUATION BY COMPUTER TESTS 39

V. Vitanova, T. Atanasova-Pachemska, S. Pachemska
STRUCTURAL EGUATION MODELING AND THEIR APPLICATION IN EDUCATIONAL RESEARCH - CASE STUDY OF ICT USAGE IN PRIMARY SCHOOLS IN SOUTH - EAST REGION IN MACEDONIA 44

T. Atanasova-Pacemska, R. Timovski
QUALITY VALORIZATION OF UNIVERSITY STUDY PROGRAMS USING LINEAR PROGRAMMING APPLICATION 53

H. Telepovská, Cs. Szabó
SWITCHING FROM INFORMIX TO ORACLE IN TEACHING DATABASE SYSTEMS 59

V. Bashovski, S. Koceski
TEACHING MODULAR SOFTWARE ARCHITECTURES 64

V. Sarac, T. Atanasova-Pacemska, Z. Trifunov
ELECTRONIC TESTS IN HIGH EDUCATION-
OPPORTUNITIES AND CHALANGES 68

A. Kotevski, N. Koceska
MOBILE AUDIENCE RESPONSE SYSTEM AS A SUPPORT TOOL IN
EDUCATION 73

B. Sobota, F. Hrozek, Š. Korečko, P. Ivančák
VIRTUAL USER INTERFACE 77

A. Kotevski, C. Martinovska – Bande
IMPROVED ALGORITHM FOR TAG-BASED COLLABORATIVE FILTERING 81

I. Lazarevski, N. Koceska, S. Koceski
SOFTWARE SYSTEM FOR AUTOMATED SUPPORT OF END-USERS 86

Cs. Szabo, A. Bollin
ON A MIXED-UP SCHEDULE FOR TEACHING SOFTWARE QUALITY AND
PROJECT MANAGEMENT – AN EXPERIENCE REPORT 90

Z. Zlatev, R. Golubovski, V. Gicev
DATA PROCESSING OF RECORDED MOTION AT SEVEN-STORY HOTEL IN
VAN NUYS, CALIFORNIA DURING NORTHRIDGE EARTHQUAKE 1994 98

A. Risteska, V. Gicev
APPLYING THE FUNDAMENTAL LEMMA OF VARIATIONAL CALCULUS
TO THE PROBLEM OF THE SMALLEST SURFACES IN ROTATION 104

B. Petkovska, B. Delipetrev, Z. Zdravev
MOOCS IN HIGHER EDUCATION – STATE OF THE ART REVIEW 108

A. Fedorov
COMPUTER GAMES' STUDIES IN RUSSIA 113

E. Yashchuk, E. Zankova
ABOUT THE IMPORTANCE OF MONITORING OF TEACHERS' READINESS
TO WORK WITH E-LEARNING TECHNOLOGIES.....117

V. Aleksic, M. Ivanovic
DIGITAL DIDACTIC GAMES IN ELEMENTARY SCHOOL.....121

T. Sasic, E. Eleven, D. Milanov
THE APPLICATION OF INTERACTIVE EDUCATIONAL SOFTWARE
IN PRESCHOOL AGES.....124

D. Danilov, N. Matkovic, D. Karuovic
INTERACTIVE WHITEBOARD INFLUENCE ON EDUCATION.....131

M. Lutovac, V. Grbic, N. Lutovac, J. Jankov
SIGNIFICANCE OF WEB -ORIENTED INFORMATION SYSTEMS FOR E-BUSINESS IN SERBIA 135

G. Berati, F. Kroni, J. Bushati
ADVANCED PARALLEL COMPUTING METHODS FOR MATRIX MULTIPLICATION 140

G. Jausevac, G. Jotanovic
ANALYSIS ICT KNOWLEDGE OF STUDENTS: FACULTY OF TRANSPORT AND TRAFFIC ENGINEERING 146

M. Lutovac, N. Lutovac, J. Jankov, I. Tasic
STABILITY SAFETY and ABUSE of BUSINESS INFORMATION SYSTEM 152

I. Stetsenko, E. Zankova
BLENDED LEARNING AS THE INTEGRATION OF TRADITIONAL AND ELECTRONIC EDUCATIONAL MODELS 156

A. Fedorov
ANALYSIS OF THE STEREOTYPES OF SOVIET FILM IMAGE OF THE WAR IN A MEDIA EDUCATION CLASSROOM 160

B. Zvizdak, D. Karuovic, I. Tasic, D. Glusac
THE USE OF SCHOOL WEBSITE FOR MOTIVATION LEVEL IMPROVEMENT 166

K. Dunjic Mandic, R. Karanac, Z.M. Papic
EXPOSURE STUDENTS FROM HIGH SCHOOL IN CACAK TO DIGITAL VIOLENCE 172

J. Simic, G. Mijatov, N. Durakovic, J. Tucakov, Lj. Popovic, D. Sakulski, S. Popov
MODELING AND SIMULATION IN DISASTER RISK MANAGEMENT EDUCATION 177

N. Bubica, I. Boljat
TEACHING OF NOVICE PROGRAMMERS: STRATEGIES, PROGRAMMING LANGUAGES AND PREDICTORS 180

I. Boljat
EXPERIMENTAL EXAMINATION of STRUCTURED-MODULAR INSTRUCTION 186

Z. Namestovski, B. Arsovic
WEB 2.0 TOOLS IN EDUCATION, THE GAP BETWEEN THE CURRICULUM AND SCHOOL PRACTICE 192

M. Adedeji Oyinloye
DIGITAL REVOLUTION: SCOPE AND INDUSTRIAL APPLICATION OF DATA WAREHOUSING AND DATA MINING 196

E. Yashchuk, E. Zankova
E-LEARNING TRAINING IN THE SYSTEM OF CONTINUOUS PEDAGOGICAL EDUCATION 201

I. Stetsenko, E. Yashchuk
FORMATION OF INFORMATION CULTURE OF PUPILS OF ORGANIZATIONS OF GENERAL EDUCATION 204

S. Maravic Cisar, R. Pinter, P. Cisar
THE GAMIFICATION OF EDUCATION 208

S. Stankovic
I LEARN WITH FUN – EDUCATION FOR THE FUTURE 212

M. Simic, P. Svircev, N. Tasovac, E. Eleven
FACEBOOK IN THE FUNCTION OF IMPROVEMENT OF TEACHING 217

A. H. Trtovac, S. Sehovic, A. Konicanin
LEARNING MANAGEMENT SYSTEM USING COMPUTERS 222

E. Tobolka, D. Mihaljica
INFLUENCES OF SOCIAL NETWORKS ON LEARNING ENGLISH 225

A. Felbab, M. Pardanjac, S. Jokic
SAFETY AND SECURITY OF CHILDREN ON THE INTERNET 230

M. Jovanovic, D. Todosijevic, V. Ognjenovic
OPEN SEMANTIC ASSESSMENT: A MULTIPLIED CHOICE APPROACH TO E-ASSESSMENT 233

E. Tobolka, M. Knezevic
HOW TO PROTECT ELEMENTARY SCHOOL CHILDREN ON THE INTERNET 237

M. Seslija
WEB APPLICATION FOR DOCUMENT MANAGEMENT SUPPORT IN HIGHER EDUCATION INSTITUTION 240

D. Lacmanovic, D. Dobrilovic, Z. Stojanov, J. Pekez, A. Tomovic
MODELLING SOFTWARE APPLICATION FOR MONITORING ENERGY EFFICIENCY OF PUBLIC BUILDINGS 245

V. Odadzic, B. Odadzic
EFFECTS OF EDUCATIONAL COMPUTER SOFTWARE ON MOTIVATION AND PERFORMANCE OF STUDENTS IN BIOLOGY 251

T. Davidov, S. Bosnjak
THE SOFTWARE COMPONENTS IN THE BUSINESS APLICATIONS DEVELOPING 256

V. Ognjenovic, M. Jovanovic, I. Berkovic
APPLICATION OF THE DSI FRAMEWORK IN TEACHING GRAPH SEARCH ALGORITHMS 262

M. Milenkovic, K. Vukadinovic, T. Neznanovic, E. Eleven
EDUCATIONAL SOFTWARE FROM TRAFFIC 266

T. Krizan, M. Pardanjac, S. Jokic
GARDEN SOLAR ENERGY 270

D. Maravic., N. Tesic, E. Tobolka
E-LEARNING AND ONLINE CERTIFICATES FOR ENGLISH AS A FOREIGN LANGUAGE 273

S. Vranjes, Z. Zarin, Lj. Pavlovic, M. Pardanjac, D. Letic, S. Milosavljevic
EDUCATIONAL COMPUTER SOFTWARE AS A SIMULATION TECHNIQUE-EXAMPLES IN TECHNICAL AND IT EDUCATION 277

Z. Senti, M. Zivkovic, M. Samolovcev, R. Vasic, D. Karuovic
THE USE OF ALGODOO IN TEACHING TECHNICAL AND IT EDUCATION - AREA OF TRAFFIC SAFETY 283

B. Popovic, I. Djurovka, J. Dudas, M. Pardanjac
INTERACTIVE SIMULATIONS IN TEACHING TECHNICAL AND INFORMATION TECHNOLOGIES EDUCATION 288

I. Grujic, D. Radosav
ANALYSIS OF INFORMATION TECHNOLOGY APPLICATION IN THE MUSIC PRODUCTION 294

E. Tobolka, I. Zdrakanovic, D. Danilov
APPLICATION AND IMPORTANCE OF INFORMATION TECHNOLOGY IN TEACHING 297

V. Filipov, E. Eleven, Z. Eremic
IMPLEMENTATION OF „MOODLE“ IN THE SCHOOL SYSTEMS 300

N. Pilipovic, S. Stanisic, S. Babuskov, N. Tatomirov, E. Eleven
DEVELOPMENT OF INFORMATION TECHNOLOGIES INFLUENCE ON TEACHING 304

J. Babic, A. Terek, S. Miskovic, E. Eleven
CHILDREN SAFETY ON SOCIAL NETWORKS 309

E. Tobolka, U. Gmizic, A. Vlaskalic
USE OF MICROSOFT POWERPOINT IN EDUCATION 312

O. Iskrenovic Momcilovic, B. Miljkovic
MOODLE - TOOL FOR E-LEARNING 315

Z. Micic, N. Stankovic, M. Blagojevic
CLUSTERING OF KNOWLEDGE INNOVATION IN STANDARDIZED "HARDWARE'S" SUBFIELDS OF INFORMATION TECHNOLOGY 319

E. Tobolka, S. Stanisic, D. Gabor
TECHNOLOGIES THAT ARE BEING USED IN E-LEARNING AND ITS EVOLUTION.. 326

N. Chotaliya, Lj. Kazi, V. Jevtic, I. Berkovic, D. Cockalo, D. Glusac
ACCREDITATION OF HIGHER EDUCATION INSTITUTIONS IN INDIA AND SERBIA: COMPARISON OF AUDIT FORMS..... 330

Lj. Kazi, B. Radulovic, M. Ivkovic, V. Makitan, B. Markoski
WEB APPLICATION FOR PROJECT MANAGEMENT SUPPORT IN INFORMATION SYSTEMS HIGHER EDUCATION 340

S.Vlacic, S.Rodjenkov-Milinkovic, A.Knezevic, I.Vlacic
USE OF THE COMMERCIAL SOFTWARE TOOLS IN THE PREPARATION PHASE OF MILITARY PILOT EDUCATION AND TRAINING 346

J. Lukic, A. Teofilovic, D. Nedeljkovic,
ALIGNING EDUCATION WITH INDUSTRY REQUIREMENTS: BIG DATA ERA 352

E. Tobolka, M. Simic
STUDYING WITH TABLETS 358

N. Chotaliya, Lj. Kazi
HIGHER EDUCATION INSTITUTIONS ACCREDITATION IN INDIA AND GUJARAT STATE OF INDIA 362

D. Rac
THE SCHOOL PRINCIPAL AS A MANAGER AND A LEADER..... 367

N. Aleksic, A. Miskovic
THE DIFFERENCES BETWEEN THE ATTITUDES AND KNOWLEDGE OF THE BOLOGNA PROCESS AND STUDENT OF ALTERNATIVE PROGRAMS IN ACADEMIA 373

M. Runic Ristic, S. Mirkov, I. Ristic
THE PROCESS OF RECRUITMENT FOR MANAGEMENT AND ENGINEERING PROFESSION: COMPARATIVE ANALYSIS..... 380

I. Tasic, D. Mihaljica, V. Srdic, D. Cvetkovic
IMPORTANCE OF INFORMATION SYSTEMS IN DECISION-MAKING..... 385

M. Grahovac, I. Tasic, D. Cvetkovic, J. Jankov
INFORMATION QUALITY IN BUSINESS LOGISTIC SYSTEMS 390

V. Vela
INCIDENTAL VOCABULARY LEARNING THROUGH READING, A SYNTHESIS OF THE RESEARCH AND BASIC ASSUMPTIONS IN THE LITERATURE 394

T. Salii, A. Salii
THE EFFECTIVENESS OF SONG LYRICS IN MOTIVATING STUDENTS IN ACQUIRING VOCABULARY 398

R. Osmani
THE WORDS YOU NEED: TARGET VOCABULARY TEACHING STRATEGIES TO BASIC ENGLISH SKILLS STUDENTS AT SOUTH EAST EUROPEAN UNIVERSITY 402

R. Serdukov
THE IDEAS OF LEN MASTERMAN AS PHILOSOPHICAL AND METHODOLOGICAL BASIS OF MEDIA EDUCATION 406

B. Blagojevic, D. Solesa, N. Kojic
TREND INTERACTION BETWEEN PEOPLE - INTELLIGENT SOPHISTICATED CONTEXTUAL ENVIRONMENT 410

J. Jankov, I. Tasic, M. Cockalo-Hronjec
WORK WITH GIFTED STUDENTS IN TEACHING OF TECHNICAL AND IT EDUCATION 416

G. Bilic Prijic
CHARACTERISTICS OF ONLINE CURRICULUM AND ITS GROUNDING IN CONTEMPORARY LEARNING THEORIES 421

S. Vranjes, D. Radosav, D. Vajic, I. Tasic, D. Letic, E. Eleven
TEACHERS' ADVANCED TRAINING OF TECHNICAL EDUCATION AND COMPUTER SCIENCE 427

D. Glusac, D. Milanov, D. Karuovic
E-LEARNING THROUGH KHAN'S EIGHT-DIMENSIONAL FRAMEWORK 433

M. Kojadinovic
BASICS OF WINDOWS PHONE DEVELOPMENT 438

MULTICAMPUS DISTANCE EDUCATION BASED ON VIDEO-CONFERENCING SYSTEM

V. Bashovski, N. Koceska, S. Koceski
University Goce Delcev - Stip/Faculty of Computer Science, Stip, Macedonia
vasko.bashoski@live.com, natasa.koceska@ugd.edu.mk, saso.koceski@ugd.edu.mk

Abstract – This paper aims at evaluating the potentials of videoconferencing education as well as to understand students' perceptions and satisfaction with this kind of distance education compared to the traditional classroom environment, but also to understand the main challenges in this kind of setting. An experimental research conducted showed that this form of distance education could be equally good as traditional methods of teaching. It also leaded to several important conclusions that may help in creation of efficient teaching methodology.

I. INTRODUCTION

Up to several years, go two state universities were providing the higher education services overall territory of Republic of Macedonia. These universities, Ss. Cyril and Methodius and St. Kliment Ohridski, were located respectively in the cities of Skopje and Bitola. Considering their location as well as strong economy demands at one hand, and the economic circumstances preventing people from moving freely from rural areas to cities for studying, have risen important questions regarding the ease of access to academic institutions for people living in not developed regions, notably the east of the country.

Therefore, in order to offer equal possibilities for high education studies, state University "Goce Delcev" – Stip was established in 2007. Organized as an integrated university, according to contemporary standards, it perfectly fits the global worldwide trends in higher education. Namely, the University is located in Stip and has four campuses, integrating 13 faculties - covering almost all scientific disciplines, 10 university centers and three institutes. The studies at this university are performed in 12 units, dispersed in 12 different cities (mainly in the eastern part of the country).

"Goce Delcev" University is permanently growing both in number of students and staff members. This is constraining the university to enlarge its infrastructure as well. These growing trends are challenging the university itself to organize and support the education process with attention for communication and collaboration between the various campuses.

Although, this process is still mainly conducted through physical mobility of academic staff between different locations, the university is progressively supporting initiatives that replace or enhance physical with virtual mobility.

Considering the new challenges in higher education and understanding the importance of innovation in education through implementation of contemporary ICT technologies, the institution is doing permanent efforts to integrate various forms of distance learning with the traditional education.

Distance education has been defined as "a separation in time and/or space between the learner and the instructor. More than a geographic separation of learners and teachers, it is a distance of understanding and perceptions that must be overcome by teachers and learners" [1]. There are many types of distance-education models including online courses, interactive videoconferencing, videotaped lectures, and audiotaped lectures.

According to our preliminary evaluation, among other distance learning methodologies, videoconferencing is considered the most relevant and proven to stimulate collaboration between the various sites, to support and enhance student and/or staff communication, to enable flexible quality learning and accessibility, as well as to rationalize various costs.

Various research studies have been conducted in order to investigate the challenges of establishing a establishing a video – conferencing based distance education. Moreover, many studies have been conducted in order to understand the real benefits of video – conferencing as a form of synchronous form of education not only in higher

education but also, also in other segments of the society.

For e.g. a pilot project aimed to deliver video-conferencing diabetes lessons to healthcare and allied healthcare professionals who provide basic level care for, and management of, people with diabetes in the Scottish Highlands region [2]. Feedback from participants indicated that the educational content was relevant and that the use of videoconferencing could provide accessibility to training where distance, cost and other issues may make access difficult. Student performance on the assessment instruments did not differ between those who received the training through video conferencing and those who received the training through face-to-face delivery.

Another, qualitative research study has been conducted in order to determine how students who are taking synchronous distance education classes via video conferencing perceive distance learning courses [3]. The results of the study have shown that the most important problems in synchronous distance education were the disconnection and sound problems, mainly due to hardware issues. Other very important issue evidenced in this study was that students became bored after some time because of limited camera angles and cameras. Besides these technical problems, the researchers observed, and the students expressed that the factors of teacher, environment, distance, course type and duration also caused the students' perceptions to change.

In [4] researchers focus on the issues how two separate classrooms that are connected to one instructional process can be handled simultaneously by one teacher.

The purpose of this study is to evaluate the potentials of videoconferencing distance education compared to the traditional classroom environment as well as students' perceptions and satisfaction in both settings.

II. RESEARCH METHODOLOGY

In order to compare the traditional face-to-face classroom course delivery to synchronous videoconferencing way of distance teaching an experimental research has been conducted. This research also aimed at evaluating the students' perception and satisfaction with this method of teaching using contemporary ICT technologies.

This research was conducted for an elective 6-credit hour Object – Oriented Software Engineering (OOSE) course delivered during the winter semester of 2012. This course was delivered to two separate groups of students, all of them regular students at the Faculty of Computer Science, University "Goce Delcev". To the first group counting 60 students, the lectures were taught face to face in a traditional classroom setting. These students were physically located in the city of Stip.

Second group, counting 42 students was attending the same course in asynchronous sessions via interactive videoconferencing. Students from the second group were enrolled at one of the dispersed campuses of the Faculty of Computer Science, University "Goce Delcev" located in the city of Strumica situated in the far southeast part of the country, and approximately 70 kilometers away in the city of Stip. In the latter course, the instructor was physically located in the city of Stip (Figure 1).

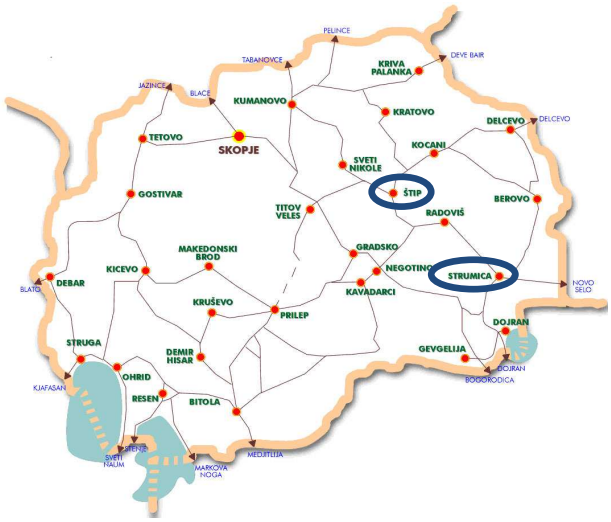

Figure 1. Campuses locations

Both courses covered the same topics and were given by the same instructor except for two lecture hours to the students in Stip, and two lecture hours presented in the classroom to students in Strumica campus given by external experts.

The distance-education lectures were delivered from a classroom equipped with Polycom HDX 8000 end-point (Figure 2), 36 computers, document camera, interactive whiteboard, two LCD projectors and monitor.

Figure 2. Polycom HDX 8000 end-point, with table microfon, multiview camera and remote controller

The lecturer had the ability to combine and to switch among three views delivered to the distant classroom: video image (e.g., the lecturer); computer screen (e.g., PowerPoint presentations); and the document camera (e.g., used to show hardcopies of figures and demonstrate working out calculations by hand). One LCD projector projected the image being transmitted to the distant classroom, and at the monitor, the image of the students in the distant classroom was presented. The distant classroom was equipped with Polycom HDX 7000 end-point, document camera, two LCD projectors and whiteboard. They were projecting picture big enough to be perceived clearly by all students. During transmission, the distant site also had a faculty facilitator present at least for the beginning of each class, and two technicians monitored the entire transmission.

The videoconferencing system used, allows setting up the camera in a number of different positions (e.g., wide shot of an entire class, close up shot of students in on the lower right quadrant) and store them as 'camera presets'. The presets are usually assigned to a button on the remote control. This allows the lecturer to easily focus in on a group of participants during the interactive portion of a session or just get a good overview of the level of engagement of varying groups at the remote site.

The traditional classroom lectures were delivered in a classroom equipped with a computer, a document camera, two video projectors and one interactive whiteboard. The synchronous distance education environment is summarized in Figure 3.

In this setting, the instructor may incorporate an alternative video source (e.g., a document camera, a VCR) for sending to remote locations, or may receive video from an alternative video source at the remote site. New feature “people on content” for example uses chroma key technology to allow lecturer(s) in a video call to become one with their content. Therefore, the potential for combining video inputs and outputs can seem endless.

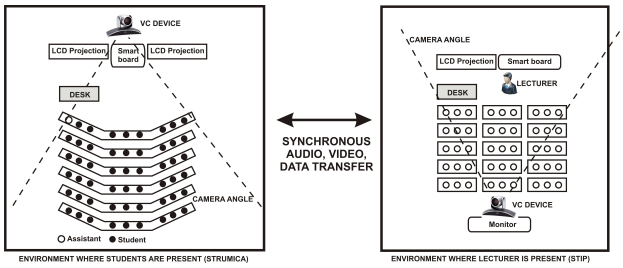

Figure 3. Synchronous distance education environment

However, with the introduction of more technologically advanced resources during classes, there is the increased danger of losing focus on the most important aspect of teaching - learning. Planning curricular objectives and concentrating on students as the major stakeholders, leads to a continuum in the life cycle of a technology based course. Evaluation at a personal level throughout the course but also at a curricular level can lead to improvements to better suit the needs of the students.

Course and instructor evaluations were administered to each group at the conclusion of the courses. The questions rated students' perceptions of the course and instructor using a 5-point Likert scale anchored at 5 = strongly agree and 1 = strongly disagree. The variances of the results were first analyzed using Levene's test for equality of variances. The evaluations were then analyzed using independent sample t tests based on the assumption of the equal variances or unequal variances where appropriate in SPSS v19.0. The final course grades were analyzed by the same method.

III. RESULTS

Students' demographic data are presented in Table1. The traditional classroom students had a higher computer science grade point average (GPA) (P = 0.012) at the onset of the 2 courses, and the distance-education students had a higher mean grade in the prerequisite Software Engineering Basics (SEB) and Software Analysis and Modeling (SAM) courses (P = 0.321 and P = 0.222 respectively) that preceded the OOSE course. No other significant differences were found.

TABLE I. STUDENT DEMOGRAPHICS

	Traditional classroom settings [Mean value]	*Videoconferencing distance education settings [Mean value]*
Age(years)	16.40	17.56
Overall CS GPA (on the scale 5-10)	8.67	7.44
Grade in SEB	8.80	8.15
Grade in SAM	7.90	8.83

Students who completed the course in the traditional classroom setting had an average final course grade of 8.92 compared to an average final course grade of 8.45 among students in the interactive videoconferencing group (P = 0.031). The response rate for the course and instructor evaluation was 95.24% (40 out of 42 students) for the distance-education students and 95.00% (57 out of 60 students) for the traditional classroom students. The mean evaluation score (Table 2) for the distance-education students was higher than for the live students (4.7 ± 0.6 and 4.4 ± 0.7, respectively; P < 0.001).

TABLE II. DOMAIN ANALYSIS OF STUDENT RESPONSES

	Traditional classroom settings [Mean(SD)]	*Videoconferencing distance education settings [Mean(SD)]*
General	4.4 (0.7)	4.7 (0.6)
Lecture content	4.4 (0.5)	4.6 (0.8)
Presentation/style	4.6 (0.5)	4.8 (0.4)
Student contact	4.3 (0.8)	4.7 (0.6)

During the videoconferencing lecture, the number of interactions between students, as well as between students and teacher were counted. The number of interactions is presented in Figure 4. As it may be observed from the figure the number of interactions is growing, which means improved synchronous communication.

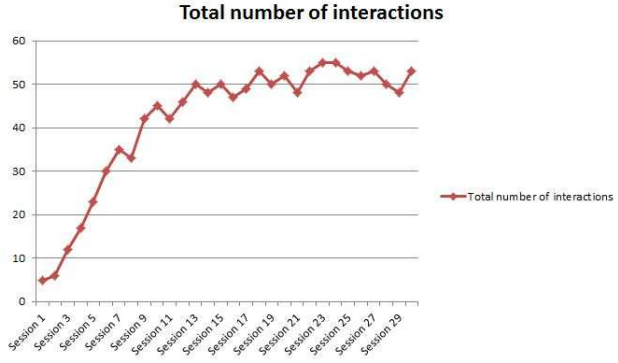

Figure 4. Total number of interactions during the synchronous videoconferencing lectures

IV. CONCLUSION

In videoconferencing distance education, it is often common for the distance students to feel a sense of alienation. In our case, students completing the OOSE course in a traditional classroom setting or by videoconferencing performed well and had a high overall perception of the instructor and courses. The distance-education course was rated higher by students than the same course delivered in a standard classroom. Several techniques were used by the instructor to facilitate the instruction via videoconferencing that may have influenced the distant students' perceptions of the course. Based on the results of the interview with the distance students the use of recitations was highly valued by the distant students. Therefore, the incorporation of regularly scheduled recitation-type sessions should be considered when developing a distance-education course. Moreover, encouraging interactivity with discussions between sites and group works were also highly appreciated. So, we can say, as a general finding from this research is the need for instructors to understand and acknowledge that using videoconferencing, as a delivery mode will have an impact on teaching styles and methods. Even though the term "interactive video-conferencing" is often used when discussing this type of technology-based, teaching, successful interaction does not take place unless lecturers plan and understand how the medium will alter their teaching approaches. Other findings also indicate that whether the course delivery mode is a traditional one or a technology-based mode, effective lecturers establish and maintain a highly interactive classroom community. Therefore, for efficient delivery of educational content through distance videoconferencing mainly depends on how much teachers are knowledgeable about their subject, about their learners, and about pedagogy.

REFERENCES

[1] T.S. Hunter, E. Deziel, W.A. Marsh, Assuring excellence in distance pharmaceutical education. Am J Pharm Educ. 2003;67.

[2] W. Maltinsky, S. Hall, L. Grant, K. Simpson, S. MacRury, "Pilot project and evaluation of delivering diabetes work-based education using video conferencing." Rural & Remote Health 13, no. 1 (2013).

[3] H. Karal, C. Ayca, E.T. Yiğit, "Perceptions of Students Who Take Synchronous Courses through Video Conferencing about Distance Education." Turkish Online Journal of Educational Technology 10, no. 4 (2011).

[4] J. Hussa, "Distance education in the school environment: integrating remote classrooms by video conferencing." Journal of Open, Flexible and Distance Learning 2, no. 1 (2012): 34-44.