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Contents

International Journal of Research in E-learning
Vol. 2 (1), 2016, pp. 5–8

Editorial

The policy goal of the technology literacy approach is to enable learners, citizens, and the workforce to use ICT in order to support social development and to improve economic productivity. Related policy goals include increasing enrolments, making high-quality resources available to everyone, and improving literacy skills. Teachers should be aware of these goals and be able to identify the components of education reform programmes that correspond to these policy goals. Corresponding changes in the curriculum entailed by this approach might include improving basic literacy skills through technology and adding the development of ICT skills into relevant curriculum contexts (UNESCO, 2011).

The present volume includes eight articles gathered in four chapters. Chapter I, entitled "ICT-tools and E-learning Methodology in Contemporary University," includes four articles. The first article entitled "Wiki Tool in Higher Education: An Australian Perspective," prepared by Australian researchers Tomayess Issa, Theodora Issa, and Touma B. Issa, aims to examine the challenges and perceptions to promote students' learning, communication, and interaction via the Wiki tool in the blackboard platform. Wiki intends to sustain and advance students' professional and personal skills, the former ones including reading, writing, research, information, critical thinking, decision making, technology, digital oral presentation, drawing (i.e. concept maps), teamwork, and languages, and the latter ones including motivation, leadership, negotiation, communication, problem solving, time management, reflection, self-management, and self-appraisal. Additionally, integrating Wiki in teaching and learning will improve students' work performance, productivity, and self-confidence: the skills needed for both the current study and the future workplace. The study results confirmed that using Wiki in a postgraduate unit at an Australian university enhance students' personal and professional skills; in addition, students learnt and absorbed the new concepts and cutting-edge knowledge of the ITS65 unit, i.e. sustainability and Green IT.

The second article, "Objectives and Content of E-module 'Tools for Adaptive Learning. Learning Styles' within the MOOC Course 'ICT Tools for E-learning'," elaborated by Czech authors Josef Malach, Kateřina Kostolányová, Milan Chmura, Ingrid Nagyová, and Tatiana Prextová, describes some theoretical and practical aspects, objectives, and content of the preparation of the e-module "Tools for Adap-

tive Learning. Learning Styles" within the MOOC course which is being developed at the University of Ostrava as an outcome of the IRNet project. The main aim of the course is to provide both academic scholars and students with the theoretical foundation of adaptive learning that will allow them to acquire skills, use the existing courses in the existing adaptive e-systems, and/or create new courses and systems. The content of the course includes the following: defining basic constructs used in the course; overview of the development of adaptive learning with the use of educational technologies, its theoretical concepts, and representatives; presentation of the results of the previous researches and educational effects of adaptive (e-)learning; and chosen concepts of adaptive learning that have recently been developed at the University of Ostrava.

The international team of researchers from Ukraine and Poland – Nataliia Morze, Rusudan Makhachashvili (Ukraine), and Eugenia Smyrnova-Trybulska (Poland) – present the paper "The Roadmap of Collaboration Skills from Programmed Teaching to E-learning," in which the comparative analysis of the basic principles of programmed teaching, and constructivism for their subsequent use in creating open learning didactics in view of the collaborative approach and collaboration oriented activities have been described. What is investigated is the fact that same idea forms the basis of the two paradigms (constructivism and personal learning): the humanistic character of education, taking individual characteristics into consideration, activity-based approach, and collaborative activity of a student.

A Czech author Pavel Kapoun proposes the article "Geolocation Services in Education Outside the Classroom," in which he stresses that geolocation services such as Geocaching, Wherigo, or Foursquare are very popular all over the world nowadays. Millions of people are involved in these games, by means of which – in addition to entertainment – they learn about geography and history. Geolocation games can be used very effectively in instruction as well. The article contains analysis, design, development, implementation, and evaluation of educational games using the geolocation service Geocaching. Sometimes, the concept "educaching," which was created by combining the words "education" and "geocaching," is used.

Chapter II – "Distance Learning Technologies in Different Countries" – contains two articles. Ukrainian authors, Kateryna Yalova, Valerii Zavgorodnii, Ksenia Yashina, and Oleksandr Sadovoy, propose a paper entitled "Distance Learning Technologies in the Knowledge Transfer System of a Modern University," which presents results of the research conducted within the European IRNet project. The research describes the place and role of distance learning technologies in the knowledge transfer system of a modern university. The main goal of the article is to describe results of the data domain analysis concerning a possibility of the academic Massive Open Online Courses (MOOC) platform development and introduction. The authors have identified the architecture and main functional

requirements of the academic MOOC platform as an effective tool to optimise the processes of knowledge transfer in the teacher–student system.

A Czech researcher, Lucie Zormanová, is the author of "The Comparison of Distance Learning Between the Czech Republic and Other European Countries," which examines distance learning in several European countries and the Czech Republic. The article analyses and compares the development of distance learning, and the supply of study options in the form of distance learning in European countries; it also covers the conditions and history of distance learning in European countries. The carried out analysis shows that currently there is an emphasis on lifelong learning, and the development of distance learning has become a priority. It is further stated that there are significant differences in the development of distance learning in individual European countries, and in the Czech Republic the distance learning has only started to develop in the past twenty years.

Chapter III – "ICT and Multicultural Competencies Developing Supported E-learning" – begins with the paper "Developing Students' Information Competencies in the Context of Multicultural Education Using University E-learning Platform," prepared by Slovak authors Andrea Kubalíková and Jana Trabalíková. In this paper, the authors introduce their way of thinking about approaches to students in the term of e-learning use in the context of a multicultural society. Authors are focusing on the question of developing the information competencies in the environment of multicultural education. This paper also provides examples of good practice, especially when teaching via e-learning platform, LMS Moodle, at the University of Žilina.

Chapter IV – "Reports" – includes the article "Report on the Implementation of Work Package 4 'Selection and Testing New ICT Tools' in the Framework of the IRNet Project," developed by the international team of authors from several partner countries participating in the IRNet project. António dos Reis (Portugal), Sixto Cubo Delgado, Prudencia Gutiérrez-Esteban, Laura Alonso-Díaz (Spain), Eugenia Smyrnova-Trybulska (Poland), Nataliia Morze (Ukraine), Tatiana Noskova (Russia), Kateřina Kostolányová (the Czech Republic), Martin Drlik (Slovakia), and Tomayess Issa (Australia) – researchers from different scientific areas, connected with ICT, e-learning, pedagogy, and other related disciplines – focus on the objectives and chosen results of the international project IRNet (International Research Network). In particular, the article describes the research tools, methods, and some procedures of the Work Package 4 "Selection and Testing New ICT Tools": Objectives, Tasks, Deliverables, and implementation of research trips. Researchers from partner universities have analysed the results of WP4 in the context of the next stages and Work Packages of the IRNet project.

In conclusion, it can be stressed that strategies of access to ICT resources are the essential elements of lifelong learning (UNESCO Incheon Declaration, 2016). Except for Web 2.0 and Web 3.0 technologies, MOOCs (Massive Open Online Courses) have continued to attract considerable media coverage, as governments

and universities respond to the open and online education movement. International teams and networks – such as the international consortium of the IRNet project – can make a fundamental contribution to the further development of strategies and methodologies of modern education.

Eugenia Smyrnova-Trybulska

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ICT-tools and E-learning Methodology in Contemporary University

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Tomayess Issa, Theodora Issa, Touma B. Issa
Australia

Wiki Tool in Higher Education: An Australian Perspective

Abstract

This paper aims to examine the challenges of and perceptions about promoting students' learning, communication, and interaction via the Wiki tool in the blackboard platform. Wiki intends to sustain and advance students' professional and personal skills, the former ones including reading, writing, research, information, critical thinking, decision making, technology, digital oral presentation, drawing (i.e. concept maps), teamwork, and languages, and the latter ones including motivation, leadership, negotiation, communication, problem solving, time management, reflection, self-management, and self-appraisal. Additionally, integrating Wiki in teaching and learning will improve students' work performance, productivity, and self-confidence, as these skills are needed for not only the current study, but also the workplace in the future. Additionally, using this tool in teaching and learning, especially in the higher education, can bring some challenges to the lecturer and students, particularly in the presentation and marking. This paper will discuss the Wiki implementation in the postgraduate unit at an Australian university. The study results confirmed that using Wiki in the postgraduate unit at an Australian university enhanced students' personal and professional skills; in addition, students learnt and absorbed the new concepts and cutting-edge-knowledge of the ITS65 unit, i.e. sustainability and Green IT.

Keywords: Wiki, challenges, perceptions, skills, postgraduate unit, Australia

Introduction

The Wiki tool consents students and lecturers to add, update, and modify contents on the website including blackboard platform. Wiki intends to sustain and advance students' skills in communication (writing, interpersonal interaction, and presenting), critical and creative thinking (problem-solving and decision-making), technology literacy, and information literacy. Additionally, the incorporation of the Wiki tool in teaching and learning practice will improve the quality of students' work, their productivity, and self-confidence.

This paper examines the implementation of Wiki's assessment in the post-graduate unit at an Australian university. The unit is Information Technology Seminar 65 (ITS65), and it aims to raise students' awareness of sustainability, Green IT, and sustainability strategies proposed by recognised scholars within the field of strategy and sustainability (Rainey, 2006; Teece, 2009).

In order to improve their learning skills, especially in communication and interaction, students must complete a set of challenging activities – as groups or individuals – via Wiki. The activities are focused mainly on: analysing and evaluating actual case studies, drawing concept maps based on unit materials and special topics, and sharing cutting-edge news, both national and international, relevant to the ITS65 unit. Students are required to upload their work as individuals or as teams to Wiki under the blackboard platform. Later, each group or individual presents their findings to the class as a PowerPoint or concept map presentation to attain feedback from their colleagues, and produce creative argument and discussion in the class.

The Wiki mark is based on quality not quantity; 15% marks are allocated for Wiki students' contributions, and the lecturer checks the students' Wiki contributions twice a week, namely on Tuesday and Friday afternoons. During the term, the lecturer provides formative feedback to improve the Wiki presentation and its quality before the final submission. In addition, the Wiki tool aims to improve the communication and collaboration between students and lecturers, to encourage teamwork and collaboration between students, and to improve their writing, reading, debating, written presentation and oral skills, and drawing (i.e. concept maps) (Diggins, 2004; Worley, 2008; Matheson, 2009; Cowan & Jack, 2011; Isaias & Issa, 2014). Furthermore, the lecturer provides summative feedback at the end of the term for all Wiki contributions based on Wiki's rubric, concerning content, organisation, appeal, contribution to group discussions, and accuracy, structure, and quality of writing.

The research approach for this study is based on students' informal feedback which is collected during the term to report students' perceptions about their learning experience including the teaching process. Informal feedback is a teaching and learning innovation requiring students, during the term, to provide their ano-

nymous feedback regarding the unit structure, layout, and assessments. This feedback assists the lecturers to improve the delivery of the unit before the end of the term.

The study outcomes indicated that Wiki assessment provided students with a better perception of the unit including the new concepts and cutting-edge knowledge of sustainability and Green IT. Wiki assessment aims to increase communication and interaction among students as the majority of students found Wiki motivating, exciting, and interactive. Students indicated that incorporating Wiki assessment in the ITS65 unit enhanced their communication, collaboration, and interpersonal, writing, reading, search/research, problem-solving, and decision-making skills, which are required for this study and for the real life in the future. In addition, students show their satisfaction with this assessment, as it develops specific skills for their current studies and for the future workplace, especially in terms of cultural awareness, cutting-edge technology, sustainability, and Green IT.

The study results and findings will make significant influences, from the theoretical and practical perspectives to the current literature, especially by implementing and using the Wiki tool in the higher education sector with a particular focus on the postgraduate units. The study outcomes will assist academics and researchers how to implement the Wiki tool in teaching to enhance personal and professional skills for the current study as well as for the real life in the future. Finally, a Wiki marking guide will be discussed in this study. The study's limitation is that is has been conducted only in Australia.

This paper is organised as follows: Introduction; What Is Wiki in Higher Education Sector; Methodology and Research Question; Participants, Unit, and Assessments; Results; Discussion and New Findings; and Conclusion.

What Is Wiki in Higher Education Sector

Wiki is a website which allows students to create, edit, and delete pages collaboratively. Ward Cunningham is the founder and creator of the Wiki, who has led to the creation of Wiki Wiki Web (Laughton, 2011). Wiki technology has the potential to enhance connection, communication, and cooperation between both students vs. students and students vs. lecturers, especially in higher education, and to enhance their personal and professional skills (Ng, 2016; Chu, Reynolds, Tavares, Notari, & Lee, (forthcoming)). The word Wiki was derived from the Hawaiian Phrase "Wiki Wiki," which means quick to swift (Issa, 2014).

Wikis have been productively employed in education as early as in 1999 (Guzdial, 1999) as a tool for collaboration. Several studies (Bruns & Humphreys,

2005; Lund & Smordal, 2006; Tsinakos, 2006; Ben-Zvi, 2007; Chao, 2007; Cubric, 2007; McDonald, 2007; Parker & Chao, 2007; Schroeder, 2009; Gibbons, 2010; Karasavvidis, 2010; Ireland, Atack, & Sandy, 2013; de Arriba, 2016) confirm that Wiki amalgamation in the education sector becomes critical and vital as this technology will promote the unit aims, namely: sustainability and Green IT for teaching and learning, including creating (documents, images, and presentations), editing, deleting, searching, discussion, interaction, debating, sharing, and arguing.

Based on the current literature review (Biasutti & EL-Deghaidy, 2015; De Smet, Valcke, Schellens, De Wever, & Vanderlinde, 2016; Wang, 2016), the use of Wiki in the education sector is increasing, and has been adopted by many different departments in higher-education institutions. A recent study by Issa (2014) confirms that integrating Wiki in learning and teaching, especially in the postgraduate units, will promote professional skills – reading, writing, research, information, critical thinking, decision making, technology, digital oral presentation, drawing (i.e. concept maps), teamwork, and languages – and personal skills, such as motivation, leadership, negotiation, communication, problem solving, time management, reflection, self-management, and self-appraisal. Therefore, this study will examine the literature findings and identify the challenges and perceptions of using this tool in the ITS65 unit at an Australian university.

Methodology and Research Question

This paper investigates the following questions: “How can Wiki enhance postgraduate students’ professional and personal skills?” and “How can Wiki enhance postgraduate students’ knowledge regarding sustainability and Green IT?” To address and answer these questions, the researchers adopted the informal feedback. The informal feedback is a teaching and learning initiative that assists the lecturer to improve and enhance the unit before the end of the term by refining certain aspects during the course to cater for students’ needs and improve the methods of teaching and learning. Questions in the informal feedback included: What are the positive aspects of this unit? What do you like about the lecturer? Do you have any suggestions or recommendations for how the learning experience can be improved? (Please provide specific suggestions.) What do you need the lecturer to continue doing, to stop doing, and to start doing?

Participants, Unit, and Assessments

The study participants comprised 150 postgraduate students, and students were mainly from Australia and Asia (i.e. China, Vietnam, Malaysia, India, Indonesia, Iran, Middle East, Pakistan, and Sri Lanka), Russia, South America, and South Africa. This cultural mixture assisted students to learn from each other by sharing knowledge, skills, and cultural perspectives, and this led them to the development of self-esteem, communication skills, and self-confidence.

The ITS65 unit was developed subsequent to the repercussion of the global financial crisis in 2007, as businesses and users were struggling to survive, especially in the area of information technology/systems. ITS65 aims to provide students with an understanding, knowledge, and experience of Organisational Sustainable Strategy and Green IT. As for the learning outcomes, on successful completion of this unit, students: 1) demonstrate awareness of and sensitivity to the importance of sustainable development and business strategies at a time that is crucial for people and the planet in addition to profit; 2) display an understanding of the fundamentals of Green IT; 3) apply conceptual tools and frameworks to critically analyse and apply business decision-making practices and policies; and 4) translate the theories, concepts, and analytical techniques learnt into practice. As for the unit's assessments and syllabus, mainly designed with university graduate attributes in mind, see Table 1.

Table 1.
ITS65 Assessment Activities and Unit Syllabus for ITS65 Postgraduate Unit

Unit	Assessments	Unit Syllabus
ITS65	• Three Journals 30% • Individual Presentation of an IT Sustainable Strategy & Report Writing 55% • Wiki for Collaborative Writing 15%	The ITS65 unit is mainly focused on issues relating to strategic development, IT business, sustainability tools and Green IT, and other related issues

S o u r c e: own work.

Results

To address and confirm the study aims and objectives, this section will present the study findings based on the students' informal feedback regarding the Wiki integrating in the ITS65 unit. The informal feedback indicated that using Wiki in the ITS65 unit was an outstanding and exceptional experience from the students'

and lecturer's perspectives, since Wiki assisted students to improve their personal and professional skills in communication, leadership, time management, problem-solving and decision-making, all of which are essential for their current university studies, as well as the workforce in the future. The Wiki tool has become very fashionable in higher education; as students endorsed, it makes the classes more interactive and cooperative. By the same token, several studies (Brooks, 1997; Ammarell, 2000; Edwards, Cordray, & Dorbolo, 2000; Godwin-Jones, 2003; Matheson, 2009; Muscarà & Beercock, 2010; Su & Beaumont, 2010; Tharp, 2010; Bayliss, 2013; Issa, 2014) indicate that the Wiki tool usage in education has become a beneficial – if not vital – tool to improve and advance students' communication, collaboration, writing, research, and to reassure social interaction among students, especially in teamwork activities.

Students were very generous to share their reflections and attitudes towards using the Wiki tool in the ITS65 unit with us. Some of their comments are as follows:

> My communication skills were improved, through the use of the Wiki, as I was encouraged to collaborate and build on others' ideas. I also learnt to consider the opinion of others and learn about the opinions of different people from different cultures and countries by using the Wiki. I learnt how to communicate with people of different cultures and nationalities.
>
> My business skills were improved by the presentation and report assessments. In these assessments I was forced to consider current business processes and infrastructure and then consider how to improve the sustainability of IT in these situations. My business skills were improved as I learnt about intangible effects of improving sustainability practices, such as the benefits of having an improved reputation and being able to market the organisation as being socially responsible. I learnt about the direct benefits of sustainability to a business including a reduction in costs and wasted resources.
>
> My presentation skills were improved by the presentation assessment. This assessment required me to consider an audience and required me to prepare an appropriate presentation which considered the use of proper language, content and delivery. My ability to communicate to an audience was improved by this assessment.
>
> My reading and comprehension skills were improved by the journal assessment, which showed me how to effectively determine the themes of an article and determine the arguments of the authors. My writing skills

were also improved by this assessment as I was required to record my observations and form my own conclusions after reading the articles.
My research skills were improved by the journal assessment as I was required to seek evidence supporting or disputing the views of the four prescribed articles. The presentation assessment also taught me to use only up-to-date references as it restricted students to using articles published in 2010 or later.

My technology skills were improved, as I learnt about energy efficiency and Green IT. I learnt about new and emerging IT such as virtualisation and using cloud computing. I learnt how physical devices can be configured to save energy. I learnt that I need to consider the recyclability of new IT devices and I need to decommission obsolete IT devices properly. Furthermore, I learnt how to develop and create concept maps, and using endnote software for the references.

ITS65 has also helped me develop confidence in public speaking, as well as new techniques in presenting information. Firstly, by requiring students in every class to present their findings not only helps with collaboration, it helps to provide a safe environment to discuss different ideas and perspectives. This has helped me develop confidence in discussing my ideas and perspectives on topics, as well as the confidence of presenting this information to a group.

ITS65 has required the use of new methods of presenting information. For example, the use of mind maps/group maps to present information in class has allowed me to learn and adopt new styles of presenting information to stakeholders, whether they are students, future clients, or future managers. Furthermore, the Wikis also provide an interesting platform in which to share information. The nature of Wikis also allows the collection and presentation to the group. As such, the Wiki assessment has demonstrated to students the benefits of the platform to collaborate with each other and also use.

The comments above indicate that the majority of students think that the use of Wiki in the ITS65 unit has empowered them to attain information and data in various realms including sustainability and green IT, and to improve their professional and personal skills, including teamwork skills, since Wiki entails them to complete vast activities individually or with a group. In the ITS65 unit, the lecturer initiated during the term 13 Wiki activities/exercises intended for group and individual activities. The Wiki activities focused mainly on specific topics, including: sustainability and Green IT in students' countries, IT environment

problems, cloud computing applications, mobiles, sustainability and Green IT, new Green IT technologies, news behind sustainability and Green IT, and case studies. Using Wiki for these activities, students were encouraged to append their voice and give their viewpoint on these topics in groups or as individuals. All the activities were posted to Wiki and the lecturer provided her feedback using the Wiki rubric. Students also shared their views about the use of Wiki in the ITS65 unit generally and specifically to learn the unit materials, i.e. sustainability and Green IT.

> Wiki is a good channel of communicating and sharing ideas, we can read many concise concepts and provide feedback for them, also to question the vague areas and open a discussion of interesting topic. There are many news and interesting events happened in the world, it might not relate to our life, but it is good to know them through Wiki, which will help build our knowledge from these information, and giving us the wisdom when we apply those kinds of theories into the real life.
>
> This class was collaborative and interactive learning as we were made to discuss, organising, exchange the ideas and debate and argue our opinion on what others came up with same or different topic. We were also made to contribute exchange and interact via Wiki on same or different topic. All these interaction, reading and contribution helped to improve our analysing skills, writing skills and most importantly as we were made to present and argue out thought and opinion on the topic we gained the capability of presenting and facing the crowdion, and giving us the wisdom when we apply those kinds of theories into the real life.
>
> I think the Wiki is the best way to collaborate between group members; however, student groups still need a tool to use for collaboration, such as project management tools for group members. In other words, I do suggest a long-term Wiki work contribution between the student members, in this project where students are required to add new work each week. Also, students should be required to use cloud project management tools, so they can communicate together using the cloud to realise the power of sustainability tools as well. There are many cloud collaboration tools on the web and most of them are free for one project with a small group.
>
> I learnt a lot in this class particularly about the importance of having a sustainable practice in a corporate environment and basically to integrate the practices into the organisational culture, the classes also fostered an interest in such activities such as writing in Wiki's and discussing concepts with your peers.

The use of Wiki is another interesting and yet important tools in this unit. It changes the traditional way of teaching to active modern teaching. It enables the students to actively seeking updated information and shares it among other students so that students can exchange information and having discussion regarding the unit. It allows the student to think out of the box and generating new ideas.

Wiki activity broadens my knowledge in different realms. Sharing this knowledge with my lecturer as well as my classmates is a good idea. Furthermore, from Wiki activity in the class I have learnt how to work as group and sharing my idea with my class mates and listening to their feedback. This activity helped me at improving my communication skills as well as reading skills. I have learnt from the activities that my classmates shared on the blackboard especially the videos one the global environmental issues in different counties around the world; and how these issues participating in polluting the environment.

Wiki discussion is helpful, at least there is an opportunity to share and see other people's perspectives. Agreeing and disagreeing at times, because of varied opinion which is healthy and encourages the culture of reading.

The Wiki is an effective tool as it allowed me to collaborate with other students in small groups and talk about sustainability issues and share our different views as well. In the class tasks made me understand that a developed country faces different sustainability challenges compared to a developing country. An example would be I come from a developing country where some parts of the country don't have the basic needs such as clean water so for them the sustainable challenge would be to get water from a sustainable and affordable resource. In a developing country such as Australia getting clean water is not a challenge as one just needs to turn on their tap however, the sustainable challenge WA as a state faces is how to ensure the water available is being used resourcefully.

Well, by completing this unit and all those assessments, I gained cast amount of knowledge about the sustainability and the importance of the satiability and the protecting the earth for the future generation rather making use every element that we are having at the monument. If we do so it is so selfish of us. Completing those assessments including Wikis made me think of how the world is responding to the sustainable issues and what measures are they taken to become more sustainable and I can see the point of that we are being individually sustainable, how they become reflects on the society as in whole. For example, we being sustainable, if

> we tend to buy our goods and services from the sustainable vendors, that will push suppliers to become more sustainable and they will start follow more sustainable measures in order to make profits, as they are the mass producers that they will help the nature to reduce the bad impact on earth from their actions.
>
> Working together in groups on Wiki exercises during the seminars was my favourite part of the unit. This is because it involves collaborating face-to-face in a group and then using the Wiki to share the ideas of the different groups. It is a powerful learning tool which allows the perspectives of many different people to be considered.

Furthermore, Table 2 displays the skills and knowledge that the students attained by finalising the Wiki exercises. Table 2 confirms that Wiki usage by the ITS65 students enhanced, convalesced, and recuperated students' professional and personal skills for the current study and the workforce in the future. Furthermore, students substantiated that finalising the Wiki exercises allowed them to learn and absorb the unit materials in a relaxed and comfortable method.

Table 2.
Themes and Student # for the ITS65 Postgraduate Unit

Themes (Skills and Knowledge)	Student #
Sustainability	53
Green IT	28
Skills and knowledge	35
Oral presentation	20
Writing skill	20
Reading skill	20
Research skill	30
Search skill	30
Discussion and debate	30
Critical thinking	30
Thinking skill	19
Communication and collaboration	30

In conclusion, the study results confirmed the study aims and objectives, proving that using Wiki in higher education will assist and support students to enhance and expand their personal and professional skills; additionally, students will learn the unit materials by completing the Wiki exercises.

Discussion and New Findings

Integration of the Wiki tool in the ITS65 unit was a challenging exercise for the lecturer and students; however, at the end it was indicated that using this tool in ITS65 allowed students to enhance their professional and personal skills, and to obtain new materials about sustainability and Green IT by completing several activities, via Wiki, in groups or as individuals. These days, in higher education, and especially in the postgraduate units, using new technologies in teaching and learning will provide the students with new opportunities to improve their collaboration, communication, cooperation, and connection among their colleagues, but also problem-solving, critical thinking, decision-making, communication, writing, listening, and research skills.

The study results confirmed the study aims, objectives, and questions, demonstrating that using and integrating the Wiki tool in the postgraduate unit is fundamental nowadays as a teaching tool, as the university's most important stakeholders – the students – will have the opportunity to expand collaboration, communication, discussion, and debate among themselves and take more control of their own learning. Furthermore, students' reflections and perspectives confirmed that the use of the Wiki tool in the ITS65 unit gave them a better understanding of the concepts presented such as sustainability and Green IT. The completion of the Wiki activities was excellent and inspiring knowledge for the students and the lecturer, as the students learnt new concepts from their colleagues, and benefited from the lecturer's feedback. The lecturer's feedback comprised formative assessment of the students' Wiki contributions, and this had two advantages: 1) improving communication and collaboration between students and lecturer, and 2) enhancing students' subsequent Wiki submissions.

The lecturer plays an essential role in Wiki's success, as her role in the learning process is that of a facilitator, providing cutting-edge knowledge, and fundamental and quality opportunities to all students through the learning process. Her teaching philosophy approach is "learning to learn," which is vital and dynamic, especially in higher education. This approach makes it possible for her students to be responsible on their own, learning through the provision of the appropriate tools (i.e. the Wiki tool) to allow more participation, debate, and discussion among students and lecturer in various activities, including real case studies. This exercise allows students to develop and enhance their personal and professional skills, which are essential not only in university studies, but also in the workforce, as most businesses require these skills in their employees.

Finally, to assess students' contributions to Wiki, a rubric was used (see Figure 1), which reflected the following criteria: content (i.e. the topic(s) is/are covered in detail with excellent examples; knowledge of the subject matter is outstanding), organisation (the issue is well-presented and organised, using

headings or a bulleted list to group related material), attractiveness/appeal (to enhance the Wiki presentation, a student uses the excellent choice of font, colour, graphics, effects, etc.), contribution to group work and discussions (a student contributes to and develops the class Wiki, by providing her/his opinion regarding her/his colleague's Wiki contribution), accuracy (student's observations and perspective are presented, explained, and demonstrated well), structure and quality of writing (it is well structured (e.g. paragraphing, sentence structure, spacing, spelling, proofreading), no HTML errors in Wiki, i.e. broken links, missing images, the above average standard of expression and presentation, the excellent overall expression and presentation, the accurate acknowledgement of sources). The informal feedback will encourage students to engage with the unit and will provide an exciting, memorable and motivating experience.

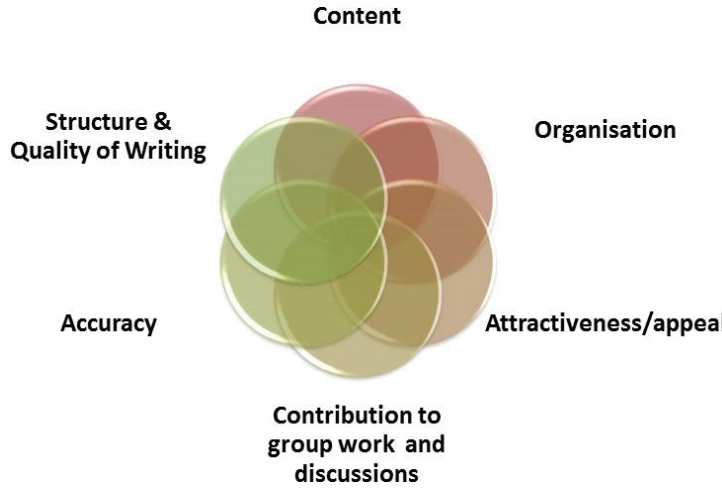

Figure 1. Wiki Marking Guide

S o u r c e: Prepared by Tomayess Issa.

Generally, the study results indicate that students endorsed and substantiated the research questions and aims, namely that working with Wiki activities consents them to advance and expand many professional and personal skills, and that the Wiki activities allow students to understand the ITS65 materials better through formal discussion and informal conversation. Similarly, several studies (Godwin-Jones, 2003; Tsinakos, 2006; Ben-Zvi, 2007; Chao, 2007; Cubric, 2007; Parker & Chao, 2007; Höller & Reisinger, 2008; Trentin, 2008; Cole, 2009; Matheson, 2009; Schroeder, 2009; Witney & Smallbone, 2011; Heng & Marimuthu, 2012; Adcock, 2013; Issa, 2014; Zein, 2014) affirm that the use of Wiki in higher education will boost students' professional and personal skills and create independent learners who are capable to firm their own learning objectives and reveal their learning processes and conclusions.

Conclusion

This study discussed the challenges and perceptions to promote students' learning, communication, and interaction via the Wiki tool in the blackboard platform. This study examined whether the use of Wiki as a teaching tool will enhance and improve students' professional and personal skills, and assist students to understand the unit materials by using various tools for their presentation, such as PowerPoint slides, concept maps, or a debate. 150 students from the ITS65 unit confirmed the study aims and research questions, showing that the Wiki tool enables students to understand the course content and improve their skills, especially in writing, discussion, and research. These skills are necessary for the current study as well as for the real life in the future. In conclusion, this study meets the study aims and objectives; however, since it was limited to one postgraduate unit at an Australian university, in the future the researchers will include more units from different disciplines to strengthen the research goals and purposes.

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Tomayess Issa, Theodora Issa, Touma B. Issa

Narzędzie Wiki w szkolnictwie wyższym: perspektywa australijska

Streszczenie

Niniejsza praca ma na celu zbadanie wyzwań i omówienie spostrzeżeń dotyczących propagowania nauki, komunikacji i interakcji studentów za pośrednictwem narzędzia Wiki na platformie tablicy. Narzędzie Wiki ma na celu podtrzymywanie oraz rozwijanie zawodowych i osobistych kompetencji studentów. Kompetencje zawodowe obejmują takie kompetencje jak: czytanie, pisanie, badanie, informacje, krytyczne myślenie, podejmowanie decyzji, technologia, cyfrowa prezentacja ustna, rysowanie (np. mapy koncepcyjne), praca zespołowa i języki. Kompetencje osobiste obejmują takie kompetencje jak: motywacja, przywództwo, negocjacje, komunikacja, rozwiązywanie problemów, zarządzanie czasem, refleksja, samozarządzanie i samoocena. Włączenie narzędzia Wiki do nauczania i kształcenia poprawi efektywność pracy, produktywność i pewność siebie studentów, a te umiejętności są potrzebne do niniejszego badania, a także do przyszłej pracy. Ponadto wykorzystywanie tego narzędzia w nauczaniu i kształceniu, szczególnie w szkolnictwie wyższym, może stawiać pewne wyzwania przed wykładowcą i studentami, zwłaszcza w zakresie prezentacji i oceniania. Niniejsza praca omawia wdrożenie narzędzia Wiki w jednostce podyplomowej na australijskim uniwersytecie. Przeprowadzone badania potwierdziły, że wykorzystywanie narzędzia Wiki może podnosić umiejęt-

ności osobiste i zawodowe studentów oraz przekonuje o tym, że studenci nauczyli się i przyswoili sobie nowe koncepcje oraz nowatorską wiedzę ITS65, tj. trwałość i zieloną informatykę.

Słowa kluczowe: Wiki, wyzwania, spostrzeżenia, umiejętności, jednostka podyplomowa, Australia

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Вики-инструменты в высшем образовании: австралийская перспектива

Аннотация

Целью данной статьи является рассмотрение проблемы поддержки и содействия обучению, коммуникации и взаимодействию студентов с помощью инструмента вики на платформе «Blackboard». Вики создает возможности для поддержки и развития профессиональных навыков и личностных качеств студентов, прежде всего, таких как чтение, письмо, исследовательские умения, информационные умения, критическое мышление, принятие решений, использование технологий, цифровая и устная презентация, рисование (т.е. концептуальные карты), командная работа, владение иностранными языками. Кроме того, способствует повышению мотивации, развитию лидерства, навыков ведения переговоров, общения, решения проблем, управления временем, самоуправления самооценки. Интеграция вики в преподавание и обучение студентов повышает эффективность и уверенность в себе, так как эти навыки необходимы для обучения, а также на рабочем месте в будущем. Кроме того, использование этого инструмента в области преподавания и обучения, особенно в высшем образовании, может вызывать некоторые проблемы у преподавателя и студентов, особенно в презентации и оценивании. В этой статье будет обсуждаться реализация вики в последипломном образовании в австралийском университете. Результаты исследования подтвердили, что использование вики в последипломном образовании позволяет студентам развивать личные и профессиональные навыки, кроме того, студенты овладевают новыми понятиями и передовыми знаниями (ITS65), а именно устойчивость и экологичные информационные технологии (Green IT).

Ключевые слова: Вики, вызовы, восприятие, последипломное образование, Австралия

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Las herramientas Wiki en la educación superior: una perspectiva australiana

Resumen

Este artículo tiene como objetivo examinar los desafíos y percepciones para promover el aprendizaje del estudiante, la comunicación y la interacción a través de las herramientas wiki en la plataforma blackboard. Las herramientas wiki tienen el objetivo de mejorar las habilidades profesionales y personales de los estudiantes, desde la lectura, la escritura, la investigación, la información, el pensamiento crítico, la toma de decisiones, la tecnología, la presentación oral digital, el dibujo por ejemplo los mapas conceptuales), el trabajo en equipo y el lenguaje. También desde la Motivación, Liderazgo, Negociación, Comunicación, Solución de problemas, Gestión del Tiempo, Reflexión,

Autogestión y Autoevaluación. Además, la integración de las herramientas wiki en la enseñanza y el aprendizaje mejorará el desempeño laboral de los estudiantes, la productividad y la confianza en sí mismos, ya que estas habilidades son necesarias para el desarrollo de lose studios actuales, así como para el futuro laboral. Además, el uso de estas herramientas en la enseñanza y el aprendizaje, especialmente en la educación superior, puede generar algunos retos para el profesor y los estudiantes, especialmente en las presentaciones y la evaluación. Este artículo discutirá la implementación de las herramientas wiki en un curso de posgrado en una universidad australiana. Los resultados del estudio confirmaron que el uso de las herramientas wiki mejoran las habilidades personales y profesionales de los estudiantes, así como los nuevos conceptos y conocimiento de vanguardia de las unidades ITS65, por ejemplo Sostenibilidad y Green IT.

Palabras clave: Wiki, retos, percepciones, habilidades, cursos de posgrado, Australia

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Objectives and Content of E-module "Tools for Adaptive Learning. Learning Styles" within the MOOC Course "ICT Tools for E-learning"

Abstract

The paper presents the objectives and content of the educational module "Tools for Adaptive Learning. Learning Styles" within the MOOC course "ICT Tools for E-learning," which is being developed at the University of Ostrava as an outcome of the IRNet project. The main aim of the course is to provide both academic scholars and students with the theoretical foundation of adaptive learning that will allow them to acquire skills, to use the existing courses in the existing adaptive e-systems, and/or to create new courses and systems. The content of the course includes the following: defining basic constructs used in the course; overview of the development of adaptive learning with the use of educational technologies, its theoretical concepts, and representatives; presentation of the results of the previous researches and educational effects of adaptive (e-)learning; and some of the concepts of adaptive learning that have recently been developed at the University of Ostrava.

Keywords: MOOC course, adaptive learning, adaptive instruction, learning styles, adaptive learning tools, adaptive learning systems, intelligent adaptive learning, adaptive educational hypermedia systems, adaptive e-learning

Introduction

As a result of the development of ICT, adaptive instruction which takes learners' unique pre-requisites and needs into account is constantly being modified and updated. One of the main pre-requisites of learners is their learning style, which can be categorised according to a number of criteria based on cognitive and emotional aspects of personality. The combination of those learning styles in each individual leads to countless real ways of learning, which can be – to a certain degree – affected by the current e-learning resources. Those e-learning resources that have predefined features, which allow them to adapt to the learners' entry characteristics during instruction management or to react to their current results, are adaptive e-learning systems (AES) and/or intelligent AES.

That is why a team at the University of Ostrava has been developing the module "Tools for Adaptive Learning. Learning Styles" within the MOOC course "ICT Tools for E-learning," which should teach the operators and creators of AES and AAS as well as teachers at all school levels, including university teachers and teachers of adults, how to effectively use and implement them. Moreover, the course should provide them with conceptual knowledge, the information about the development and direction of adaptive learning, adaptive e-learning tools, information about the results of their implementation, and skills needed to use them for evaluation.

Methodological Bases

In the late 1950s, the idea of instruction using educational machines was introduced by G. Pask. He thought such instruction could be based on the conversation and game theories. Therefore, he created adaptive educational programmes.

A revival, which has resulted from the updates in the ICT area, followed the era in which there was little interest in the ideas of adaptive learning, the main reason of which was the overall state of the movements that promoted and realised different concepts of personalised learning. The revival has also been sparked by knowledge development in the area of cognitive styles, learning habits, approaches to study, learning modes, and learning styles.

Aimed at individualisation and, to a certain degree, personalisation of learning, the so-called Intelligent Adaptive Learning (IAL) has been on the rise since the beginning of the 21st century. It is defined as digital learning which is based on students working in modular learning environments where every decision they

make is captured and considered within the sound learning theory. Those decisions are then used to guide their learning experiences, to adjust their path and pace within and between classes, and also to provide their teachers with formative and summative data. Tailoring instruction to each student's unique needs, current knowledge and interests, this type of instruction ensures that all responses are in compliance with sound pedagogy. The IAL system is designed to: a) be the student's personal tutor, b) individualise the learning pace, c) regulate the student's cognitive load, d) adapt the sequence of the curriculum and associated learning experiences, e) engage students in learning through games (Dreambox, 2011). Dreambox, an adaptive programme which is being developed in the USA and Great Britain, has shown promising results (WWC Intervention Report, 2013; Harvard University, 2016).

Aimed at the development of adaptive learning in the university environment (see the aforementioned definition), the Tyton Partners paper (2016) introduces interesting facts concerning the evaluation of current e-learning products. Moreover, it presents the reasons why the approach of universities to instruction needs to be changed, thus providing reasons for the implementation of the products. As a result, instruction will become:

1. Active – technology is used to add focus to the faculty's role as instructors who shape not only the "journey," but also the learning outcomes;
2. Relational – the faculty works as subject matter experts, coaches, and guides alongside students as they are making progress through an adaptive curriculum or assessment;
3. Involved – the faculty uses digital features and functions that enable it to guide students through a course, programme, or module, and to stage interventions and interactions as needed;
4. Insightful at scale – the faculty uses learning maps, dashboards, and analytics to make the student's progress more transparent; it also uses flags or indicators to suggest potential interventions that may help the student be successful.

Moreover, the paper also provides recommendations for new users of adaptive systems and introduces 20 systems (platforms).

The annual IMS Global Learning Consortium reports are the basis for numerous impulses that encourage universities and academics to use the adaptive learning and teaching systems. The 2013 report contains a two-dimensional matrix (Implementation Challenges and Learning Impact Gain/Potential), in which online homework, adaptive learning, and formative assessment were placed 3rd. As the authors assess adaptive learning as "Clearly superior," "Straightforward/Turnkey," it is clear that they see great potential in it.

The 2015 report (IMS Global, 2016) introduces the following three new Learning Impact Trend categories, all of which contain elements of personalised learning: a) Integrated Digital Curriculum to Enable Student-centred Learning highlights new ways of managing digital content and alternative tools; b) Assess-

ment Enhancements with Digital Technology deals with the growing number of technology-based tools, and applications aimed at the assessment of student performance and learning outcomes; c) Educational Accessibility and Personalisation focuses on the increasing ability of technology to enhance learning experiences of all students, including those with physical and learning disabilities.

The results of conducted experiments are the basis for determining the trends in implementing ICT into education, i.e. the adaptive e-learning development.

Even though Beckman, Bertel, and Zander (2015) have not found the impact that instruction adapted to students' preferred learning styles has on the verbal and visual areas to be statistically important, they have learnt that such instruction influences emotional factors such as satisfaction and motivation. Since emotional factors play a key role in self-regulated learning, their importance should not be downplayed.

Surjono (2015) focuses on the effects of instruction which takes place in an adaptive system, which is able to realise instruction based on the student's learning style and preferred multimedia. He has named the adaptive system the "learning mode." He has found out that on three successive occasions, the results of students who used a particular learning mode were better than the results of students who used the system in which "their" mode was not available.

In concluding their study aimed at comparing adaptive and traditional instructions, Murray and Pérez state that "adaptive learning is touted as a potential game-changer in higher education, a panacea with which institutions may solve the riddle of the iron triangle: quality, cost, and access. Though the research is scant, this study and a few others like it indicate that today's adaptive learning systems have negligible impact on learning outcomes, one aspect of quality. There is also evidence that adaptive systems positively impact other aspects of quality such as student persistence and engagement" (Murray & Pérez, 2015).

Target Group and Course Objectives

The target group will be internally differentiated and inhomogeneous. It will contain 4 sub-groups different in educational attainment and the degree of the expected involvement in the process of implementation of adaptive e-learning. The first sub-group will consist of the students from all three stages of the Informational and Educational Technologies study programme, studying either at the University of Ostrava or at one of its partner universities. Those should be actively involved in promoting, realising, and updating the course. The second sub-group will consist of volunteers studying one of the teaching study programmes, who are expected to use the systems in their university studies, but also to draw on their

experience with e-learning in the future when teaching children and/or adults. The third sub-group will consist of academic scholars interested in using the existing adaptive courses or creating new ones. Among them will be those who could specialise in developing new processes or systems of adaptive e-learning. The final group will consist of teachers who could use the course for their own development. They might then encourage their students to use this form of learning.

The course objectives should be set in three domains. In the cognitive domain, Anderson and Krathwohl's modified, two-dimensional taxonomy of educational objectives should be used. As far as knowledge is concerned, there are four dimensions: a) factual (knowledge of facts, terms, observations), b) conceptual (knowledge of classifications, patterns, theories, models, or structures), c) procedural (knowledge of specific algorithms, techniques, methods, and criteria of the appropriate procedure), d) meta-cognitive (general learning, problem-solving, task-identifying, and self-knowledge strategies).

As far as cognitive process dimension is concerned, the objectives are at the following levels: a) remembering, b) understanding, c) implementation, d) analyses, e) evaluation, f) creativity.

If the knowledge dimension is used as the basis for the presentation of the draft of the course objectives, the course participants will learn:

a) *factual knowledge* and will be able to use it to realise particular cognitive processes:
   - names of the important figures and institutions focusing on adaptive learning,
   - names of companies and their products related to adaptive learning, and
   - titles of studies or academic papers,
b) *conceptual knowledge:*
   - knowledge of definitions/basic terms;
   - knowledge of theoretical concepts of adaptivity in education, adaptive learning/e-learning, cognitive styles, learning styles, and approaches to learning;
   - knowledge of the results of particular researches or so-called good practice; and
   - knowledge of selected models of adaptive (e-)learning,
c) *procedural knowledge:*
   - knowledge of the stages of the implementation of adaptive learning, including the evaluation stage and its effects;
   - knowledge of the main activities of the teacher/learner in adaptive learning;
   - knowledge of the processes realised by the selected adaptive e-learning systems; and
   - knowledge of limits, restrictions, and risks associated with the implementation of AES and AAS,
d) *meta-cognitive knowledge:*
   - knowledge of information resources regarding AES/AAS-related products, and
   - knowledge of AES/AAS-related professional networks and communities.

In the *psychomotor domain*, the objectives will be aimed at the acquisition of the following skills:

- skills needed to be able to learn in the AES/AAS environment,
- skills needed to adapt to the changes in the AES/AAS technical and programme layout,
- teachers' skills needed to implement and encourage the use of AES/AAS in instruction,
- skills needed to reflect and evaluate particular processes and their outcomes,
- skills needed to use the evaluative (feedback) information for revision of learning processes and evaluation of students.

In the *affective domain*, it will be the following objectives:

- convincing the course participants to accept the AES and AAS systems as effective and useful learning tools;
- a quick and appropriate reaction to scientific studies, "good practice" examples, and system updates;
- integration of AES, AAS, and other ICT components into the "personal educational tools and learning" folder and into the complex environment of an educational institution.

Content of Course Sub-modules

The one-term course consists of eight sub-modules. It is based on the chronological principle and on the from-theory-to-practice principle. Each sub-module has specific content, the understanding of which is tested at the end of the course through a distributed, formative, didactic multiple choice test. The results of the test can lead to the participant being advised to re-learn the sub-module curriculum, to pay more attention to the informational resources, and/or to consult the course tutor. At the end of the course, the participants need to take an exit (summative) test which they need to pass in order to receive a certificate of completion of the course.

Sub-module 1: Meaning and Conception of Adaptive Learning

Content:

- Definition of adaptive learning (AL),
- Basic terms,
- Meaning and potential of AL contemporary conceptions of education,
- Contribution of IAL (Intelligent Adaptive Learning) (Dreambox Learning),
- AL personalities (Pask),

- Selected AL conceptions (adaptation to the needs, performance, cognitive styles, learning styles, approaches to learning, types of intelligence, information perception techniques (through Eye tracking), etc.),
- Traditional vs. adaptive learning (Murray, Pérez).

Sources:

Murray, M. C., & Pérez, J. (2015). Informing and performing: A study comparing adaptive learning to traditional learning.

Leveraging intelligent adaptive learning to personalize education. (2011). Dreambox Learning.

Sub-module 2: Development of Theory and Practice of Adaptive Learning

Content:

- Outline of the AL development,
- Theoretical concepts of AL,
- Programmed learning (Skinner),
- Models of adaptive learning (Kostolányová),
- Adaptive learning research results,
- Current situation of adaptive learning at universities,
- Future of adaptive learning at universities (Tyton).

Sources:

Kostolányová, K. (2012). *The theory of adaptive e-learning*.

Learning to adapt. The evolution of adaptive learning in higher education. (2016). Tyton Partners.

Sub-module 3: Learning Styles, Cognitive Styles, and Approaches to Learning in Adaptive Learning

Content:

- Cognitive style (Mareš);
- Learning styles, definitions, classification of learning styles;
- Diagnostic tools for determining learning styles:
  - *Kolb's Learning Style Inventory (LSI)* by D. Kolb (1984),
  - *Inventory of Learning Styles (ILS)* by D. J. Vermunt,
  - *Learning Style Inventory (LSI)* by Dunn and Dunn,
  - *VARK Questionnaire (Visual, Autal, Read/Write, Kinesthetic)* by Fleming and Mills (1992),
  - *Thinking Style Inventory (TSI)* by Sternberg and Wagner (1999),
  - *Approaches and Study Skills Inventory (ASSIST)* by Entwistle (1996),
  - *Myers-Briggs Type Indicator (MBTI)* by Briggs and Briggs-Myers,
  - *Felder-Silverman Learning Style Model (FSLSM)* by Felder and Silverman (1988).

Sources:
Mareš, J. (1998). Pupils' learning styles.
Beckmann, J., Bertel, S., & Zander, S. (2014) Performance & emotion – A study on adaptive e-learning based on visual/verbal learning styles.

Sub-module 4: Adaptive E-learning and E-assessment and Their Theoretical Solutions
Content:
- Four evolutionary variants of adaptive e-learning: macro-adaptive approach, aptitude-treatment interaction approach, micro-adaptive approach, a constructivist-collaborative approach (Mödritscher);
- Adaptive e-learning systems (AES);
- Adaptive e-assessment systems (AAS);
- Effects of adaptive learning (Surjono);
- Three models of adaptive e-learning (content model, learner model, instruction model) (van Selers).

Sources:
Mödritscher, F., Garcia-Barrios, V. M., & Gütl, Ch. (2004). The past, present and the future of adaptive e-learning.
Surjono, H. D. (2015). The effects of multimedia and learning styles on student achievement in online electronics courses.
van Seters, J. R., Ossevoort, M. A., Tramper, J., & Goedhart, M. J. (2012). The influence of student characteristics on use of adaptive e-learning material.

Sub-module 5: Adaptive E-learning and E-assessment (AES and AAS) Tools
Content:
- UALS – User-centric Adaptive Learning System (Huang),
- AdeLE – Adaptive e-Learning with Eye tracking (University of Applied Science, Graz) (Mödritscher et al.),
- Adaptive learning management system based on Felder and Silverman's learning styles and mashup (Chang),
- AEHS – Adaptive Educational Hypermedia Systems (Somyürek).

Sources:
Huang, S. L., & Shiu, J. H. (2011). A User-centric Adaptive Learning System for E-learning.
Chang, Y. H., Chen, Y. Y., Chen N. S., Lu, Y. T., & Fang, R.J. (2015). Yet another adaptive learning management system based on Felder and Silverman's learning styles and mashup.
Somyürek, S. (2015). The new trends in Adaptive Educational Hypermedia Systems.

Sub-module 6: Development of Adaptive E-learning Systems
Content:
- Gagné's theory of learning elements (steps),
- ADDIE model as an approach to the creation of educational programmes (PHARE texts),
- AMDPC adaptive learning system (Adaptation with Multi-Dimensional Personalisation Criteria) (Yang).

Sources:
Yang, T. Ch., Hwang, G. J., & Yang, S. J. H. (2012). Development on an adaptive learning systems with multiple perspectives base on students' learning styles and cognitive styles.

Sub-module 7: Adaptive E-learning System at University of Ostrava
Content:
- A brief overview of the development of the interest of the Pedagogical Faculty of the University of Ostrava in the implementation and research of AES,
- Barborka LMS,
- Three-element model scheme,
- Student module,
- Author module,
- Expert module (Virtual Teacher).

Sources:
Kostolányová, K. (2012). *The theory of adaptive e-learning*.
Czeczotková, B., & Prextová, T. (2014). Creation of study materials for adaptive learning.

Sub-module 8: Adaptive E-learning System at Partner University (IRNet Project) where Course Takes Place:
Content:
- Type of installed AES,
- AES components (modules, tasks),
- Use of AES in regular instruction,
- Research/description of the effects of learning in AES.

Sources:
Malach, J., Kostolányová, K., Chmura, M., Nagyová, I., & Prextová, T. (2016). The conceptual bases for designing module "Tools for adaptive learning and learning styles" within MOOC course "ICT tools for e-learning" [in print].
Malach, J., Kostolányová, K., Chmura, M., Nagyová, I., & Prextová, T. (2016). Objectives and content of e-module "Tools for adaptive learning. Learning styles" within the MOOC course "ICT tools for e-learning" [in print].

Conclusion

The preparation of the syllabus of the study module and its transformation into online study materials – which will include short thematic video sequences, control tests, and the final test – requires its authors to have deep knowledge of the fundamental pedagogical and technological aspects of adaptive e-learning.

The paper describes the authors' effort to present the issue of adaptive e-learning to the students of the module from a variety of viewpoints, particularly from the psychological, pedagogical, and technological ones. The audio-visual presentation of the curriculum, the use of feedback, and the presentation of the content in an interesting manner – which will be achieved through the use of historical and comparative information, and the author's own experience with designing and using adaptive e-learning systems used at the University of Ostrava – seem to be potentially suitable didactic tools for the practical implementation of the course.

Acknowledgments

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Josef Malach, Kateřina Kostolányová, Milan Chmura, Ingrid Nagyová, Tatiana Prextová

Cele i zawartość e-modułu „Narzędzia do adaptacyjnego kształcenia. Style kształcenia” stworzonego w ramach kursu MOOC „Narzędzia teleinformatyczne dla e-learningu”

S t r e s z c z e n i e

Praca przedstawia cele i zawartość modułu edukacyjnego „Narzędzia do adaptacyjnego kształcenia. Style kształcenia” stworzonego w ramach kursu MOOC „Narzędzia teleinformatyczne dla e-learningu”, który jest opracowywany na Uniwersytecie Ostrawskim jako wynik projektu IRNet. Głównym celem kursu jest zapewnienie zarówno pracownikom akademickim, jak i studentom teoretycznych fundamentów kształcenia adaptacyjnego, które pozwolą im przyswoić umiejętności korzystania z narzędzi do adaptacyjnego kształcenia, korzystanie z istniejących kursów w adaptacyjnych e-systemach i/lub tworzenie nowych kursów oraz systemów. Kurs zawiera następujące elementy: definicję podstawowych konstrukcji użytych w kursie; omówienie rozwoju adaptacyjnego kształcenia przy użyciu technologii edukacyjnych, jego koncepcji teoretycznych i przedstawicieli; prezentację wyników wcześniejszych badań oraz efektów edukacyjnych adaptacyjnego (e)kształcenia i pewnych koncepcji adaptacyjnego kształcenia, które zostały niedawno opracowane na Uniwersytecie Ostrawskim.

S ł o w a k l u c z o w e: kurs MOOC, kształcenie adaptacyjne, nauczanie adaptacyjne, style kształcenia, adaptacyjne narzędzia kształcenia, adaptacyjne systemy kształcenia, inteligentne kształcenie adaptacyjne, adaptacyjne hipermedialne systemy edukacyjne, adaptacyjny e-learning

Josef Malach, Kateřina Kostolányová, Milan Chmura, Ingrid Nagyová, Tatiana Prextová

Цели и содержание электронного модуля «Инструменты адаптивного обучения. Стили обучения» в рамках МООС курса «ИКТ-инструменты для электронного обучения»

А н н о т а ц и я

В статье представлены цели и содержание образовательного модуля «Инструменты для адаптивного обучения. Стили обучения» в рамках МООС курса «ИКТ-инструменты для элек-

тронного обучения», который разрабатывается в университете Остравы как результат проекта IRNet. Основная цель курса состоит в том, чтобы познакомить преподавателей и студентов с теоретическими основами адаптивного обучения, что позволит им приобрести навыки, использовать существующие курсы в адаптивных электронных систем, и / или создавать новые курсы и системы. Содержание курса включает в себя следующие аспекты: определение основных понятий, используемых в курсе, обзор развития адаптивного обучения с использованием образовательных технологий, его теоретических концепций и представителей; представление результатов предыдущих исследований и образовательных эффектов адаптивного обучения, некоторые из концепций адаптивного обучения, которые недавно были разработаны в университете Остравы.

К л ю ч е в ы е с л о в а: MOOC курс, адаптивное обучение, стили обучения, адаптивные средства обучения, адаптивные обучающие системы, интеллектуальное адаптивное обучение, адаптивные образовательные системы гипермедиа, адаптивное электронное обучение

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Objetivos y contenido de módulo “Herramientas para el aprendizaje adaptativo. Estilos de Aprendizaje” en el marco del MOOC “Herramientas TIC para el E-Learning”

R e s u m e n

Este artículo presenta los objetivos y contenidos del módulo “Herramientas para el Aprendizaje Adaptativo. Estilos de Aprendizaje”, dentro del MOOC “Herramientas TIC para el E-Learning” que se está desarrollando en la Universidad de Ostrava en el marco del proyecto europeo IRNET. El objetivo principal del curso es proporcionar al profesorado y al alumnado la base teórica del aprendizaje adaptativo que les permita adquirir habilidades, utilizar los cursos existentes en los e-sistemas adaptativos existentes y/o crear nuevos cursos y sistemas. El contenido del curso incluye lo siguiente: definición de los constructos básicos utilizados en el curso; visión general del desarrollo del aprendizaje adaptativo con el uso de tecnologías educativas, sus conceptos teóricos; presentación de los resultados de las investigaciones anteriores y efectos educativos del e-aprendizaje adaptativo, y algunos de los conceptos de aprendizaje adaptativo que se han desarrollado recientemente en la Universidad de Ostrava.

P a l a b r a s c l a v e: MOOC, aprendizaje adaptativo, instrucción adaptativa, estilos de aprendizaje, herramientas de aprendizaje adaptativo, sistemas de aprendizaje adaptativo, aprendizaje adaptativo inteligente, sistemas educativos adaptativos hipermedia, e-learning adaptativo

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The Roadmap of Collaboration Skills from Programmed Teaching to E-learning

Abstract

The article presents the comparative analysis of the basic principles of programmed teaching, and constructivism for their subsequent use in creating open learning didactics in view of the collaborative approach and collaboration-oriented activities. What is investigated is the fact that the same idea forms the basis of the two paradigms (constructivism and personal learning): the humanistic character of education, taking individual characteristics into account, the activity-based approach, and the collaborative activity of a student. The assumptions about increasing the efficiency of the educational process, based on the ideas of integrative unity of these concepts, are justified. Further development of the personally-oriented approach in terms of such interconnected approaches as e-learning, connectionism, and combined learning is discovered. Simultaneously, programmed teaching – also experiencing its renaissance – can be used effectively and purposefully in educational collaboration in connection with other paradigms.

K e y w o r d s: collaboration, programmed teaching, personally-oriented approach, constructivism, e-learning

Introduction

Knowledge of the course and the regularity of the learning process are the starting points in formulating the accuracy and organisation of the educational process (Grzesiak, 2010). For this reason, modern teaching emphasises the dialectical unity of teaching and learning, conditioning the mutual coexistence of both of these processes (Strelau, Jurkowski, & Putkiewicz, 1975).

J. S. Bruner emphasises that "devising ways of teaching young can't forget about what we know about the development – with its conditions and potential opportunities" (Bruner, 1974, p. 20). The same author puts forward four basic requirements for the teaching theory:

1. The theory of teaching should specify what experience students develop most effectively in an inclination to learn.
2. The theory of teaching must identify the ways to assign to any resource of knowledge such a structure that makes this knowledge most easily digestible for the student.
3. The theory of teaching must specify the most efficient order in which the material to assimilate is going to be presented.
4. The theory of learning must specify the nature and frequency of use of rewards and punishments in the process of learning and teaching.

Within the modern educational paradigm, the 21st century skills concept (Abbott, 2013) is motivated by the belief that teaching students the most relevant, useful, in-demand, and universally applicable skills should be prioritised in today's schools, and by the related belief that many schools may not sufficiently prioritise such skills or effectively teach them to students. The basic idea is that students, who will come of age in the 21st century, need to be taught different skills than those learned by students in the 20th century, and that the skills they learn should reflect the specific demands that will be placed upon them in a complex, competitive, knowledge-based, information-age, technology-driven economy and society.

While the specific skills deemed to be the "21st century skills" may be defined, categorised, and determined differently, the term does reflect a general – if somewhat loose and shifting – consensus. The following list (Abbott, 2013) provides a brief illustrative overview of the knowledge, skills, work habits, and character traits commonly associated with the 21st century skills:

- critical thinking, problem solving, reasoning, analysis, interpretation, synthesising information;
- research skills and practices, interrogative questioning;
- creativity, artistry, curiosity, imagination, innovation, personal expression;
- perseverance, self-direction, planning, self-discipline, adaptability, initiative;
- oral and written communication, public speaking and presenting, listening;

- leadership, teamwork, collaboration, cooperation, facility in using virtual workspaces;
- information and communication technology (ITC) literacy, media and internet literacy, data interpretation and analysis, computer programming;
- civic, ethical, and social-justice literacy;
- economic and financial literacy, entrepreneurialism;
- global awareness, multicultural literacy, humanitarianism;
- scientific literacy and reasoning, the scientific method;
- environmental and conservation literacy, ecosystems understanding;
- health and wellness literacy, including nutrition, diet, exercise, and public health and safety.

While many individuals and organisations have proposed definitions of the 21st century skills, and most states have adopted learning standards that include or address cross-disciplinary skills, the following are three popular models that can serve to illustrate the concept and its applications in education (Abbott, 2013):

- Framework for 21st Century Learning (The Partnership for 21st Century Skills),
- Four Keys to College and Career Readiness (David T. Conley and the Educational Policy Improvement Center),
- Seven Survival Skills (Tony Wagner and the Change Leadership Group at the Harvard Graduate School of Education) (Suto, 2013).

In lieu of the fact that leadership, teamwork, collaboration, and cooperation are considered to be an integral part of the 21st century marketable skills scope, the objective of this paper is to consider the placement of collaborative activities and skills across educational paradigms.

Collaboration is commonly defined in various sources as: 1) an act or process of working with another person or group of people to create or produce something; a piece of work produced by two or more people or groups of people working together (MWDO, 2017); 2) "united labour, co-operation; especially in literary, artistic or scientific work" (OD, 2015); 3) "To work jointly with others or together especially in an intellectual endeavor" (WTNID, 1993).

In education and business coaching, collaboration is referred to as two or more people working together to accomplish a certain objective, to achieve shared goals (Boston KM, 2014). It is a recursive (Marinez-Moyano, 2006) process where two or more people or organisations work together to realise shared goals – which is more than the intersection of common goals seen in co-operative ventures, but rather a deep, collective determination to reach an identical objective – by sharing knowledge, learning, and building consensus. Structured methods of collaboration encourage introspection of behaviour and communication (Spence, 2006). These methods specifically aim to increase the success of teams as they engage in collaborative problem solving.

It exists in two main forms:

- *synchronous*, comprising of Same Place, Same Time and Different Place, Same Time models; and
- *asynchronous*, comprising of Same Place, Different Time and Different Place, Different Time models (Boston KM, 2014).

Principle models and corresponding features of collaboration are:

1. Same Time, Same Place: discussion, brain storm, communicative skills, access to documents, access to educator, polling, project/task management, rosters of multiple types, calendaring/scheduling;
2. Same Time, Different Place: lecture, discussion, workshop, research, tutoring, conference, file sharing, resources;
3. Different Time, Same Place: resources, control;
4. Different Time, Different Place: message exchange, review, assessment, resources.

Participants of reciprocal educational collaboration include universities, educators, and students. In turn, student's collaboration environment includes: 1) students from university, 2) teaching staff of university, 3) administrative staff, 4) experts, 5) peers, 6) tutors (MOOC), 7) family, and 6) employers.

Among the *indicators of effective collaboration* are: group work, shared responsibility, shared decision making, co-depended work (Townsend, DeMarie, & Hendrickson, 1998). The given indicators are traced across educational paradigms.

Programmed teaching

In 1954 B. F. Skinner embarked upon a series of studies designed to improve teaching methods for spelling, math, and other school subjects by using a mechanical device that would surpass the usual classroom experience. General theoretical basis of programmed instruction created an American psychologist B. F. Skinner was based on the following principles (Tollingerová, Knězů, & Kulič, 1966; Heba, Kapounova, & Smyrnova-Trybulska, 2013):

- the principle of active response;
- the principle of strengthening/confidence;
- the principle of small steps; rule one's own pace;
- the principle of management.

He believed the classroom had disadvantages because the rate of learning for different students was variable, and reinforcement was also delayed due to the lack of individual attention. Since a personal tutor for every student was usually unavailable, Skinner developed a theory of programmed learning that was to be implemented by teaching machines (Wleklinski, 2014).

The teaching machine is mainly composed of a programme, which is a system of combined teaching and test items that carries the student gradually through the material to be learned. The "machine" utilises a fill-in-the-blank method on either a workbook or in a computer. If the answer is correct, the subject gets reinforcement and moves on to the next question. If the answer is incorrect, the subject studies the correct answer to increase the chance of getting reinforced next time (Wleklinski, 2014).

The teaching machine is merely a device for presenting the set of frames of which the programme is composed. However, it is not supplementary but all-inclusive. The programme will do all the teaching through a response/reward mechanism. Skinner also noted that the learning process should be divided into a large number of very small steps and reinforcement must be dependent upon the completion of each step. Skinner suggested that the machine itself should not teach, but bring the student into contact with the person who composed the material it presented. He believed this was the best possible arrangement for learning because it took into account the rate of learning for each individual student (Wleklinski, 2014). In such a fashion, a rudimentary form of limited collaboration was introduced – within the template of unilateral synchronous teacher-to-student model.

A Personally-oriented Approach

Traditionally, a personally-oriented approach is considered in the framework of developing education and provides a maximum consideration of individuality of a student – the unique identity of each person performing their livelihoods as a subject of lifelong development (Yakimanskaya, 1966, p. 9). I. S. Yakimanskaya rightly points that "[i]ndividuality is a generalized characteristic feature of a person, firm expression of which … defines individual style of activity as a personal learning" (Yakimanskaya, 1966, p. 19). The purpose and objectives of personally-oriented learning is to help students understand themselves as individuals, "to determine and reveal their capabilities and to establish identity in implementation of personally meaningful and socially acceptable forms of self-identity, self-fulfillment and self-assertion" (Bim-Bad, 2003, p. 134).

The role of a teacher in an organisation of developing learning is in creating conditions able to encourage disclosure of every student. In a system of principles that reflect the current understanding of the organisation of personally-oriented learning, the following are included:

- education is not a self-aim, but a means of developing a student's abilities and inclinations;

- each student is unique and individual;
- a student is a subject of educational process;
- a student is a subject of support in training;
- a student is provided with a freedom to choose the content (according to the curriculum), means and methods of learning material, and organisation of training.

Specific collaborative features of a personally-oriented approach comprise:

- providing positive emotional contact in "teacher-student" and "student-student" systems based on cooperation, co-creation, and motivation to succeed;
- recording the value of thought and academic progress of each participant of the educational process, and a tolerant attitude towards them;
- assessing learning achievements not only for compliance with educational standards, but also as stages of individual personal growth of each student.

Thus, the implementation of a personally-oriented approach in learning enables personal development of each student with the most complete view of its specific features. The same aim of a maximum possible development of personality and individuality demonstrates the constructivist didactics and open e-learning didactics.

Constructivism

The category of "constructivism" is derived from the Latin words "constructivus" (connected with construction, designing) and "iconstructio" (accession, construction). Construction in a process of learning is defined as "a means of deepening and broadening of received theoretical knowledge and development of creativity, inventive interests and aptitudes of pupils" (TMWD, 2017). Constructivism is argued by modern researchers to be a theory of knowledge identifying humans as generating knowledge and meaning from an interaction between their experiences and their ideas (Tobias & Duffy, 2009). At the early stages of constructivism paradigm development, J. Piaget introduced the concept of knowledge *schemata – a framework of interaction* between human experiences and their reflexes or behaviour patterns (Piaget, 1967).

In the basis of its ideas, educational philosophy of constructivism uses activity and consideration of individual, "subjective" experience of students and pupils. Having first appeared in the writings of J. Piaget, J. Brunner, J. Dewey, G. Gardner, the ideas of constructivist didactics are embodied in many proprietary methods of self-development and "free education" (M. Montessori, R. Steiner, C. Freinet, etc.).

The essential collaborative approach within the constructivist paradigm was derived by L. Vygotsky, known for his theory of social constructivism, who be-

lieved that learning and development are collaborative activities and that children are cognitively developed in the context of socialisation and education (Greener & Wakefield, 2015). The perceptual, attention, and memory capacities of children are transformed by vital cognitive tools provided by culture, such as history, social context, traditions, language, and religion. For learning to occur, the student first makes contact with the social environment on an interpersonal level and then internalises this experience.

In terms of this approach, collaboration at the conceptual level involves the following traits and features:

- awareness,
- motivation,
- self-synchronisation,
- participation,
- mediation,
- reciprocity,
- reflection, and
- engagement.

It is obvious that the same idea forms the ground for the two paradigms (constructivism and personal learning): the humanistic character of education, consideration of individual characteristics, the activity-based approach, and the activity of a student. E. S. Polat underlines that "both areas have grown from the core values of humanistic psychology and pedagogy, which is the antithesis of traditional, authoritarian pedagogy" (Polat, 2006, p. 16). As a result, there is a justified assumption of increasing the efficiency of the educational process, based on the ideas of integrative unity of these concepts. Let us discover their content and functional aspects in details and demonstrate how they can be used in the implementation of e-learning.

Constructivism considers the collaborative position of a student as being active, self-governing, mainly based on own constructive activity, only from time to time controlled externally by a teacher (Mandl, Koop, & Dvorak, 2004, p. 27). The modern view of foreign researchers and educators on the organisational aspects of the educational process is reflected in the fact that a teacher creates conditions for students' self-development, providing them with assistance (if it is necessary), but does not provide fully complete knowledge, models, algorithms, and methods for solving problems. This is similar to the main provisions of the inverted learning, which is important in the implementation of e-learning. A teacher's activity is aimed at forming each student' independence by using the instruments of self-construction of their previous experience and personal learning environment, which includes such components as electronic personal learning environment (Dubs, 1995, p. 30).

For E. S. Polat, the system of the basic collaborative principles of constructivism didactics consists of the following provisions (Polat, 2006, pp. 40–41):

- cognitive activity is an active process of constructing by a student of the new knowledge generated from earlier experience;
- knowledge is impossible without motivation and a sense of purpose of cognition;
- the basis of experience formation is the intellectual activity of a student which allows pedagogical motivation of his or her mental activity (encouraging thinking out aloud, statements of assumptions, hypotheses, etc.);
- learning process is effective in terms of communication and social activity of a student;
- cognitive activity is linked with a student's real life;
- training is based on the creation of conditions (choice of methods, learning, assessment tools), emphasising the intellectual dignity of each student, in particular the value of their point of view, personal approach to solving problems, unique vision, personal style of thinking.

Presently, considering the tasks of learning, and especially its specific focus on the individual, the constructivist approach is the most appropriate approach to systematic knowledge creation and designing activities in accordance with the final result. This approach is currently used for the development of conceptual positions of open education that involves the extensive use of e-learning environment and e-learning technologies.

E-learning

As M. Weiser stated, "the most profound technologies are those that disappear" (Weiser, 1991, p. 94). He was the first scholar to define ubiquitous computing as an environment where the computer is integral but embedded into the background of daily life. Applying this concept to the education field, electronic learning (e-learning), or more specifically ubiquitous learning (u-learning) involves learning in an environment where "all students have access to a variety of digital devices and services, including computers connected to the Internet and mobile computing devices, whenever and wherever they need them" (van 't Hooft, Swan, Cook, & Lin, 2007, p. 6). In the education field, "ubiquitous computing allows us to envision a classroom in which the teacher remains focused on his or her field of expertise (e.g., math or social studies) while still utilizing technology to enhance student learning" (Crowe, 2007, p. 129). If information is to be used in multiple contexts, we must ensure multiple contexts learning strategies and ensure that students can widely use the educational information materials. Proceeding from the foregoing, it is possible to formulate some theses to be used in the implementation of innovative educational technologies and e-learning which didactics is created in nowadays:

1. Learning should be an active process. An active process is to provide students with tasks for using information in practical situations. Such information may be in a single learning environment of the institution and created by all players.
2. Students must construct their own knowledge instead of a personal perception without converting the data from teachers; students should be active participants in filling the educational space of the institution.
3. Joint and cooperative learning must be implemented. Teamwork is a life experience of students to work in groups that makes it possible to use successes of other students and to learn from them.
4. Students are required to be provided with the ability to control the learning process. This is possible by using formative assessment ideas – most MOOC use pear-to-pear evaluation technology.
5. Students should be given time to think and for retrospective analysis of their activity (reflection). Such reflection is desirable to be constant and open.
6. Students should feel that learning has a personal meaning for them. Therefore, it is useful for study materials to contain examples that are close to the interests of students, curious as additional information, and take into account their individual needs and learning dominating styles.
7. Learning should be interactive in order to ensure a high level and social significance. Training is an extension of the space of new knowledge, skills, and relationships with referring to data bases and using the resource of educational environment, including electronic ones.
8. The learning space formed by a teacher consists of the following components: activity, constructive cooperation, collaboration, commitment, complexity, content, communicativeness, reflectivity.

Of all the educational paradigms under consideration, e-learning relies almost exclusively on collaboration as an educational template, skills formation, assessment tool, and ultimate objective.

Forms of collaboration comprise of 2 groups:

- relationship oriented: affinity networks, learning communities; and
- task oriented: communities of practice, project communities.

Needs of collaboration in an open e-learning environment include the following issues:

- sharing information and documents;
- collaboration across physical locations;
- sharing creation and access to work products;
- identifying and accessing external experts and resources;
- classroom with easy-to-use tools;
- document repository;
- management tools, including scheduling and task management;
- lists, tables, rosters, tasks, score cards;
- communication tools, including e-mail, discussions, conferencing, voting.

Connectionism

In developing innovative approaches to implementing e-learning, it is necessary to consider ideas of connectionism, as information and educational space, including electronic, in which students, teachers, and administration cooperate and study, is a network where all nodes are data carriers (human resources, scientific and methodical works, library and Internet resources), and edges are connections between network nodes. It is known that the level of the university depends on established information and educational space. Leading universities have a well-developed and diverse network that works almost constantly, updates and develops, and is absolutely interactive. The nodes of this network are teachers-researchers, teachers-methodists, teachers-multipurpose, laboratory facilities, experimental basis, a powerful library, developed web resources. Students are in a constant contact with these nodes. In time they also become the relevant nodes of such an educational network.

Connectionism, proposed by G. Siemens (Siemens, 2014), is based on theories of network, chaos, hard-organised and self-organising systems. Study, by Siemens, is a process that takes place in an uncertain, vague, and changing environment. This process cannot be fully controlled by an individual. Study can be supported from the outside and is a combination of information sources. This means a creation of a personal learning environment for all students. This integration of the units allows us to rise to a higher level of understanding. Connectionism emphasises the transient, dynamic nature of learning. The principles of connectionism are as follows:

- Learning and knowledge require diversity of approaches and opportunities to choose an effective approach.
- Study is a process of network forming, connecting specialised nodes and sources of information materials.
- Knowledge is in a network that is constantly changing.
- Knowledge can exist separately from a person. Technology helps us in learning.
- The ability to learn new things means more than accumulated knowledge. The ability to extend is more important.
- Learning and cognition happen all the time – they are always a process, but never a condition.
- The key skill today is the ability to see connections between fields of knowledge, concepts, and ideas;
- Timeliness (accuracy, renovation of knowledge) is a necessary feature of modern learning. Instead of folders there come flows.
- Teaching is a decision making. In the light of the changing reality, we constantly have to make a choice of what to teach. The right choice made today may be wrong tomorrow because of changed conditions in which decisions were made.

The use of ICT in the learning process enables us firstly to increase the power of an information and education network (appearance of new resources), and collaborative educational environment, and secondly to increase the links between nodes (web 2.0) and take out students outside the campus (you can involve third-party experts from industry and business). Yet, it should be noted that the power increases gradually, and most universities still do not feel it. Against the background of the increasing average age of the teaching staff, changes are almost absent. Therefore, one of the priorities is to improve the qualification of teachers in ICT usage in the learning process, and the services and technologies of creation and development of a modern educational environment of the institution.

Siemens argues that behaviourism, connectionism, and constructivism can be used in learning in knowledge-environments distributed online and obtaining the necessary meta-skills. What is important is not the "know how," but "know where." Connectionism theory and constructivism can be used in massive open online courses (MOOC) and in the development of didactic basics of open e-learning.

Connectionism theory describes learning as a process of creating relationships and developing networks. It is based on the premise that knowledge exists in a world, not in the mind of a person. From a practical point of view, education should focus on where to find information (flows) and how to measure these flows, rather than trying to add it in the memory of a person.

Combined Learning

In recent years, information technologies have dramatically changed the education in the leading countries of the world. It is almost impossible to imagine the learning process without social services (Web 2.0). There are new pedagogical approaches (for example connectionism), and massive open distance learning courses, which train hundreds of thousands of listeners for free. At the same time, among modern approaches to learning the leader is still combined or blended learning. By definition of the Sloan Consortium, education is considered to be combined (mixed) if distance education is from 20% to 80%.

At this stage combined learning is a purposeful process of gaining knowledge and skills in the integration of classroom and extracurricular academic activities by subjects of educational process on the basis of use and addition of technologies of traditional, electronic, remote, and mobile learning with a student's self-control of time, place, route, and rate of learning.

A combination of traditional and distance learning allows a teacher to use the strengths of each learning environment to achieve academic goals. The ultimate

goal of combined learning lies in improving the efficiency of learning by using systematic evaluation of related variables and integration of learning tools.

A combination of learning contributes to the optimisation of resources and time, and learning becomes more open; students have opportunities to learn to manage their learning and tend to be ready for the successful completion of the course.

The principles of combined learning are as follows (Abdel Bary, 2006):

1. One should focus on the goals, rather than on the method of delivery of course materials.
2. Different personal learning styles need support to achieve learning objectives.
3. Each participant brings different knowledge into the learning process.
4. In many cases, the most effective strategy is to meet the needs in a timely manner.

There are six reasons for the use of combined training (Dubs, 1995):

1. High educational level,
2. Access to knowledge,
3. Social interaction,
4. Personal learning,
5. Cost-effectiveness, and
6. Ease of viewing.

According to J. Berzina, the key to combined training is the right choice of social services at the lowest possible cost. Achieving this, in principle, is possible because of clear goals and quality educational designing.

According to the Customer Satifaction Evaluation Model assessment, the top ranking collaborative tool falls into the social media category. The social network engines are designed to store, share, promote, reference, and review academic output. The network type interface is designed to facilitate students' and researchers' personal collaboration, navigation through the thematic span of academic output, uploaded into public domain.

Combined study is recommended to be designed with using the ADDIE technology and taxonomy of Bloom (Abdel Bary, 2006). In a learning management system and various social services, the student's activity during whole educational process is planned and implemented. This increases a student's responsibility; he or she is not just learning a specific discipline, but learning to learn in collaboration.

Conclusion

To summarise, we note that the analysis of the main provisions of programmed teaching and constructivist didactics shows that it can be understood as a pedagogical philosophy: an ideology that is close to a personally-oriented approach.

The affinity of the personally-oriented paradigm of learning and constructivist pedagogy can be traced in several positions, particularly rich in content and functional filling. In constructivist pedagogy, in personally-oriented learning, and in e-learning, the main figure of the whole educational process is a student. Objectives of constructivist pedagogy, personally-oriented learning, and e-learning are to create conditions for the development of the personality and individuality of each student.

However, the content and functional fullness of personally-oriented approach concepts, programmed teaching, constructivist pedagogy, and e-learning have originality and distinction. Considering learning as an active process in which a student constructs his or her own knowledge at the situational interaction with the teacher, constructivist pedagogy specifies targets of an individual approach to learning and suggests ways to achieve them. Thus, the principles of training remain unchanged: activity, reliance on subjective experience, and independence of a student are the main factors of developmental education. Focusing on the development of personality and individuality, education constructivism, in fact, offers a way to achieve the goal of developing education, thereby reflecting the tactics of the educational process within the framework of the strategic statements of the personally-oriented educational paradigm. At the same time, e-learning forms the information-educational environment in which contact and collaboration between students and teachers happens and, as a result, generates an information network of the university. However, this network also aims at forming the independence of each student, as it provides management of self-construction of their experience, including the use of a personal educational learning environment. Therefore, today the usage of electronic environment and e-learning is the basis for the development of conceptual positions of open education in connection with some components of programmed teaching and learning.

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Mapa umiejętności w zakresie współpracy od nauczania programowanego do e-learningu

S t r e s z c z e n i e

W artykule przedstawiono analizę porównawczą podstawowych zasad nauczania programowanego oraz konstruktywizmu dla ich późniejszego zastosowania przy tworzeniu dydaktyki otwartego kształcenia z uwzględnieniem podejścia zorientowanego na współpracę. Zbadano fakt, że podstawą dwóch paradygmatów (konstruktywizmu i osobistego kształcenia) jest ta sama koncepcja: humanistyczny charakter edukacji, uwzględnienie indywidualnych charakterystyk, podejście oparte na aktywności i działalność studenta zorientowana na współpracę. Założenia dotyczące podniesienia wydajności procesu edukacyjnego, oparte na koncepcjach integracyjnej jedności tych pojęć, są uzasadnione. Odkryty został dalszy rozwój podejścia zorientowanego na jednostkę pod względem takich wzajemnie ze sobą powiązanych podejść, jak: e-learning, koneksjonizm i kształcenie mieszane. Jednocześnie nauczanie programowane, także przeżywające swój renesans, może być efektywnie i celowo wykorzystywane we współpracy edukacyjnej w połączeniu z innymi paradygmatami.

S ł o w a k l u c z o w e: współpraca, nauczanie programowane, podejście zorientowane na jednostkę, konstruktywizm, e-learning

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Дорожная карта навыков сотрудничества от программированного обучения к электронному обучению

Аннотация

Сравнительный анализ основных принципов программированного обучения и конструктивизма для их последующего использования в создании дидактики открытого обучения с использованием совместной деятельности, представлен в статье. Исследуется факт, что в основе этих двух парадигм (конструктивизм и личное обучение) лежат следующие идеи: гуманистический характер образования, учет индивидуальных особенностей, деятельность на основе совместной деятельности студентов. Предположения о повышении эффективности учебного процесса, основанного на идеях интегративного единства этих понятий, оправданы. Дальнейшее развитие лично-ориентированного подхода с точки зрения таких взаимосвязанных подходов как электронное обучение, коннекционизм и комбинированное обучение также обнаруживается. Одновременно программированное обучения переживает свое возрождение и во взаимосвязи с другими парадигмами может быть эффективно и целенаправленно использовано в учебном сотрудничестве.

Ключевые слова: сотрудничество, программированное обучение, личностно-ориентированный подход, конструктивизм, электронное обучение

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La hoja de ruta de las Habilidades de Colaboración, desde la Enseñanza Programada al E-Learning

Resumen

En el artículo se presenta un análisis comparativo de los principios básicos de la enseñanza programada y del constructivismo para su uso posterior en la creación de una didáctica del aprendizaje abierto en relación con el trabajo colaborativo. Se investiga el hecho de que en la base los dos paradigmas (constructivismo y aprendizaje personal) forman parte de un mismo concepto: el carácter humanista de la educación, la consideración de las características individuales, el enfoque basado en la actividad colaborativa de los estudiantes. Se justifican los supuestos acerca de la creciente eficiencia del proceso educativo, basados en las ideas de unidad integradora de estos conceptos. Se informa del desarrollo de enfoques interconectados tales como el e-learning, el conexionismo y el aprendizaje combinado. Simultaneamente la enseñanza programada también ha experimentado un auge de manera que en relación con otros paradigmas puede utilizarse de manera eficaz en la educación.

Palabras clave: colaboración, enseñanza programada, enfoque personal, constructivismo, e-learning

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Geolocation Services in Education Outside the Classroom

Abstract

Geolocation services such as Geocaching, Wherigo, or Foursquare are very popular all over the world nowadays. Millions of people are involved in these games, and, in addition to the entertainment, they learn about geography and history. Geolocation games can be used very effectively in instruction as well. The article contains analysis, design, development, implementation, and evaluation of educational games using a geolocation service Geocaching. Sometimes the concept "educaching" is used, which was created by combining the words "education" and "geocaching."

K e y w o r d s: didactic game, geolocation services, GPS technologies, geocaching, educaching

Introduction

All of us, even those who no longer attend school, know that the Czech pedagogue and philosopher J. A. Comenius spreads the idea of using games in classroom-based education in his work, *Schola Ludus*. Therein, he shows how to use the natural creative energy of children for the dramatisation of the subject matter. This allows the student to create learning experience from such an activity, and determines its accurate and lasting adoption.

Even today, there is still an interest in Comenius' concept of dramatising the subject matter, as it is obvious given the number of educational projects in European Union. Our department also participated in the Historical Recreation as a Pedagogical Project (Madeira, 2009). Each of the participating countries presented their own historically-themed educational game. You can find out more about the project by visiting the website www.osu.eu/history/.

Nowadays, the term "educational game" usually indicates a computer game. We can find a plethora of these on CD-ROMs, on DVDs, or even on the Internet, especially when we are not limited to only those in Czech language.

Technology is advancing rapidly, and students – although not only students – follow this development closely. Students are attracted to social networks; also, those who are involved in the production of educational games are heading towards this environment. One of the most favourite games played all over the world is geocaching. This game consists of searching for a hidden cache based on given geographic coordinates using the GPS navigation system. The popularity of this adventure game was used to create a stimulating and enjoyable atmosphere during the lesson. The educational application of geocaching even received a name – educaching.

When devising new ideas for teaching that are supported by all those amazing technology-based toys, we should not forget pedagogical principles, not only those given in the works of J. A. Comenius, but also those that have evolved over the last century.

The study is methodologically based on the ADDIE model, which defines the individual steps of the implementation of the educational application – analysis, development, implementation, and evaluation. The evaluation consisted of a pedagogical experiment and an evaluation questionnaire. The interpretation of the evaluation results contributed to theoretical and methodological foundations in the field of Information and Communication Technologies in Education.

Theoretical Background

Didactic Game

All teachers have completed pedagogical and didactic courses, and have certainly encountered the topic of didactic games and their use in teaching. Computer games that are challenging – especially when it comes to developing multimedia objects – are often created by IT specialists who are not familiar with pedagogy and didactics. The optimal solution is a close cooperation between those two fields. It will not do any harm to either of these groups to reiterate some pedagogical principles that apply to didactic games. We recommend, for example, the paper

by L. Sochorová, "Didactic Game and its Significance in Teaching" (Sochorová, 2011). The paper is conducted as a study review. First, the author defines the term "game" from the perspective of several authors. Thereafter, she offers a list of types or kinds of games divided according to various aspects, and she considers the significance of a game for children. Yet, mostly she deals with the issue of didactic games as a teaching method, its concept, functions, types, use, impact on the student, importance, and teacher's use of this method.

The definition of didactic game taken from The Pedagogical Dictionary (Průcha, Walterová, & Mareš, 1995) is as follows: "Didactic game is an analogy of spontaneous activities of children, which pursues didactic goals (not always obvious to the students). It can take place in the classroom, gymnasium, playground, community or in the countryside. It has a set of rules, needs continuous direction and a final evaluation. It is intended for individuals as well as groups of students. The role of the head teacher has a wide range from an organiser up to an observer. This role possesses the advantage of creating a positive, stimulating environment because it fosters interest, boosts students' involvement in carried out activities, inspires their creativity, spontaneity, cooperation, competition, forces them to use their knowledge and skills and integrate their life experience. Some didactic games are very similar to model situations from real life." It is interesting to compare this definition with the requirements for contemporary computer games mentioned in some foreign sources, for example, the web portal Games in Schools at http://games.eun.org/.

Educational Computer Game

Computer games take place in a virtual world which is influenced by a player using input devices; that is, the player performs assigned tasks. Generally, a computer game is designed for fun, but it can also cultivate psychomotor and cognitive skills. However, what is the real cognitive benefit of games? Is it necessary to design games with explicitly educational purposes in order to use them in the educational process?

Educational games are specifically designed for educational purposes. Well-designed games motivate the player and so become the perfect environment for learning. They have rules, structure, and goals that inspire motivation. They are interactive, and provide results and feedback. Real issues that can be set up in the game can involve people in the process of learning.

Let us reminisce about one computer game for children. It is multimedia software originally designed for Macintosh and released in March 1992. Today it also works in other environments including a mobile application. Its name is "Just Grandma and Me," and its content is very simple: Little Critter and his grandmother spend the day at the beach. The game contains all that should be present in a multimedia application and is pleasing as well as witty. It is possible to switch between English, Spanish, and Japanese version. When the game first

appeared, we were thrilled by it and even learned some Spanish words. Even today many authors imitate this legend of educational games. We do not know how great the cognitive benefit to children was; perhaps there exists some research, but were not able to find any report.

Two interesting Czech papers about digital educational games are posted on the Methodological Portal FEP (Framework Education Program, http://www.rvp.cz/). Even though the papers were posted in 2009, they still offer a good overview of educational games in schools. They contain information regarding various kinds and forms of games, their pros and cons, ways to evaluate their benefit, tips and tricks for teachers, and a number of useful links to resources. The first paper entitled "Digital Educational Games in Schools – Research" (Naske, 2009a) reports on EUN Schoolnet research as a part of a project "How Are Digital Games Used in Schools?," which was conducted in years 2008 and 2009. The paper uses the term "GBL" (game based learning) and regards it as "the use of a digital game as a source of support for a reasonable, professional and committed teacher, who perceives a game as a significant tool in the world of children and uses the game rules for specific educational purpose. Therefore, we do not mean independent study done at home by children using digital technology in order to attain specific skills, unless these games were specifically used in a lesson by the teacher." The second paper, "Digital Educational Games in Schools – Czech Experience" (Naske, 2009b), as the title already suggests, summarises Czech experience and resources. Given the publication date, the discussion would most likely go in a different direction nowadays.

The same portal also holds a recently published paper entitled "Educational Game of the Future" (Janda, 2013), in which the author presents his ideas and visions. Again, we recommend looking at the links of mathematical and educational environments and communities, if only for the reason not to invent or develop something that already exists and works well, for example, the portal Khan Academy (https://www.khanacademy.org/) and its database of learning resources. Mathematical topics are represented by knowledge maps in order to establish the links between them. It is not only about the source of information, since the explanation, comprehension of terms, and their framework are also important.

What more is there to add? The same rule applies to traditional textbooks as well as educational games – they are completely useless unless used in a suitable way. That means more of the teacher's energy and time than when the lesson is conducted in a traditional way. Why then be bothered? Perhaps one of the reasons is that teachers are interested in the environment in which children will learn in the future. Will it bear any resemblance to a game or rather to traditional textbook study? If we want to prepare children for the future, we have to do it in an environment that most resembles the future one.

Edutainment

By integrating entertainment and education, a new term came into existence, and later also a whole new branch of the computer industry. Products that are meant to educate as well as entertain are labelled with this term. It depends on the developers, but also on users (teachers and students) whether the educational part will dominate.

Some can object that educational entertainment has been around for quite a long time (fables, parables in the Bible). The term "edutainment" emerged in 1948 in Walt Disney Studios. In its current understanding, it includes television, movies, museum exhibitions, and even software. One should note that edutainment also changes the paradigm of science centres or museums (Langlotz, 2011). This approach requires a greater degree of entertainment in addition to – or perhaps at the expense of – educational content. This is based on the assumption that people are used to the environment of amusement parks, and require similar comfort from science centres and/or museums.

Computer Games in Social Networks Environment

In recent years, there has been a strong development in social networks, and it was only a matter of time until this phenomenon reached schools. It has already entered the Learning Management System (LMS). LMS Moodle, which is frequently used in schools in the Czech Republic, is nowhere near social networks. Nevertheless, there are other online systems with greater interaction between students that provide easy and quick feedback, and many other features and functions required in social networks. Users (both students and teachers) are involved in content creation, respond to assignments, and are in mutual contact. Quick feedback when solving tasks is an advantage.

Some specialised online learning management systems with elements of social networks (iTřída, Edemodo, a Schoology) are mentioned in the paper "Social Networks for Teaching" (Moldřík, 2013).

Educaching

Geocaching

When searching for a definition of geocaching, we found the following text on the web. It seemed so concise that we will use it here (Rouse, 2001):

> Geocaching, also referred to as GPS stash hunting, is a recreational activity in which someone buries something for others to try to find using a Global Positioning System (GPS) receiver. The pursuit can be thought of as a GPS

enabled treasure hunt. Usually, a geocache consists of a small, waterproof container that holds a logbook and inexpensive trinkets. Participants are called geocachers.

A note from the Czech environment is as follows: Geocaching is a hybrid game of sport and tourism. The cache is known by its geographic coordinates and is located in places that are of interest, but are not typical tourist destinations. The cache description contains information about the peculiarities and attractions of the place (Geocaching.cz, 2017).

Other location-based services (LBS) – that is, services and applications working with the user's or device location – can be used when teaching; see http://geokarlovka.cz/. Recently, a game called Wherigo (http://www.wherigo.com/), which was developed by the same authors as the geocaching game, has been very popular.

Educaching

Educaching is bringing the popular adventure sport of Geocaching into the classroom. Teachers around the world are giving GPS devices to their students to create a fun and innovative learning atmosphere.

Educaching (Geocaching and Education, 2012):

- takes the classroom out into the world;
- encourages teamwork and critical thinking; and
- can be used in different subjects, e.g. math, science, history, or physical education.

Teachers are constantly looking for ways to motivate their students to learn. Their motto is: educaching is a fun and active way to learn. On the portal Educaching, A GPS-Based Curriculum for Teachers – Geocaching Lesson (http://www.educaching.com/), we can find Educaching Curriculum manuals, usually written by a teacher for teachers. Free samples and links to other resources are also useful. How does the portal promote educaching? Quoting from the Educaching website, "[…] Educaching curriculum:

- increases students' early exposure to real-world mathematics and geospatial science;
- provides a comprehensive, easy-to-use STEM (Science, Technology, Engineering and Mathematics) resource to instructors;
- helps transform the traditional classroom into an inquiry-based, exploratory learning environment that is student-centered, teacher-facilitated;
- allows for discovery of content and an engagement with problem solving, applying critical thinking skills;
- provides for critical thinking in a time-sensitive framework, preparing students for STEM career opportunities;

- offers STEM learning opportunities beyond the school day when used as afterschool or summer program."

We would be happy for now if the goal of educaching – "to get teachers and students of the classroom" – was achieved. Yet, we need to hurry up before somebody comes up with the idea of virtual educaching, and students will sit in their classrooms and stare at the monitors again.

An Example of Using the Geolocation Networks in School

The educational game called "Lost places in Ostrava," which is described in the thesis entitled "The Use of Geolocation Networks in Education" (Šrámek, 2013) aims to educate game participants in an entertaining way about the history of architecturally interesting places in Ostrava city centre using the GPS. Participants in the game consist of the students of an elementary school and any users of a geolocation network Geocaching. Based on the location of the final cache, an educational trail in Ostrava city centre was laid out. The trail has four stops and a final point, where the incentive is hidden. At the specified coordinates, a player looks for a QR code using the GPS. After scanning the QR code into a smartphone, a player can display a webpage with information about the history and historical photographs of the given place. That way he or she gains interesting information about places with historical significance and can at the same time visually compare the present with the past. The webpage also provides the geographic coordinates of the next stop. The cache is registered on the official Geocaching website and so is available to all the users of this network.

Retrieval of Photographs and Information about Places

A suitable source of historical photographs is the Internet. Additionally, Ostrava City Archive converted many of its photographs to an electronic form and provides access to them via web interface. Books dealing with the history of Ostrava city served as another source (Korbelářová, 2000; Lipus, 2006).

The historical centre of Ostrava went through great changes in the last hundred years. Among the main causes for those changes were war, undermining of the city, and even idiosyncratic ways of addressing urban issues during the communist era, when many buildings were torn down rather than maintained or renovated. There are not many places in the city centre that have been left untouched by these significant changes in the last century. The places of interest for our game were selected based on following criteria:

- the place had to be well known so that participants would be curious about the former appearance of the place; and

- the change of the former urban character of the place had to be evident, but at the same time there had to be some clues, that is, original parts.
  The following were selected as suitable places:
- the former German House located on the Dr. E. Beneš Square,
- Smetana Square with Antonín Dvořák Theatre,
- Lauby (present parking lot between Muzejní and Velká streets), and
- Zámostí (area behind the Miloš Sýkora Bridge towards Silesian Ostrava).

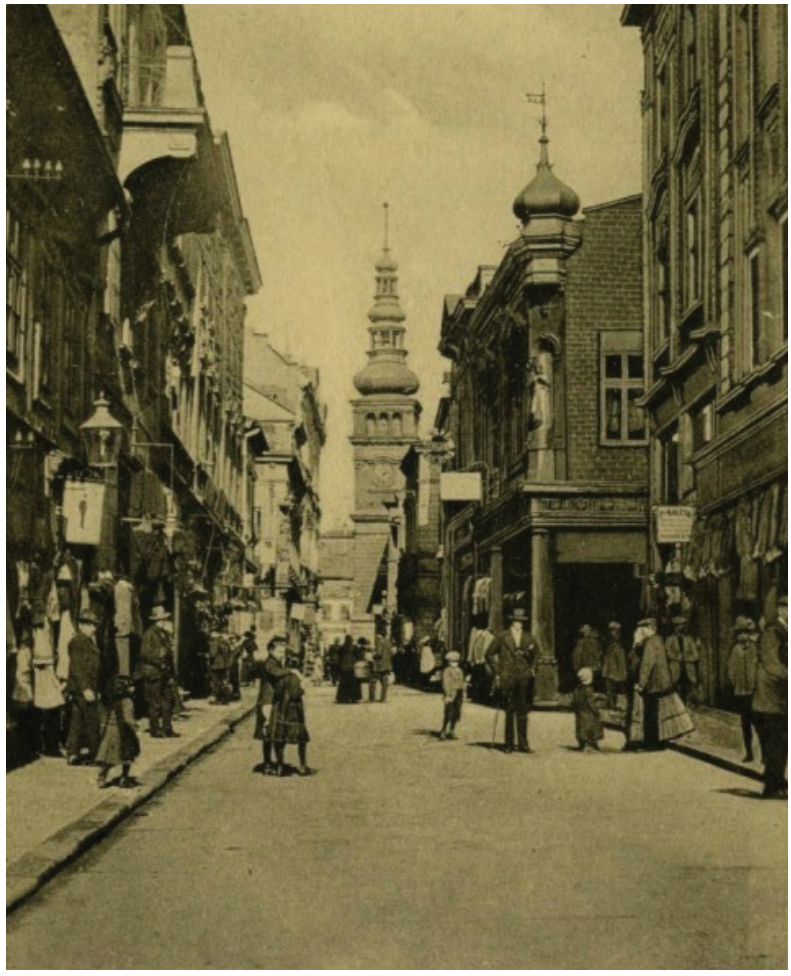

Figure 1. Lauby, an extinct world of pubs, cafés, shops, and cabarets in Ostrava

S o u r c e: Ostrava na starých pohlednicích, 2011–2017.

Certainly, there are many other places in Ostrava city centre deserving attention, not just the four listed above, but a greater number of stops in the game could be discouraging, and too long of an educational trail could prove to be boring.

Development of Webpages and QR Codes

Webpages are developed using manual tagging in a notepad (available as a part of Windows operating system) and Cascading Styles Sheets (CSS). Since webpages were developed for smartphones, they are made in a minimalistic way as to avoid downloading excessive amounts of unnecessary data.

Photographs are published in a resolution that allows them to be small enough for download to a mobile phone, but at the same time suitable for viewing on desktop. If interested, the player can return to the webpages at home and view them through the browser on his or her desktop.

A QR code can be generated using one of the generators freely available on the Internet. To read a QR code, a mobile phone with camera and a QR code scanner (an application for mobile phones) is necessary.

One should note that a QR code is a square figure carrying certain information in a similar way as a barcode. However, while a barcode can store 20 characters, a QR code can theoretically store up to 4300 characters in its largest version. Any kind of textual information can be stored in a QR code, but mostly it is used to store a web address. The code became popular with the advent of smartphones, when the phone's camera could be used as a scanner for scanning a QR code.

Creation of the Trail

The trail was set up by placing the QR codes at all the trail stops and then finding a suitable place to hide the final cache. The QR codes, fashioned as stickers with a durable surface, were placed in such a way as not to attract the attention of passers-by. Their location was to roughly correspond with the location of the taken historical photographs, so that when the player sees the photograph in his or her smartphone, he or she can compare the present with the past. The final cache had to be well hidden, so that no passer-by could find it by accident. At the same time, we had to abide to the geocaching rules, which require that the minimal distance from other caches is 161 meters. The final cache is a container with a volume of about 1 litre, containing a logbook to record the players exploit and trade items with the Ostrava theme, which can be exchanged for other items.

The Approval Process

Geocaching can bring joy through discovery and adventure, but when the cache is hidden in an unsuitable place, it can also mean a risk of injury. To minimise this risk, the placement of a cache is subject to an approval process. Requests for placing a new cache into the registry is approved by a so-called reviewer for a certain region, who also administers control over the compliance with formal requirements. The physical control of the cache, suitability of its placement, and appropriateness of the given level of difficulty are tested by a so-called betatester. There are usually several of them for one region. After a successful approval, the cache becomes available on the web. Since our project was intended only for

students, it did not have to be registered on the Geocaching webpage. Nevertheless, we did apply for approval because we wanted to know whether a geolocation game can be used as an educational tool for the Geocaching community as well.

The Game Plan

The player obtains the first geological coordinates on the http://www.geocaching.com/ website. He or she then arrives at the first stop where he or she finds the first QR code sticker using given help. He or she then scans the QR code with his/her smartphone and obtains a link to a web address. He or she displays the address in his/her smartphone, and views the historical photographs of that place and information about its history. The webpage also contains coordinates for the next stop where the player finds another QR code, and the whole process is repeated. Our trail has four stops and one final stop with incentive.

Feedback

Even before launching the geolocation game, we had to determine a way to receive feedback from players. During the course of three months, about a hundred of Geocaching network users participated in the game and walked the trail. These players participated of their own volition, obtaining the coordinates on the Geocaching website. Using the webpage at the final stop, they were asked to fill out an electronic questionnaire. The questionnaire was voluntary, and its goal was not to test the gained knowledge, but to record the subjective feelings of each player.

Students in the 6th grade at an elementary school in Ostrava-Poruba were another group of players. They walked the trail in two groups – 9 students in one and 13 in another. The students walked the educational trail by themselves. A teacher was present, yet she did not interfere with the game, but only showed the students how to use the smartphone. At the final stop, the students found the container with a "treasure" and were asked to fill out a short test. The goal of this test was to check the gained knowledge from the trail.

On the basis of their subjective feelings, game participants evaluated whether their knowledge of the history of interesting places in Ostrava widened. A total of 75% of the game participants indicated that their knowledge was greatly augmented by the completion of the educational trail. Another 22.5% said that their knowledge was partially widened.

A total of 74% of participants regarded the game as uniquely entertaining. Feedback from participants on the Geocaching website confirmed this fact. These participants said that finding the cache was a great experience for them. Participants expressed their interest in further educational games using geolocation services as Geocaching on similar topics.

The first nine-member group of pupils answered the knowledge questions with a success rate of 83.33%. The second group of thirteen pupils answered knowledge questions with a success rate of 77.69%. The average success rate is 81.45%.

Questionnaires for the Geocaching network users

Although geocaching is popular across all age groups, the group of players between 26 and 35 years was the largest. The difference between the number of males and females is insignificant.

Knowledge of QR codes is essential for the completion of the trail. Players who did not know about them or knew only very little (about 25%) had to learn about them as a part of preparation for the trail.

Basing on their subjective feelings, the players judged whether the trail helped them to gain more knowledge about the history of some interesting places in Ostrava. About 75% stated that it did, 22.5% said it did only partially, and a little over 3% did not gain any new knowledge. The game was received positively concerning the entertainment factor. About 74% of players think that the game is definitely entertaining. The feedback from the Geocaching webpage clearly suggests that finding the cache was a great experience and some even asked whether other interesting places in Ostrava will also be made into another game.

The test for students

The goal was to verify whether the students remembered the information they had learned in the game. The test was completed immediately after walking the trail. It was anonymous, and the students choose either one or more correct answers to the questions.

The group with nine members gave correct answers to 83.3% of the knowledge questions. The group of thirteen members answered the same questions with a 77.7% success. The difference between the groups can be attributed to the different number of students in the groups. Students in bigger groups can feel less involved in the game and tend to become inattentive, passive, bored, or unruly, which can result in a weaker score in the test.

Answers to an additional question express the feelings of the students about the game. The students enjoyed the most hunting for the treasure, secondly, recognising the QR codes, and thirdly, the visual comparison of past and present. Gaining information about the city's history was the least popular item of all. It turned out that it is not so important that students enjoyed the entertaining elements of the game more than the educational ones. Despite that, the results of the test show that students "soaked up" the information presented to them on the trail.

Conclusion

Teaching using a geolocation game is an unconventional way of education. As the results show, the students had fun but also gained new knowledge while

participating in our small project of exploring interesting places of Ostrava city centre.

Geolocation game has its specific use. It is advisable to conduct it for smaller groups of students from about twelve years of age. The very core of Geocaching has an educational character because many caches are created as a quiz, and only after doing research about the topic and solving the riddle can a player obtain the geographic coordinates. Similarly, as a didactic game, geolocation game should not be too long so that students will not grow tired of the long trail and be burdened by a great amount of boring information instead of enjoying the game.

The preparation of such a game is rather demanding on the side of a teacher. However, once the game is prepared, it can be used repeatedly. We recommend using it on not-so-busy days, such as before the final reports are given, on the way back from the cinema, an exhibition, or as a part of other extracurricular activities. It is only up to the fantasy and skills of a teacher to create an educational and entertaining game, and incorporate it into the curriculum. Geolocation game is suitable for teachers who like to discover and try out new ways of teaching.

Given the present rapid development of ICT (information and communication technologies) in combination with the enthusiasm for discovering and testing new innovations, there are great opportunities for seeking new ways of using technology in education. Geolocation game is certainly just one of the possible ways of using them.

The findings from the educaching game enriched the theoretical and methodological foundations of leisure time pedagogy, and the use of educational games. In addition to expertise knowledge, the educaching game also contributed to the development of spatial intelligence and key competencies, namely learning, social and personal, communication and work competencies.

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Pavel Kapoun

Serwisy geolokalizacyjne w kształceniu poza salą lekcyjną

Streszczenie

Serwisy geolokalizacyjne, takie jak: Geocaching, Wherigo czy Foursquare, są obecnie bardzo popularne na świecie. Miliony ludzi angażują się w gry geolokalizacyjne, łącząc rozrywkę z nauką geografii i historii. Gry geolokalizacyjne mogą być bardzo efektywnie wykorzystywane także w nauczaniu. Artykuł obejmuje analizę, projekt, opracowanie, wdrożenie i ocenę gier edukacyjnych wykorzystujących serwis geolokalizacyjny Geocaching. Pojawia się także koncepcja „educachingu", której nazwa została stworzona z połączenia angielskich słów „education" (edukacja) i „geocaching".

Słowa kluczowe: gra dydaktyczna, serwisy geolokalizacyjne, technologie GPS, geocaching, educaching

Pavel Kapoun

Геолокационные сервисы во внеучебной деятельности

Аннотация

Геолокационные сервисы, такие как Геокэшинг, Wherigo или Foursquare пользуются большой популярностью во всем мире в настоящее время. Миллионы людей участвуют в этих играх, и в дополнение к зрелищности они узнают о географии и истории. Геолокационные игры

можно очень эффективно использовать в обучении. В статье представлен анализ, проектирование, разработка, внедрение и оценка образовательных игр с использованием геолокационых служб Geocaching. Иногда используется понятие «educaching», которое было создана путем объединения слов «образование» и «геокэшинга».

Ключевые слова: дидактические игры, геолокационные сервисы, GPS-технологии, геокэшинг, educaching

Pavel Kapoun

Servicios de geolocalización en la educación fuera del aula

Resumen

Los servicios de geolocalización como Geocaching, Wherigo o Foursquare son muy populares en todo el mundo en nuestros días. Millones de personas usan estos juegos que suponen además la posibilidad de aprender sobre la geografía e historia. Los juegos de geolocalización se pueden utilizar muy eficazmente en la educación también. El artículo contiene el análisis, diseño, desarrollo, implementación y evaluación de juegos educativos utilizando el servicio de geolocalización Geocaching. A veces se utiliza el concepto de “educaching”, que se creó combinando las palabras “educación” y “geocaching”.

Palabras clave: juegos didácticos, servicios de geolocalización, tecnologías GPS, geocaching, educaching

II

Distance Learning Technologies in Different Countries

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Distance Learning Technologies in the Knowledge Transfer System of a Modern University

Abstract

This article presents the results of a research conducted within the European IRNet project. In the research, the place and role of the distance learning technologies in the knowledge transfer system of a modern university were described. The main goal of the article is to describe the results of the data domain analysis concerning the possibility of development and introduction of the academic massive open online courses (MOOC) platform. The authors identified the architecture and main functional requirements to the academic MOOC platform as an effective tool to optimise the processes of knowledge transfer in the system of teacher-student.

K e y w o r d s: distance learning, information technologies, knowledge transfer, progressive pedagogy

Introduction

The activity of higher educational institutions is accompanied with substantial material, information, human, and monetary flows, which inevitably leads to the necessity of solving the task of their management. Higher educational institutions are more often considered from the point of view of effective management, while the instalment of automated information analytical and search or recommendation

systems is becoming an inalienable part of higher educational institutions' management.

In its general sense, the definition of knowledge transfer covers the transition of certain scientific ideas or scientific problems into a different scientific field, in which due to this a new, previously non-existent, scientific, and practical zone is formed. This definition is widely used for describing informational processes of spreading knowledge accumulated by the universities and is one of the priority directions of modern societies' development. The university knowledge circulates within the system "knowledge creator (provider)–knowledge consumer." This paper presents outcomes of the Work Package 5 conducted by the research team from Dniprodzerzhinsk State Technical University within the framework of the international project IRNet – International Research Network for the study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning and intercultural competencies. The work results correspond to the Work Package 5 tasks on development of the main components of a computer-oriented system of distance learning for the modern specialists' training. As a technology of distance learning, the academic massive open online courses (MOOC) platform design is considered.

Academic MOOC Platform Design as a Special Type of University Knowledge

The information environment in which the corporate university knowledge is formed is a totality of the following components (Ivanov, 2008):

- information resources of various kinds, which move data from a source to a consumer. Information resources of the university are a set of data presented in the form of documents, concepts, techniques, participating in the exchange of information, including the use of computers (Zhulyabin, 2011). Information resources in the form of data streams accompany all the processes of the university functioning, from reporting and accounting to scientific and educational;
- organisational structure providing the information environment operation. Within the framework of the organisational structure, the actors and the administrative management system can be identified. The actors are employees who perform information operations and can act as sources, processors, and consumers of data and knowledge. The information operations of the information environment actors include: data creation, collection, storage, processing, retrieval, dissemination and analysis, and operational management

decision-making. The administrative management system is a set of operations and organisational activities carried out in order to increase the efficiency of the university operation and to obtain objective data on the actual performance of the institution as a whole;

- information exchange environment, including information technology, software, and hardware. One of the ways to implement the information exchange environment is the use of information systems. Development and implementation of information systems can significantly reduce information operations of the information environment actors and perform automatic processing of data in the "challenge–response" regime.

The formation of a common information environment of the university as an integral part of the knowledge transfer system makes it possible to (Karpenko, 2015):

- unite the information systems of the departments,
- avoid data redundancy in the collection of primary information,
- get away from duplication of data processing operations,
- improve the information exchange in general,
- overcome the problems of interaction of distributed sources of information and knowledge,
- provide knowledge consumers with an access to the university information resources, and
- improve the efficiency of management of the information resources and knowledge in general.

In general, knowledge of the university is generated during the execution of three types of work (Yalova, 2015):

- educational work, which includes organisation of the students learning process in accordance with the prescribed documents, such as the curricula of specialties and specialisations for each qualification level;
- methodical work, which is the main source of information support of the process of preparation of qualified specialists. Methodical work includes: development of curricula and work programmes of the disciplines, lecture notes, guidelines for all kinds of activities and classes, test kits and examination tasks for the current and final control of knowledge, etc. The distribution of educational materials and their use in the learning process can be considered as a special kind of knowledge transfer, where under a "knowledge provider" we mean any teacher who develops teaching materials, and students who obtain knowledge in the framework of selected specialties are referred to as knowledge consumers;
- scientific work, the result of which is the creation of scientific articles, abstracts, and presentations at conferences, monographs, patents, theses, reports on budgetary and non-budgetary research works, inventions, innovations, scientific research, etc. A special type of scientific work is the creation of

information and training literature: textbooks and manuals. The transfer of knowledge gained in the course of research can be an effective means of developing the country's economy as a whole. It should be noted that in developed countries it is the universities who play the role of key economic engines in the process of creating new knowledge and its transfer to a non-academic sector.

The place of knowledge transfer system in the university's information environment is presented in the graphic form in Figure 1.

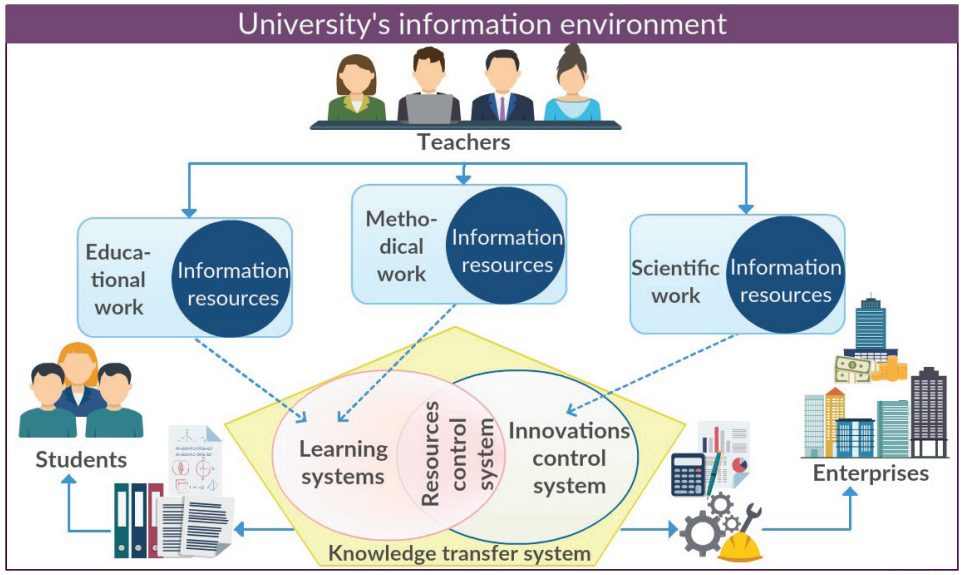

Figure 1. The place of knowledge transfer system in the university information environment

S o u r c e: own work.

The results of scientific and methodical work of each teacher form generalised indicators of the university activity and characterise the level of its corporate knowledge, which finally influences:

- the national ranking of the university;
- the competitiveness of the university in the educational market and in the field of research projects implementation; and
- the success of the accreditation and licencing of areas of study, specialties, and the university as a whole.

The improvement of efficiency of management of the information environment and the accumulated knowledge of the university can be achieved by automating the management processes, and by introducing automated information systems for administrative control and e-learning systems (Arhipova, 2014). Their use can provide the following positive effects:

- the reduction of time and labour expenditures of information processing;
- the improvement of the quality of management due to a faster and more complete use of the accumulated knowledge and database;
- the increase of the reliability of information, on the basis of which the decisions are made by the university administration, and minimising data entry errors;
- definition and effective use of the integrated indicators in the administrative management system, which will lead to the improvement of the operational management information support;
- construction of a common information environment of the university with the implementation of functions of electronic collecting, storing, processing, and generating data for the process of effective operational management decision-making; and
- the increase of the efficiency of knowledge transfer system operation by optimising the processes of collection, storage, and dissemination of knowledge.

In accordance with the kinds of information resources and the selected types of information work, we define and characterise two groups of automated information systems designed to improve the university knowledge transfer system:

1. Information systems increasing the efficiency of information and educational environment, and
2. Information systems optimising information processes of administrative management system.

Information systems increasing the efficiency of information and educational environment include (Bird, 2015): distance learning, Massive Open Online Courses, virtual classroom, IT tools such as LMS (Learning Management Systems), CMS (Contents Management Systems), VSCR (Virtual Synchronous Classrooms), SSA (Screen Share Applications), CSA (Contents Sharing Application), cloud computing environment, virtual campus, virtual learning environment, and "virtual synchronous classroom." All of these types of information and computer resources belong to distance learning technologies.

Distance learning is the interaction between a teacher and students at a distance, reflecting all the typical components of the educational process (objectives, contents, methods, organisational forms, teaching aids) and realised by specific interactive media (Fisher, 2014).

The rapid development of information technology allows using computers not only for processing, storage, or transfer of information resources, but also as a means of organisation of the educational environment. The training systems using information technologies and providing training materials on the Internet are called E-learning Systems.

Using E-learning Systems and distance learning technologies will provide the following key benefits within the knowledge transfer system framework (Johnson, 2014):

1. Providing timely and round-the-clock delivery of e-learning materials.

2. Getting information support from the system in the form of consultations, advice, tips, and reference solutions. Obtaining theoretical knowledge, practical skills, and conducting self-control of acquired knowledge.
3. Giving the opportunity to set own rhythm of training and volume of received knowledge, which leads to the increase of intellectual potential through self-learning. In addition, E-learning Systems provide access to education for people with special needs.
4. Providing aggregated and generalised knowledge in a given area, freeing students from having to spend considerable time searching for information.

Academic MOOC Platform Design

Distance learning technologies have passed the stages of dissemination of educational materials via e-mail and e-learning systems (Gutiérrez, 2014) such as MOODLE (Modular Object-Oriented Dynamic Learning Environment) to the academic MOOC platforms such as EDX (Founded by Harvard University and MIT in 2012).

MOOC is a training course with massive interactive participation, the use of e-learning technology, and open access through the Internet. As a complement to the traditional materials of the course, such as videos, reading, and homework, MOOC gives an opportunity to use the interactive user forums, which help create and maintain communities of students and teachers.

The academic MOOC platform as a general term is a system created by means of information and digital technologies, providing a process of acquiring knowledge when a source of information and students are separated by time and distance. The word "academic" in the given definition refers to the mandatory compliance of the platform training materials to the established normative documents of the university specialties, namely curricula of specialties and work programmes of disciplines.

In general, the development and introduction of the academic MOOC platform at the university makes it possible to (Moreno, 2011):

- provide distributed access to electronic versions of educational materials created by teachers, by cycles of disciplines, within a given form of training, a qualification level, and a term;
- optimise the dissemination process and to unify the representation of the electronic versions of training materials;
- provide tools for the creation of electronic assignments and tests for the evaluation of knowledge acquired by the students (intermediate and final control, and self-control);

- use different forms of theoretical material presentation: video lectures, multimedia clips, online workshop, etc.; and
- get statistics on the activity of students, the number of their accesses to training materials, the knowledge assessment results.

The architecture of the academic MOOC platform should have the following five levels (Design Solution, 2016):

1. User access – the level of user access to the data. It includes a graphical interface of the system, transferred through a browser;
2. Common services – the level of services providing storage of users' identifying data. Common services provide the collaboration among all users of the system (Synchronous / Asynchronous) and the event management (Calendar / Scheduling / Reminders) to support users' workflow;
3. Learning services, which provide core functionality for creation and use of the educational resources;
4. Database – the level of storage of all the data involved in the system. As a database of the system, relational databases, NoSQL-databases, or XML can be used;
5. Infrastructure – the level includes client–server network and physical hardware, utilising standard internet technology protocols.

A distinctive feature of the academic MOOC platform is the possibility of a system electronic content management, represented as a set of massive online courses. In addition, the use of the academic MOOC platform should also provide the following benefits for teachers:

- creation, editing, and organised distribution of the electronic version of training materials in a variety of video, audio, and text formats;
- positive impact on creativity, level of IT-competency, and qualifications of the teacher in accordance with the innovations in the field of information technology and progressive pedagogy; and
- automated receipt of statistics on the achievements of the students, their secure storage, and maintenance of an electronic journal of the teacher.

However, it will be necessary to pay particular attention to solving the following problems:

- the necessity of effective implementation of modules for practical training, which is particularly important for the specialties with practical and technical direction;
- determining the place and role of the academic MOOC platform services in the framework of the traditional full-time and distance education of the university; developing corporate rules and standards of its application;
- addressing the issue of information provision of the platform, defining the rules and requirements to the e-content of the system, the integration of an academic MOOC platform into the administrative management system of information resources and knowledge transfer of the university;

- the motivation of students and teachers to use the academic MOOC platform, the marketing promotion of distance learning services on the developed platform.

Despite the fact that the academic MOOC platform is essentially a software application, the latest achievements in the field of pedagogy should be taken into account in its implementation, and the representation of its e-content should be designed according to the educational methodology, theory, and technology of solving educational problems. The authors propose the following method of obtaining theoretical knowledge:

- learning the theoretical material in a textual form;
- using links to the description of each definition or concept of the lecture topic;
- applying multimedia support of the lecture material in the form of video lectures, walkthroughs, shorts, problem sets, voice instructions, etc.;
- creating a list of definitions or concepts that deserve special attention in learning;
- forming responses to the test questions on each topic of the material;
- creating electronic assignments and tests to check learning of the material of various kinds, such as: assignments with a choice of one correct answer, assignments with a choice of one wrong answer, assignments on establishing compliance, assignments with a choice of several correct answers, assignments with an open response;
- when receiving an incorrect answer to the control question of the topic, providing the correct answer and a link to the text from the theoretical material.

To learn any theoretical material, it is necessary to perform a series of mental activities. In the training unit development, the function of individualisation of educational activity should be implemented, which means having an alternative in gaining theoretical knowledge, namely:

- reading the theoretical material in a textual form;
- watching video lectures and video materials;
- using the encyclopaedia regime and automatically obtaining definitions for the selected term or concept;
- using the voice guidance of the training;
- forming one's own thesaurus from the most important aspects of the discipline;
- forming responses to test questions on the topic.

The insufficient quality of distance learning often depends on the ways of communication process organisation (Yalova, 2016). When building a dialogue within the academic MOOC platform, the psychological principles of the student's interaction with the system were taken into account. In order to avoid undue attention, which may cause a feeling of protest in the student, the optimal level of accompanying services has been defined. What was also taken into account is that excessive frequency of the external dialogue breaks the internal dialogue of the student. On the other hand, the implementation of tips and assistance of the system

should be sufficient to ensure that the student does not have a sense of helplessness. The authors propose to minimise meta-dialogue in the organisation of theoretical material learning process. With this purpose, before starting to learn theoretical material, the student is given a description of the topic, its abstract, and its aim. After receiving an affirmative answer about the readiness to learn theoretical material, a dialogue from the side of the academic MOOC platform is not initiated as it can disrupt the process of student thinking. At the time of completion of each topic learning, the dialogue is renewed and the student is asked whether everything was clear for him or her, and whether he or she is willing to continue learning the new material.

One of the functional requirements which the authors impose on the academic MOOC platform is the application of a combined type of distance learning. On the one hand, the interactive training of students without a teacher's participation is organised, and on the other hand, each course of the platform must contain functional modules, which help the teaching staff carry out coordination and control of knowledge acquired by students.

As for any software application, a life cycle of the academic MOOC platform development consists of five main stages: analysis of the functional requirements or domain analysis, design, implementation, testing, and exploitation. Using a spiral life cycle model for the academic MOOC platform development provides an opportunity to simultaneously have a working version of the software application, to specify the requirements of the project, to determine its quality, and to plan work on the next version.

Under the domain analysis, the type of research is meant in which a real or imaginary object is divided into its component parts (elements), and these elements and relationships between them are studied.

The research included the functional model and object model development. For these purposes, the authors used a function-oriented method of the business process description and an object-oriented method of domain structure designing.

The created functional model of the academic MOOC platform allows one to determine the roles of system users – students, teachers, staff of the education quality monitoring centre, and unregistered users – and describe the actions available for every type of user. For the formalised representation of information on a functional model of the academic MOOC platform, the authors developed a mathematical model which can be described as a system specified as a set of processes $E = \{E_1,\ldots,E_N\}$, by relations between the processes G and a dictionary of glossaries S of each level of the model. The obtained mathematical model allows us to display the analysed domain in a formal way, taking into account its decomposition into elementary functional steps, describing relationships between objects, schemes, and algorithms of their interaction.

The object model is a static display of the domain structural components. The structural components include: entities, their characteristics, and the charac-

teristics of relationships between entities. The created object model can describe data domain mathematically and consists of a multitude of entities, a multitude of characteristics of entities of the domain, and a multitude of relationships between the objects with a given multiplicity of relationship.

Peculiarities of the International IRNet Project Results Used for Development of the Knowledge Transfer Mechanism of a Modern University

The Dniprodzerzhinsk State Technical University takes part in the academic collaboration programme "International Research Network for study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning and intercultural competences." The project is financed by the European Commission under the Seventh Framework Programme, within the Marie Curie Actions International Research Staff Exchange Scheme.

The project aims to (IRNet, 2016):

1. Set up a thematic multidisciplinary joint exchange programme dedicated to development of new tools for advanced pedagogical science in the field of ICT instruments, distance learning, and intercultural competencies in EU, Australia, Ukraine, and Russia;
2. Strengthen collaboration between the EU and third country institutions through mutual internships of researchers.

The project is divided into 7 Work Packages. From 01 January 2016 to 01 August 2016, the tasks of the Work Package 5 "Pilot methodology development" are being performed, including (IRNet, 2016):

- defining some most important skills of the contemporary specialist course profile;
- identification and theoretical justification of the principles, forms, methods of effective use of the ICT, and remote forms of teaching in the education in higher pedagogical educational institutions;
- defining and testing a computer-oriented methodical and theoretical scientific system for competencies developing, which includes: 1) psychological and pedagogical aspects; 2) organisational and methodical security curriculum; 3) implementation of the social contract in such educational requirements for training future and in-service teachers; 4) protection of the learning process of computerisation measures, information, methodological and technical support of the school, and the cognitive activity of in service and future teachers and other specialists with extensive use of distance forms of learning, based on

Internet technologies; 6) adequate information on competencies components including e-learning and intercultural competencies;
- development of theoretical-methodological, psychological, pedagogical, and methodological foundations of distance learning science based on Internet technologies;
- identifying and characterising organisational forms, models and remote types of courses, case-technologies, social media, Web 2.0 and Web 3.0, Internet-courses.

The developed functional and object domain models for creation of an academic The MOOC platform can be successfully used in the implementation of the IRNet project Work Package 5 tasks, such as (IRNet, 2016):
- to develop, theoretically justify, and experimentally verify the basic concept of shaping the location ICT teachers competencies in the use of information and communication technologies and remote forms of teaching in their professional activities;
- to develop, theoretically justify, and experimentally verify the basic components of a computer-oriented system of methodical preparation of contemporary specialists;
- to develop the content, forms, methods, technologies.

Conclusions

The academic MOOC platform, proposed for development, has the following advantages:
- it is free of charge, has low system requirements to software and hardware platform, and there is no need to use licenced software for its operation;
- unlike the existing systems of distance learning, it provides an automatic control mode to control the learning process of students of all forms of studies;
- it provides a possibility of automatic evaluation of the quality of obtained knowledge and formation of statistical data of the system;
- it reproduces the traditional interaction between a teacher and a student through the mechanism of support of data and files sharing, and effective feedback;
- it ensures the effective interactive navigation on educational materials depending on the set trajectory of learning; and
- it provides e-content, electronic tasks, and tests in different formats and forms with the use of multimedia.

The authors expect to get the following social effect of the academic MOOC platform introduction:

- maintaining an adequate level of higher education under conditions of continuous decrease of classroom hours;
- increasing the intellectual potential of youth through self-education;
- ensuring the availability of education for people with special needs; and
- having a positive impact on the creativity and the level of IT-competencies of teachers according to the innovations in information technology.

The software implementation of the academic MOOC platform adjusted for the functional requirements generated by the authors will provide a positive impact on the knowledge transfer system in the university due to:

- providing a shared access to electronic versions of educational materials created by teachers within a given form of studies and a qualification level. A shared access is realised through the introduction of roles for users to separate their access to data. The smallest amount of data is available for unauthorised users; the most extensive system administration rights are given to the staff of the university knowledge transfer unit;
- optimising the structure of knowledge presentation with a possibility to add, edit, delete information resources;
- introducing the virtual instruments of creation of electronic assignments and tests to evaluate knowledge obtained by students (self-control and evaluation control) with a possibility of adjusting the parametres of knowledge testing and data storage;
- improving the quality of monitoring and administrative functions of teachers through obtaining statistical data regarding the activity of students, the popularity of the topics of disciplines, the number of references to theoretical material and materials of practical orientation, the results of evaluation assignments and self-control.

The results of the creation of a functional and object domain model provide the opportunity to develop architecture of the platform, highlighting its function modules and defining the rules of distribution rights of access to data based on the roles of users of the system. To manage the e-content of the academic MOOC platform, the functions of adding, deleting, editing, moderation information resources, data search, or obtaining results of data-mining should be provided for administrators. The data on the number of users, the amount of transmitted data, or the waiting time restrictions for issuing the queries results open up the opportunity to set technical and hardware specifications of the academic MOOC platform servers.

According to the research results, the authors see an opportunity to use distance learning technologies in the form of the academic MOOC platform as effective tools for improving the quality of knowledge transfer system of a modern university. The obtained results can be used in the course of implementation of the IRNet Work Package 5 for developing a methodology of information technology application in teaching.

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Kateryna Yalova, Valerii Zavgorodnii, Ksenia Yashina, Oleksandr Sadovoy

Technologie kształcenia na odległość w systemie przekazywania wiedzy na nowoczesnym uniwersytecie

S t r e s z c z e n i e

Niniejszy artykuł prezentuje wyniki badań przeprowadzonych w ramach europejskiego projektu IRNet. Opisano miejsce i rolę technik kształcenia na odległość w systemie przekazywania wiedzy na nowoczesnym uniwersytecie. Głównym celem artykułu jest opisanie wyników analizy domeny danych dotyczącej możliwości opracowania i wprowadzenia platformy akademickich masowych otwartych kursów online (MOOC). Autorzy określili architekturę i główne wymogi funkcjonalne akademickiej platformy MOOC – jako efektywnego narzędzia optymalizacji procesów przekazywania wiedzy w systemie nauczyciel-student.

S ł o w a k l u c z o w e: kształcenie na odległość, technologie informacyjne, przekazywanie wiedzy, pedagogika progresywna

Kateryna Yalova, Valerii Zavgorodnii, Ksenia Yashina, Oleksandr Sadovoy

Технологий дистанционного обучения в системе передачи знаний современного университета

А н н о т а ц и я

В данной статье представлены результаты исследований, проведенных в рамках Европейского проекта IRNet. В исследовании описаны место и роль технологий дистанционного обучения в системе передачи знаний современного университета. Основная цель статьи состоит в том, чтобы описать результаты анализа предметной области, касающихся возможностей использования, разработки и внедрения платформ массовых открытых онлайн курсов (MOOCs). Авторы определили архитектуру и основные функциональные требования к академической MOOC платформе.

К л ю ч е в ы е с л о в а: дистанционное обучение, информационные технологии, передача знаний, прогрессивная педагогика

Kateryna Yalova, Valerii Zavgorodnii, Ksenia Yashina, Oleksandr Sadovoy

Tecnologías de enseñanza a distancia en el sistema de transferencia de conocimientos de una universidad moderna

R e s u m e n

Este artículo presenta los resultados de una investigación realizada en el marco del proyecto europeo IRNet. Se describió en primer el lugar el papel de las tecnologías de aprendizaje a distancia en el sistema de transferencia de conocimientos de una universidad moderna. El objetivo principal del artículo es describir los resultados del análisis realizado sobre la posibilidad de desarrollo de una plataforma de cursos en línea masiva (MOOC). Los autores identificaron la arquitectura y los principales requisitos funcionales de la plataforma académica MOOC como una herramienta eficaz para optimizar los procesos de transferencia del conocimiento.

P a l a b r a s c l a v e: aprendizaje a distancia, tecnologías de la información, transferencia de conocimiento, pedagogía progresiva

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The Comparison of Distance Learning Between the Czech Republic and Other European Countries[1]

Abstract

This article examines distance learning in the Czech Republic and other individual European countries. It analyses and compares the development of distance learning, and the supply of study options in the form of distance learning in European countries; it also covers the conditions and history of distance learning in European countries.

The carried out analysis shows that currently there is an emphasis on lifelong learning, and the development of distance learning has become a priority. It can be further stated there are significant differences in the development of distance learning in individual European countries, and in the Czech Republic distance learning has only started to develop in the past twenty years.

K e y w o r d s: lifelong learning, e-learning, distance education, open distance learning, foreign experience, European countries, Czech Republic

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Introduction

Nowadays, the emphasis on lifelong learning, learning, self-study, and education is becoming a regular part of everybody's life. Since the society realises the fact that combining work, family responsibilities, and study requirements is demanding, it is already possible to acquire higher qualifications in many fields by means of distance learning, using an electronic system of learning, i.e. e-learning.

Since the society understands that it is difficult to harmonise work, family, and study duties, many fields of study offer obtaining a higher qualification through a distance form of study, which is carried out through e-learning. E-learning provides education opportunities to various groups of disadvantaged people, who would not be able to attend the classic daily or combined classes, such as women on maternity leaves, single mothers with small children, the health-impaired, people working in shifts, convicts, army personnel, but also people living in regions with insufficient transportation system, etc.

There are new opportunities at the level of university studies. Universities are facing the fact that demand exceeds supply. In other words, universities are not able to accept all prospective applicants. The interest in lifelong learning at universities is also growing.

Distance Education

Distance learning has a years-long tradition in many European countries, especially the United Kingdom, Germany, and France. Currently, a dynamic development of distance learning is characteristic for European countries; the trend is connected with the development of technology.

Historical Development of Distance Learning in Europe and the Czech Republic

Distance learning was originally carried out as correspondence courses (courses started in 1840 in the United Kingdom); with the development of radio communication, broadcast courses came to existence (e.g. broadcast courses of French universities). Later on, the development of distance learning significantly accelerated by the development of cinematography, telephone and telegraph, television broadcast, and satellite systems. In the second half of the 20th century, another significant technological advancement came with the development of ICT, which played an important role in distance learning as well, because information

and communication technologies were quickly and intensively used as support of the education process, particularly at universities.

Distance learning, particularly at universities, is not as established in the Czech Republic as it is in other countries. In this country, distance learning only started to properly develop in the 1990s. A dual system is supported in the Czech Republic – in other words, education institutions may offer distance learning and full-time study simultaneously. Since 1998, the Higher Education Act has placed full-time study and distance learning on an equal level of quality. At secondary school and tertiary technical school levels, the equality between full-time and distance learning was legislatively approved in 2004.

In the Czech Republic, the form of distance education of studies existed before the introduction of e-learning, albeit on a much smaller scale than in the United Kingdom, France, Germany, etc., where distance learning had had a long tradition and had always been relatively popular. After 2000, however, it became apparent that distance learning using old media had become obsolete; e-learning started to dominate distance learning. The development of e-learning, which increases the comfort of students and the quality of distance learning, supports the cooperation between universities and organisations focusing on the development of e-learning and its application in the education process. The most important organisations in the Czech Republic include: National Centre for Distance Education, Czech Association for Distance University Education, Centre of Further Education (Klement & Dostál, 2012).

The development of distance learning further benefits from the recommendation of the Accreditation Commission, Czech Republic, aimed at combined fields of study, which states 30% of the education should be carried out as distance learning (Vinš, 2000).

Distance Education in Europe

In order to implement effective e-learning education, states have to meet requirements such as introducing an accessible Internet infrastructure of high quality, a large percentage of fully literate people (including computer literacy), an emphasis on lifelong learning in a particular country, and culture which values education and supports lifelong learning, etc.

E-learning with the full backing of national institutions is regarded as the significant factor (Mackeogh, 2004).

Scandinavian countries are remarkable for their excellent information infrastructure and people's readiness for ICT integration into all areas of life (Paulsen, 2003; Zlámalová, 2007a).

In Europe, we can find different implementation forms of distance learning within the education system of each country (Baumeister, 1999; Hampl, Česal, & Vaškovic, 2008).

There are enormous differences in distance education within European countries. Western European and Scandinavian countries have a long-established tradition of distance education realised in the correspondence form of studies. Central and Eastern European countries have rather a tradition of evening and combined learning supported by their governments. In these countries, the development of distance learning started in the 1990s (Baumeister, 1999; Mackeogh, 2004; Hampl, Česal, & Vaškovic, 2008).

In most European countries, open and distance learning up to the level of secondary education is mostly provided by local bodies (organised as e.g. ad hoc projects on the level of school institutes) or actively offered by private education providers. Rarely are these initiatives or solutions provided by national-level institutions (Kostolányová, 2013; Zlámalová, 2007a; Mackeogh, 2004).

In most developed countries, the issues of adult education and distant education are systematically addressed. In these countries, the distance form of education is also commonplace. Usually this form of study is supported by the state in its entirety or in large portion (Baumeister, 1999; Hampl, Česal, & Vaškovic, 2008).

Table 1.
Examples for distance education in European countries

Country	Important university with dual system	Open university	Associations or consortia of conventional universities
Austria	University of Klagenfurt, Johannes Kepler Universität Linz, Fachhochshule Weiner Neustadt, Danube University Krems, Vienna University of Economics and Business, University of Applied Science Technikum Wien	Ferdinand Porsche Fern-Fachhochschule	
Bulgaria	International Business School		
Cyprus		Open University of Cyprus	
Czech Republic	Jan Amos Komensky University, Brno University of Technology, Palacký University in Olomouc, Technical University of Liberec, University of South Bohemia, University of Ostrava, Tomas Bata University in Zlín, University of Hradec Králové, Technical University of Ostrava, Metropolitan University Prague, Global University	Open University	Czech Association of the Distance Teaching Universities

Denmark	University of Copenhagen, Copenhagen Business School, University of Southern Denmark, Aalborg University, Aarhus University		Danish Association of Open Universities (DAOU)
Estonia	University of Tartu, Tallinn University	Estonian e-University	
Finland	Helsinki University of Technology, University of Tampere, University of Jyväskylä	Finnish Association for Distance Education (FADE)	
France			National Center of Distance Education (CNED)
Germany	University of Applied Science Fresenius, Freie Universität Berlin, Beuth University of Applied Science, University of Kassel	Fernuniversität in Hagen, AKAD University, Leuphana University of Lüneburg	
Greece	Athens University of Economics and Business	Hellenic Open University	
Ireland	Dublin City University, University College Cork, National University of Ireland in Galway, Dublin Institute of Technology		National Distance Education Centre (NDEC), National Institute for Digital Learning
Italy	Universita di Pisa, Politecnico di Milano		The International Telematic University UNINETTUNO
Latvia	Liepaja Pedagogical Higher School, University of Latvia, Riga Technical University, Daugavpils Pedagogical University		
Lithuania	Kaunas University of Technology		Lithuanian National Distance Education Association
Netherlands		Open University of the Netherlands (OUNL)	
Norway	University of Tromsø		Norwegian Agency for Digital Learning in Higher Education

Poland	University of Humanities and Economics in Lodz (AHE), AGH University of Science and Technology in Kraków, University of Opole, Centre of Distance Education in University of Szczecin, University of Economics in Katowice		Polish Virtual University (PUW)
Portugal		University of Aberta	
Russia	Moscow State University of Economics, Statistics, and Informatics		
Slovakia	Žilina University in Žilina		Slovakian Association for Distance Higher Education
Spain	Technical University of Madrid	National University of Distance Education (UNED) in Madrid, Open University of Catalonia (UOC) in Barcelona	
Sweden		Swedish Association for Distance Education in Linköping University, Swedish Net University	
Switzerland			Fernfachhochschule Schweiz
UK		Open University	The University of London (External System)

S o u r c e: own work.

Models of Distance Education

According to V. Jochman (as cited in Palán, 1997 and supplemented), it is possible to define several different models of distance learning that we encounter in European countries. Naturally, it is a certain simplification. The variety of distance learning models and distance education is caused by different cultural aspects of the given countries and different education systems. Furthermore, there are different legislative norms, laws regulating the education and education systems, including

distance learning. The tradition of distance education and distance learning also plays a major role. The development of information and communication technology together with its use in education, school environment, and adult education performs a significant role. A principal aspect which supports the development of distance education and distance forms of studies covers the population density in a particular country and accessibility of educational institutions to the whole population in terms of spatial dimensions (Hampl, Česal, & Vaškovic, 2008).

British model

In the UK, there is a large institution, which is financially supported by the government. This institution, with its headquarters in Milton, is widespread throughout the country and has branches in other European countries. The branches are also set up in the Czech Republic, Slovakia, and Spain. This large institution is specialising in distance education of all types and levels.

The UK is known for its Open University (http://www.open.ac.uk/), which is the largest open university in Europe. The Open University is the world's largest open, distance, multi-channel university, founded in 1969 by the order of the UK government in order to make quality education available for people whose work or family duties prevented them from regular participation in university education. Currently, this university has lived up to its set goal and offers quality education; its graduates enjoy social recognition and proper evaluation on the labour market (http://www.open.ac.uk/). The Open University is also the largest European education institution, which offers MBA programmes, and currently offers also studies programmes in nearly all fields, with the exception of medicine (http://www.open.ac.uk/; Zlámalová, 2007a). Moreover, it focuses on research, also in the field of distance learning (HEA, 2009; Zlámalová, 2007a).

Distance learning in the UK is not regulated by the government, and there is no state law regulating the distance form of studies. This is because the educational institutions which provide distance learning are completely independent of the government (Owusu-Boampong & Holmberg, 2015).

The Open University in the UK is guided by its Founding Principles, which define the equality distance learning with other forms of education and include the guidance for the education quality, stipulating the responsibilities and status of teachers, and rights and responsibilities of students (http://www.open.ac.uk/about/main/).

Currently, increasing numbers of British students are joined by international students as the university has become popular worldwide, welcoming students from China, Japan, and other South-East Asian countries. To support its global expansion, the Open University is founding branches around the world, especially in the US, China, Japan, Germany, and Austria. There is a branch in the Czech Republic with Faculties of Business, Art & Design, and Media & IT.

The British model is known for its support from one national institution financed by public funds, which specialises in distance learning of all types and levels. This model is being adopted by other European countries, especially Spain (Zlámalová, 2007a).

Spain has also developed distance learning, and the distance form of study has become an important part of the Spanish education system. The traditional National University of Distance Education (Universidad Nacional de Educación a Distancia, UNED) was established in 1972 (http://portal.uned.es/).

German model

In Germany, a specialised distance university of the central European type is implemented and focuses only on the university education. Fern Universität (FU) in Hagen (https://www.fernuni-hagen.de/) is an important German university which offers distance learning. It was founded in 1975. One of the reasons its education is readily accessible is that it is provided free of charge; students only pay for study materials. This university provides bachelor's, master's, and doctoral programmes, with branches all over Germany, Austria, and other countries of the Central and Eastern Europe (https://www.fernuni-hagen.de/). Fern Universität is not the only university or university college providing distance learning in Germany.

Deutsches Institut für Fernstudienforschung in Tübingen (DIFF) was founded in 1967, with its activities terminated in 2000; however, it has a successor in the Institut für Wissensmedien in Tübingen (IWM) (http://www.uni-tuebingen.de/fileadmin/Uni_Tuebingen/Einrichtungen/Universitaetsbibliothek/Universitaetsarchiv/Dokumente/diff.htm). Another university offering distance education is Fernfachhochschule (AKAD) (https://www.akad.de/), with its headquarters in Stuttgart and 33% share in Germany. Fernfachhochschule has a branch in Switzerland (with its headquarters in Brig, and sub-branches in Basilej, Zurich, and Bern); as a federally acknowledged university, it provides bachelor's and master's study programmes predominantly in the fields of trade, industry, law, and IT (https://www.ffhs.ch/). Other German universities with distance studies are Funkkolleg in Hessen, founded in 1966 (Greven, 1998), and Tellekolleg (http://www.br.de/telekolleg/startseite-106.html), which has taught adults since 1967; the distance form of study is offered by other traditional German universities, like Universities in Dresden, Hannover, Oldenburg, Paderborn, etc. (Zlámalová, 2007a). In Germany, the distance form of studies is regulated by the Student Protection Act to protect students who study at distance learning programmes (Owusu-Boampong & Holmberg, 2015). This law has been in force since 1976, with several amendments. It regulates distance education and is valid for all federal states. The law defines forms of studies, and rights and obligations of students.

The German model is used in Portugal and the Netherlands (Zlámalová, 2007a). In Portugal the distance form of studies is also regulated by the government (Kommers et al., 2014).

The German model is used in Italy (Zlámalová, 2007a). Distance learning in Italy started to develop relatively recently – in the 1990s. The important step leading to its development was the creation of the Open Education Consortium (Consorzio NETTUNO) in 1992. Residing in Rome, the Consortium associates several Italian and foreign universities and companies, which deal with new technology and communication channels. All study is carried through distance learning with the use of ICT. Distance learning has its place at traditional universities as well, specifically at universities in Rome and Florence (Zlámalová, 2007a).

French model

France has cherished a tradition of the distance form of studies since the 1920s, when the radio used to broadcast education courses was implemented by Sorbonne University. France is characteristic of state-supported institutions for distance learning. These institutions are interdisciplinary structured and enable education at all levels (Kostolányová, 2013). The institutions which offer distance learning are interconnected with traditional universities, colleges, and other education institutions providing full-time studies (Zlámalová, 2007a).

The distance form of studies is also regulated by the state. Further Education and Training Act and the Apprentices Act define the distance form of studies as an integral part of the education system in the context of continuing education (Zlámalová, 2007a).

France has CNED (http://www.cned.fr/), a centre for distance learning founded in 1939. This institution is the largest educational institute in Europe that offers distance learning. CNED runs bachelor's, master's, and doctoral study programmes in the fields that include administration, librarianship, law, social work, etc. This institution is financially supported by the state. Its headquarters are in Poitiers, and it has another seven branches in French cities such as Lille, Vanves, Rouen, Rennes, Lyon, Grenoble, Toulose, and also in former French colonies, Martinique, Guyana, French Polynesia, New Caledonia, and others (http://www.cned.fr/).

The French model is used in Belgium. Distance learning is widespread particularly in Belgium, where the form of distance learning is provided by twenty commercial institutions (Kostolányová, 2013; Zlámalová, 2007a). In Belgium, there has been a distance learning state school founded by the government of the French-speaking Belgian community, L'Enseignement a Distance (http://www.ead.cfwb.be/). Studiecentrum Open Onderwijs (STOHO) has been operating in Belgium since 1987, directed by a consortium of Flemish universities and university colleges, with six study centres (Kostolányová, 2013).

Irish model

In Ireland, distance learning has a relatively long tradition, with a number of institutions specialising in further education of adults in a distance form (e.g. Flexible Learning Ireland in Cork-LIT Flexible Learning, functioning since 1932,

in the beginning through correspondence course (http://flexiblelearning.lit.ie/); Chartered Institute for Personnel and Development, founded in Dublin, functioning since 1937 (http://www.cipd.co.uk/global/europe/ireland/about/); Kilroy's College (http://www.kilroyscollege.ie/); Home Study Institute; McKeon Murray Business Training Services). Distance learning is provided by universities (OSCAIL Distance Education at Dublin City University, whose education and research institution focuses on lifelong and distance learning (http://dcu.ie/openeducation/index.shtml); University College Cork (http://www.ucc.ie/en/); National University of Ireland, Galway, founded in 1849 (http://www.nuigalway.ie/); Dublin Institute of Technology (http://www.dit.ie/)) and other educational institutions, which work closely with National Distance Education Centre (NDEC), which is financially supported and directed by the state (Zlámalová, 2007a; HEA, 2009).

Irish education institutions which provide distance learning are often linked to the British Open University they co-operate with (Owusu-Boampong & Holmberg, 2015; HEA, 2009).

Nordic model

Association of universities and other educational institutions offering distance learning is typical of the Nordic model of education. These units mostly have a mutual managing authority within the association, i.e. a common regional centre (Amft, 2014). A dual education system – that is, a combination of both full-time and distance learning at the same time – is typical of these institutions (Kostolányová, 2013). These educational institutions provide graduate studies and various types of adult education courses (Owusu-Boampong & Holmberg, 2015).

In Finland, Sweden, and Denmark, distance learning is highly detailed, functioning as an addition for students of the traditional higher secondary schools or students of expert education studying in parallel; it is also used for university education, aimed at adults to expand their education and qualifications, and for migrants to adopt the national language of the new country.

In Sweden, a tradition of distance education dates back to 1898, when the oldest Swedish institution providing distance learning, Liber Hermonds (Zlámalová, 2007a), was founded, and it still exists. In Sweden, Swedish Association for Distance Education (SADE) (http://www.sverd.se/swedish-association-for-distance-education/) has been operating since 1884 – it is a national association of dual universities.

Finland with its high level of ICT is sparsely populated, which is considered to be ideal conditions for the development of distance learning. Finnish Association for Distance Education (FADE) (http://www.virtualschoolsandcolleges.eu/index.php/Finnish_Association_for_Distance_Education) has operated in Finland since 1991, and all Finnish universities are its members (Moore & Kearsley, 2012).

Denmark has a great tradition of evening and weekend study forms. The idea of lifelong learning has been applied there since the 19th century. The concept was

popularised by N. F. S. Grundtvig, a founder of the so-called folk colleges focusing on students' personal development (Zlámalová, 2007a). In Denmark, there has been Danish Association of Open Universities (DAOU) since 1982, which is an association of universities offering dual education (Kostolányová, 2013). Norway has a highly developed system of distance learning which represents a part of its education system. Norway was the first country where the distance form of study was regulated by a specific act. The Act of Education concerning distance education was adopted there in 1947.

Distance learning is widespread in Norway, which is a pioneer country in utilising distance learning (Zlámalová, 2007a; Hampl, Česal, & Vaškovic, 2008).

There is no independent distance university; distance learning is organised by the Norwegian Association for Distance Education (NADE), which was established in 1968 and coordinates the development of distance learning (http://www.virtualschoolsandcolleges.eu/index.php/Norwegian_Association_for_Distance_Education). In Norway, a significant role in distance learning is played by private institutions focusing on adult education. In 1990, at Tromsø University The Norwegian Agency for Flexible Learning (SOFF) was launched, which focuses on the coordination of distance learning at Norwegian universities and university colleges at national level (OECD, 2002).

In addition to these five models of distance education, mixed models also exist, and they only adopt some organisational elements.

Distance Education in the Czech Republic

The tradition of distance education in the Czech Republic does not exist. This is why its implementation is rather complicated and lengthy (Hampl, Česal, & Vaškovic, 2008; Poulová, 2009). In the Czech Republic, distance learning only started to develop after 1989. During this time, when the existing options of evening studies at secondary or vocational schools and distance learning at universities had been limited or closed down due to their cost ineffectiveness, the demand for new options to study while employed started to appear, boosted by changes on the job market, changes in wages based on education, and the low proportion of university educated people. To adapt to these changes, developing distance learning appeared to be one of the effective solutions (Zlámalová, 2007b).

Therefore, in the beginning of 1990s, expert discussions on implementing distance education into the existing education system of the Czech Republic took place, which led to the legal decision to create a dual system, which enabled the individual study programmes to be offered both as a full-time study option and in the distance learning format. Universities had these programmes accredited, they

carried them out and offered them to the public. The decision has been grounded on the Accreditation Commission regulation and on the act on higher education (Kostolányová, 2013; Poulová, 2009). The Higher Education Act of 1998 put both forms on the equal level of quality and significance. At secondary school and tertiary technical school education, the equality between all forms of study was put in effect by a new education act of 2004.

If we research the available study programmes offered in the distance learning form, the results show that, with the exception of several experiments of introducing distance learning at institutions that focused on adult education such as the Jan Amos Komensky University or the European School for Correspondence Courses, this form has gained gradual acceptance mainly at universities. They are especially Brno University of Technology, Palacký University in Olomouc, and Technical University of Liberec; all of these universities started to organise this form of studies in the 1990s. Later they were followed by University of West Bohemia, University of Ostrava, Tomas Bata University in Zlín, Technical University in Ostrava, University of Economics, Prague, Global University, and Metropolitan University Prague. It can be therefore stated that distance education in the Czech Republic has mostly focused on adult education and mostly at the tertiary level; other activities around further education of adults, such as interest education of adults, company education, and civic or family education have not been carried out in the distance form of learning as frequently.

Currently, the development of distance education at the university level is carried out through various development projects, such as those by the Ministry of Education, Youth and Sports, university development funds, ESF projects, etc. These projects focus on the innovation of study programmes, support for using ICT, support for the development of education technologies, and innovation of offered study programmes (Zlámalová, 2007b). Some private-owned educational institutes became proactive in utilising distance education, focusing primarily on ICT, and use e-learning and learning management software, such as Moodle or EDEN. These institutions include Net University and Gopas (Zlámalová, 2007b)

Basing on the available sum of available distance study options, it has to be stated that the Czech Republic is behind other European countries. However, the situation has been quickly improving. Distance learning in the Czech Republic has come a long way since 1991, when the first conference on this topic was held in Prague.

Nowadays, the issue of distance education and distance learning support is discussed in the Czech Republic. This form of studies meets the needs in the education process of adults who have work, family, and study responsibilities, and it is sometimes extremely difficult to handle them all (Barešová, 2011; Poulová, 2009). The government of the Czech Republic also deals with the issue at the level of strategic documents, for example the government document on the Strategy of Lifelong Learning in the CR.

The important role in the support of distance education is played by the National Centre for Distance Education, which has held an international conference every two years since 1999, with experts in the field from other European countries, especially Slovakia, Austria, the United Kingdom, and Finland. The aim of these conferences is to map the development of distance learning in the country and implement distance learning into the education system of the given country, discover common topics for discussion, and, unifying interests, start cooperation, exchange information on positive and negative experiences with distance learning and e-learning forms, and collect good practice (Zlámalová, 2007b).

The international Phare programme called "Multi-country Cooperation in Distance Education," which took place in the Czech Republic in 1994–1999, had a significant impact on the development of distance learning. The programme provided theoretical and financial support to implementing distance learning into the education systems of eleven countries of Central and Eastern Europe which participated in it. This project also helped create the National Centre for Distance Education, which further supports the development of distance learning in the Czech Republic with its array of organisational, educational, and expert activities. The National Centre for Distance Education is part of the Centre for Higher Education Studies, as a national coordination body, which is also aimed at supporting distance education in the Czech Republic through its activities (Zlámalová, 2007b).

Table 2.
Students in distance education in the Czech Republic

Year	Total number of students
1994	14 953
2005	29 297
2006	34 186
2007	39 692
2008	44 573
2009	44 337
2010	47 611
2011	46 443
2012	43 320
2013	40 066
2014	36 184

S o u r c e: Ministry of Education, Youth and Sports, 2015.

Conclusion

A new information society has been born in the past few years, with ICT in its forefront. Services rendered by ICT are part of everyday activities and education. In the last decade, the ICT supported form of distance education developed in the Czech Republic as well.

Not every study content can be taught in the distance form, but it can be stated that any field can be studied via distance learning. However, it has to be well thought out what percentage of direct education needs to be included in distance learning in order for the studies to be effective. Face to face study is necessary because while knowledge can be effectively passed in the distance form of education, skills are more complicated to be passed on, and it is frequently not possible to do it at all. On the other hand, it should be noted that distance learning is currently an important and perspective area, which gains more prominence within any information society, and will continue to develop and become an important part of study options.

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Lucie Zormanová

Porównanie kształcenia na odległość w Czechach i w innych krajach europejskich

Streszczenie

Niniejszy artykuł bada kształcenie na odległość w Czechach i wybranych innych krajach europejskich. Analizuje i porównuje rozwój kształcenia na odległość oraz zapewnianie możliwości uczenia się w formie kształcenia na odległość w krajach europejskich; obejmuje rozwój, warunki i historię kształcenia na odległość w Europie. Przeprowadzona analiza pokazuje, że obecnie kładzie się nacisk na uczenie się przez całe życie, a rozwój kształcenia na odległość stał się priorytetem. Można też stwierdzić, że istnieją istotne różnice w rozwoju kształcenia na odległość w poszczególnych krajach europejskich, a w Czechach kształcenie na odległość zaczęło się rozwijać dopiero w okresie ostatnich dwudziestu lat.

Słowa kluczowe: uczenie się przez całe życie, e-learning, edukacja na odległość, otwarte kształcenie na odległość, zagraniczne doświadczenia, kraje europejskie, Czechy

Lucie Zormanová

Сравнение дистанционного обучения в Чехии и других европейских странах

Аннотация

В данной статье рассматривается дистанционное обучение в отдельных европейских странах и Чехии. Анализируется и сравнивается развитие дистанционного обучения, варианты обучения в форме дистанционного обучения в европейских странах, условия развития и история дистанционного обучения в европейских странах.

Проведенный анализ показывает, что в настоящее время акценты на идеях непрерывного образования и развитии дистанционного обучения стали приоритетными. Можно также утверждать, что существуют значительные различия в развитии дистанционного обучения в каждой из европейских стран; в Чехии дистанционное обучение развивается в течение последних двадцати лет.

Ключевые слова: непрерывное образование, электронное обучение, дистанционное обучение, открытое дистанционное обучение, зарубежный опыт, европейские страны, Чехия

Lucie Zormanová

Comparación del aprendizaje a distancia entre la República Checa y otros países europeos

Resumen

Este artículo analiza el aprendizaje a distancia en La República Checa y en otros países europeos. Se estudia y compara el desarrollo del aprendizaje a distancia, la oferta de opciones de estudio en forma de educación a distancia en los países europeos; informa también del desarrollo, las condiciones y la historia del aprendizaje a distancia en los países europeos. El estudio realizado demuestra que actualmente se hace hincapié en el aprendizaje a lo largo de la vida y que el desarrollo del aprendizaje a distancia se ha convertido en una prioridad. Se han encontrado diferencias significativas en el desarrollo del aprendizaje a distancia entre la República Checa y otros países europeos.

Palabras clave: aprendizaje a lo largo de la vida, e-learning, educación a distancia, enseñanza abierta a distancia, experiencia extranjera, países europeos, República Checa

III

ICT and Multicultural Competencies Developing Supported E-learning

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Developing Students' Information Competencies in the Context of Multicultural Education Using University E-learning Platform

Abstract

In this paper we would like to introduce our way of thinking about approaches to students in the term of e-learning use in the context of a multicultural society. We are focusing on the question of developing the information competencies in the environment of multicultural education. This paper also provides examples of good practice especially when teaching via e-learning platform, LMS Moodle, at the University of Žilina.

K e y w o r d s: e-learning, information literacy, information competencies, information education, information technologies, communication technologies, evaluation criteria, LMS Moodle, multicultural education

Changes in Education and the Use of E-learning

Nowadays, the society is changing significantly. This change is also reflected in reforms in the area of education. The pressure of the market, globalisation, and finance can be noticed here. The efforts to reduce the cost of education lead educational institutions to seek less expensive ways of organising education, for example by its computerisation (Sakálová, 1998; Zacharová & Bomba, 2012). The school loses its monopoly on information. The traditional role of a teacher

is changing, just as the way of educating. This happens under the influence of penetration of ICT (Zacharová & Bomba, 2012).

Another significant change of this society is its internationalisation. We can assume, for example, that the socio-cultural diversity of Slovakia's population will increase due to the growing number of refugees from various areas of the world, who are suffering from crisis, poverty, and unemployment. Logically, we have to take into account students coming from different countries. Students will directly seek educational institutions on the market that are prepared for the internationalisation of education.

A university teacher frequently meets students from different cultural environments. They are coming to the university through different programmes which support students' mobility (the Erasmus+, Grundtvig, etc.). In addition, university teachers also realise teachers' mobility to different countries and are involved in the cooperation among universities. These are all reasons that lead us to reflect at this time on the use of e-learning in the context of a multicultural society.

Today, terms such as information and communication technology (ICT), e-learning, virtual environment, and online learning are standard parts of the dictionary for both a teacher and a student. According to Průcha (2006), we need to identify and summarise all the pedagogical aspects of applied and used ICT tools.

Many authors have subscribed to the most current issue of applying new educational strategies – that of evaluation of the impact of ICT on methods of learning, teaching, learning styles of students, the teaching style of a teacher, the quality of education, and the competencies of students and teachers. We could ask ourselves the following questions:

- Are we prepared to teach students from different countries using ICT?
- Could we compare how students learn using ICT or without using these tools? Which mode is more effective?
- Could we apply some positive effects of using ICT to all students, or only to those who have a positive attitude towards using the modern information and communication technologies?
- Would the large quantity of information received through e-learning have a positive effect on the learning process and the level of a student's knowledge structure, especially when teaching students from various cultures?
- How could we design and develop an educational curriculum in virtual environments, when students are drawn into an enormous amount of information?
- Which pedagogical principles of teaching and learning should be respected in the design of e-content?
- How could we help students analyse, classify, interconnect, and integrate this amount of the offered information?
- How could we ensure that students coming from different cultures are able to communicate or present information obtained in a virtual environment adequately?

- How could students become familiar with teachers' criteria for evaluation of the quality of their work with ICT?
- What criteria are best for as objective evaluation as possible?
- Is it better (easier) to teach with ICT if students come from different cultures?

Certainly, educators play an active role in identifying and developing students' information competency regarding their ability to find, define context, and create a non-linear relationship with this mass of information. It seems that this would be a good way to integrate modern technologies and utilise the traditional educational environments currently existing in our schools. This can be the beginning if an educator wants to be near the educational environment from which international students are coming.

According to the Association for Educational Communications and Technology, an information literate student has basic skills to work with the computer as a didactic teaching tool, but computer literate students are not necessarily information-competent. Zacharová (2011, p. 154) asks: "Do teachers accept this situation in general or is there only a small group of enthusiasts, 'e-teachers' who can accept it?"

Theoretical Background

From our personal experience we know that for students just the lack of information literacy devalues cognitive processes and learning outcomes themselves as computer literacy. As we mentioned in the introduction, the area of development of the capabilities to search for relevant information and to work with it effectively – to learn the methods of its processing and applications – becomes the key to a change of the paradigm of education. When we mention information and media literacy, we mean the ability to search for, evaluate, and use information from various sources, and also a disposition to work with various forms of media (text, images, animation, films, etc.) as carriers of information (Smith, 2003).[1] According to Müllerová (2001), when the learner processes, analyses, and selects information, it is the innate cognitive style in which he or she explores the world and acquires access to human cognition. In addition, in the context of multicultural

[1] In general, an information literate person is able to: use the opportunities of the information society, obtain the necessary information, identify potential sources of information, improve the strategies for seeking information in book and electronic form, disclose information using information and communication technologies, evaluate information and organise it systematically for application in specific situations, integrate new information into conceptual structures, and form a special, individual style in effective interaction with the world of information (cited by the American Library Association).

education, "We must promote a positive vision of cultural diversity and advance cultural literacy through learning, exchanges and dialogue. These are essential for fighting against discrimination, prejudice and extremism. Cultural diversity and cultural literacy are essential forces for the renewal of our societies" (as spoken by I. Bokova, 2013, UNESCO).

We are thinking about multicultural education as a process through which individuals create positive perception and assessment of cultural systems different from their own culture, and on this basis regulate their behaviour towards members of other cultures (conception of Průcha, 2000). The necessity to deal with the multicultural education (Trabalíková, Macháčik, & Zemančíková, 2014) has the source in the cultural diversity of humanity. Studies relevant to multicultural education show that education can play an important role in the coexistence of the human race in conditions of cultural variability.

Klein (2007) states that in the multicultural education we emphasise interaction between teachers and students as well as among students themselves. Multicultural education cannot work without developing strategies of politeness, meaningful discussion, effective communication, constructive cooperation, and critical thinking. At the level of instructional methods, it is recommended to encourage discussions, brainstorming, cooperative learning, situational games, and project-based teaching. In the study, Sawir (2011) examined whether the presence of international students has an impact on the staff's teaching practice. Some of the teachers reported that they made no adjustments to their teaching, and they treated all students as one student group. Others said that there were changes in their teaching in response to the presence of international students in their classroom.

Especially in the context of multicultural education, we have to take into account the degree of suggestibility of components of student learning styles. The deepest layer (personal cognitive style of a student) is the most stable, while the next layer is only partly influenced by external interventions. Another layer comprising social, motivational, and emotional processes is more susceptible to external influences. Student preferences are viewed as processes, methods, and forms that a student prefers in the learning and the teaching process. These are influenced by the educational action of a teacher (Mareš, 1998, in Müllerová, 2001). We assume that by changing the paradigm of education, the scope for influencing the information processing strategy will be greater. As stated by Kosová (2002, p. 6), the major role of a teacher in today's information society becomes "a diagnostic role, facilitator and guide of the development of each student or effective teaching situations manager, reflective professional and innovator, creator of the stimulating and emotionally safe class- or group-climate." While teaching students from different cultures, we know that the class does not become a good team when students are only connected with a lot of data. It is also necessary that a consistent dialogue about what children learn at school and what reaches from

outside the classroom exists. The school becomes a place where pupils' culture meets the culture of school and society. In this situation, it only makes sense if we teach the basis of values of equality, democracy, solidarity, and empathy. Values that students and teachers share with each other are crucial for the further development of a positive social change. Some sources of information (for example the Internet) tell students "almost everything," but they do not tell them how to search, filter, verify, select, accept, or reject information. Yet, to decide which information is worth remembering and which is not, is an art (Eco, 2007, in Vančíková, 2011).

The terminological lexicon of new information-communication technologies and their implementation (Katuščák, 1998) in a broader definition of informational education understands it as the implementation of "rational education and training of the human for the use and creation of knowledge in order to acquire a comprehensive system of knowledge, skills and habits in the cognitive process" (p. 128). Sakalová (1998) writes that information is a critical source of the development of the society. This transition from an industrial to an information based society is changing the status of traditional schools; they are no longer the dominant source of information. The content of information education is derived from the assumption that the most important task of the school is to develop the learners' personality to prepare them mainly for life in the information based society. According to Horváthová and Švejda (2006), the major objective of information education is to contribute, together with other subjects, to the development of students in lifelong learning systems.

The educational and didactic side of information education in today intercultural society includes certain methods of interaction with new media, case studies, individual and group information tasks, and methods to stimulate activity and creativity. It is important to use new media forms to educate a broad public about diversity and intercultural competencies. The question is how to catch up with the current possibilities, since new media are rapidly developing, and new uses for old media are expanding daily. An innovative approach to spreading intercultural competences is taking advantage of the possibilities offered not only by the current mass media, but also by many social and new media forms (Papastergiadis, 2006). Other possibilities include "e-notebooks on peace and intercultural dialogue" providing a readily accessible vehicle for young people around the world to use in sharing personal initiatives and experiences for everyday peace and dialogue (UNESCO, 2011, in UNESCO, 2013). Chupáč (2007) claims that work with information itself is one of the creative methods of the teaching process – it teaches autonomy, analytical thinking, concentration, attention, and "in-depth learning style" (p. 21).

Supporting Information Competencies in the Context of Multicultural Education

In National Educational Curriculum in the Slovak Republic, competencies for all levels of education are defined and classified. Classification and characterisation of core students' competencies is adjusted according to the recommendations of the European Parliament and the Council from 2006 related to key competencies for lifelong learning. This set of competencies serves teachers in knowing where to direct their educational activities through purposeful, meaningful development, appropriate for children.

At the primary level of education, when describing information competence (The national curriculum ISCED 1, Ministry of Education, 2008/2009), the term "a competence in information and communication technologies" is used within the national curriculum.

Thus, a student must demonstrate:

- the use of selected ICT in teaching and learning,
- knowledge of the necessary fundamental computer applications,
- adequate communication via electronic media,
- the ability to actively search for information on the Internet,
- the use of a variety of instructional programmes,
- the basic knowledge of algorithmic thinking,
- the understanding of the difference between the real and virtual world, and
- awareness that there are risks associated with the use of the Internet and ICT.

Teaching strategies, forms, and instruction of lower and upper secondary level education are trying to achieve the following attributes of information competencies in the spirit of the Slovak school system:

- to use effectively information and communication technologies in education, creative activities, project based learning, expression of thoughts and attitudes, and solving real life problems;
- to acquire the ability to use the Internet and ICT to obtain and process information in text and graphic form;
- to be able to think algorithmically and use these skills in real life;
- to be aware of the difference between the real and virtual world; and
- to understand the opportunities and potential risks associated with the use of the Internet and ICT.

At the university level, information literacy, as part of information competencies (in literature the term "media literacy" is often used), is defined as follows (National Forum on Information Literacy):

1. An information literate student defines the scope and nature of the necessary information:

- formulates the requested information clearly and understandably,
- identifies various forms and structures of particular sources of information,
- considers the value of the obtained and acquired information, and
- reviews the scope and nature of the requested information.

2. An information literate student acquires necessary information quickly and efficiently:
- selects the most appropriate strategy for information retrieval, and online information and database search;
- creates and applies effective search methods; and
- flexibly adjusts and changes strategies of access to information according to needs.

3. An information literate student evaluates and integrates information into an adequate conceptual structure:
- summarises the main concepts, ideas from the received information;
- applies appropriate criteria for the evaluation of information according to the objective;
- synthesises data into appropriate concepts; and
- interprets information to other entities of the teaching process and experts in the field (e-mail, discussion groups).

4. An information literate student can individually or as a member of a group use information effectively for specific purposes:
- uses priority information when presenting the results of the learning process, and
- incorporates information to the prior knowledge.

5. An information literate student understands the legal, ethical, and social issues related to the use of information sources:
- respects the rules applied by citation of primary and secondary sources.

When educating in the multicultural society and supporting information competencies of students, we should tackle the questions of intercultural competencies very carefully. A. Fantini and A. Tirmizi (2006) describe it as "…a complex of abilities needed to perform effectively and appropriately when interacting with others who are linguistically and culturally different from oneself" (p. 12).

The objective of multicultural education is to prepare students for life in a culturally pluralistic society by equipping them with the necessary intercultural competencies. These competencies consist of:

- knowledge of the various ethnic and cultural groups living in the Slovak and European society;
- abilities to orient themselves in a culturally pluralistic world, and benefit from intercultural contacts and dialogue to enrich themselves and others; and
- attitudes of tolerance, respect, and openness to different groups and life forms, including the knowledge of the necessity of personal commitment (Klein, 2006, p. 17). They have to reach out to a new generation of cybercitizens, notably young men and women who have unimagined opportunities for global

conversations as it is written in a Conceptual and Operational Framework by UNESCO (2013).

From our point of view, schools are a crucial place to develop such knowledge, abilities, and attitudes. In the project "Innovation and Internationalization of Education – An Instrument for Increasing the Quality of the University of Žilina in the European Educational Space," university teachers are preparing new study materials. The main goal is to support the quality of education at the university by developing innovative forms and attractive study materials, and rationalising study programmes. Some materials will be processed into a form of reusable objects, and supplemented by multimedia and interactive elements. These materials will be prepared also for international students and can be particularly useful in breaking the language barrier, which occurs when teaching students coming from different countries together with Slovak students. From our own experience as university teachers, we can confirm that many university students have a limited ability to find, process, and interpret required special information, or determine the importance of information in appropriate ways. Their low level of information-communication competencies is also reflected in the findings that many students can pass the required 5–6 pages of continuous scientific text, i.e. information obtained in the field, but they cannot explain, reproduce, prepare the hierarchical structure of important and less important information, ask questions on the subject, work with graphs and diagrams, etc. Empirical experiences of E. Sakálová & M. Matthaeidesová (1999) confirm that many current high school graduates who are seeking university education do not know the basics of self-study methodology.

It follows that the contents of the undergraduate educational teacher training should encompass not only acquiring skills for computer, information, and communication technologies (promotion of computer literacy), but mainly working effectively with information in the printed or electronic form. This area should be an essential part of a teacher's preparation of professional standards, respectively the process of professionalisation of teacher education. This is why we focus on the development of the ability to seek, evaluate, and use information from various sources with students of teaching study programmes at the Faculty of Humanities, University of Žilina from the beginning of their university study.

Support of the Information Competencies in the Context of Intercultural Education at the Faculty of Humanities, Žilina

E-learning in Tertiary Education

In tertiary education (in contrast to primary and secondary education), teachers have greater autonomy in the definition of the curriculum, which is a benefit in the

intercultural environment. However, a didactic transformation of the curriculum at university level education is a relatively complicated, multi-level process (Figure 1).

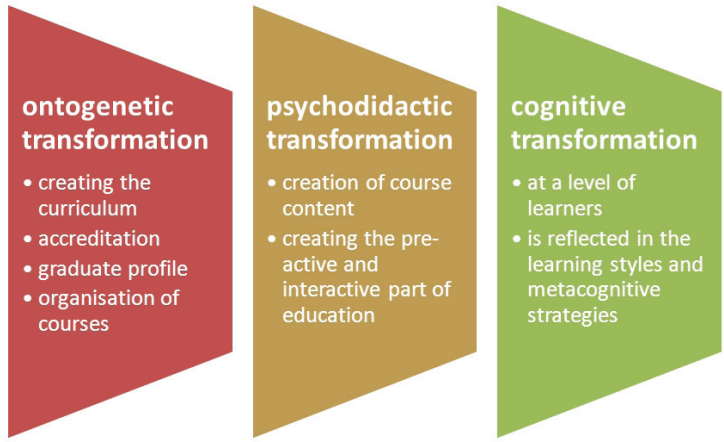

Figure 1. Didactic transformation of the university curriculum

S o u r c e: own elaboration based on Janík et al., 2009 in Slavík, 2012.

Figure 1 shows the results of the ontogenetic transformation. The main actors should be the universities themselves, in collaboration with professional and employers' organisations, and the Accreditation Commission. As a criterion for the university education content selection, the above authors proposed to evaluate expertise and scientism, usefulness and importance for the future graduates, cultural importance and historical significance of the content. Psychodidactic transformation should be ensured by university teachers in the role of study programme and subject supervisors. The output of this transformation process should be well-prepared teaching units (lecture, workshop, tutorial) through which university teachers effectively implement results of scientific theories, or results of their own research activities. The process of the university education content transformation is completed in the third cognitive phase, in which the actors are students. The cognitive phase approach to learning, learning styles, a type of study motivation to "empower" new knowledge and skills, the integration into existing knowledge structures, and the application to real and practical situations is important (Slavík, 2012). Teaching methods and strategies are also a way to regulate, organise, and support students and their own personal learning style, ability to learn, and positive attitude to lifelong learning. As reported by J. Maňák and V. Švec (2003), this aspect is often underestimated. As a consequence, many university students do not embrace rational learning methods. We also agree with L. Kaliská (2009) that "one of the key competencies – an individual's interest in lifelong learning, can be developed through the ability to 'learn how to learn.'

If a learner understands their own learning process, he/she will become more independent, more responsible and more confident. The education passes into motivated self-learning" (p. 288).

According to J. Zounek (2006, p. 339), there is no clear definition of a direct understanding of the concept of e-learning. For example, the European Commission (www.elearningeuropa.com) defines e-learning as "the use of modern multimedia technologies and the Internet to improve the quality of education, in particular by facilitating access to resources, services, information exchange and distant cooperation." We agree with Zounek (2006), who defines e-learning as "any learning process with varying degrees of intentionality, in which ICT are used when working with data in electronic forms. The method of use of ICT is dependent primarily on educational objectives and content, the nature of the learning environment, needs and opportunities of all factors of the educational process" (p. 339). According to Singh (2003), application of e-learning forms has gone through two stages in recent years. The first stage meant digitisation of traditional "classroom-based courses" to the environment of the Internet and forms of online learning. In the second stage of e-learning, many teachers, tutors, and educators began experimenting with interesting and even promising alternatives in ICT-assisted learning with "blended learning." Blended learning is a combination of: a) face-to-face teaching (contact, full-time course) with traditional teaching instructions, b) asynchronous teaching (off-line teaching) which includes different forms of student self-study or participants in training courses and modules, and c) practical training of sensomotoric skills (especially in professional education). A rapidly emerging field of study which started in the late 1980s is Computer-Supported Collaborative Learning (CSCL). Arranging students to work collaboratively at the computer reaps the benefits both of the use of computer simulation as an exploratory tool and of peer collaboration (Tao & Gunstone, 1999). Hrušecký (2005) characterises the online education and blended learning by using an approximate quantification of the course content. The online course indicates that a score of at least 80% of the rate is via the Internet. Contact (full-time) training is not usually part of this form of education. If the course is supported with ICT, but only about 30% of the content is transformed into an online form, we are talking about blended learning. The use of e-learning and blended learning at universities proves to be useful and effective for both students and teachers.

The Department of Educational Studies, Faculty of Humanities, University of Žilina in undergraduate (initiating) teaching programmes provides guidelines for the education roles and the obligation to convey the curriculum to students in a clear, interesting, and attractive manner. It is the combination of the presence of traditional and electronic forms of study via LMS Moodle (Learning Management System), which supports us in those efforts. Our experience and our colleagues' experiences (e.g. Hasajová & Villim, 2014) with e-learning are based on a number of methodological assumptions for creating e-learning material. As stated by

Drozdová (2007), didactic support for the development of students' information and media competencies in computer-assisted instruction should be well designed study material in an interactive, preferably multimedia electronic form. This means using efficiently and professionally processed themes, graphic illustrations of processed information, verification of knowledge through feedback, and interaction of graphic and text information. These are important characteristics of the effectiveness of the educational process, in which the essential feature should be the percentage of the learners' work and the whole Learning Management System – LMS. When using forms of blended learning in undergraduate education, the methodological principles described below are applied.

Creating appropriate study materials in the e-form for students

We respect the fact that scientism and professionalism of teaching material presented in the e-form is not directly related to the disproportionate number of specialised words and the complexity of expressive language. Teaching material available to our students in an electronic learning environment serves as the basic orientation of the topic. It also serves as support and working material for students. Students can work with materials by adding examples, other notes, diagrams, and links (during contact teaching). Thus, during face-to-face teaching, more focus can be placed on the specifics of the presented issue. Within the graphic design of study material, we focus on an efficient inclusion of hyperlinks, adequate font size, variety of colours in the academic text (examples, summaries, links to key and new concepts), appropriate integration of suitable plans, diagrams, etc.

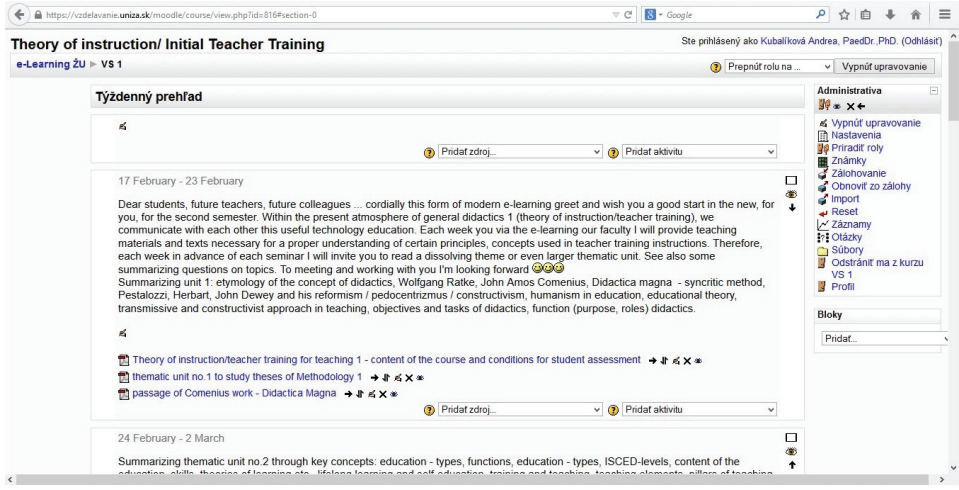

Figure 2. A sample of several possibilities of interactive activities supporting the objectives and background of blended learning concepts

S o u r c e: University e-learning platform.

Detecting feedback from students continuously

To achieve effective communication with students, study material in an electronic form contains interactive elements. Study material should provide effective feedback, because then students are encouraged to pursue other activities by such feedback (e.g. use a dictionary of basic concepts, manual, links to other print and electronic resources, contacts, forums, etc.). Providing questionnaires continuously – including the international students – is also beneficial in obtaining feedback on work with the electronic system of education. When this is available, a student is no longer in the role of a passive observer. We have chosen a few sample questions and responses from the formative evaluation questionnaire as examples for the purpose of this paper (see: Appendix 1).

Developing students' critical thinking when using a wide variety of sources and materials

After several years of experience as university teachers, we find that through blended learning the following options and elements can be applied:

- fostering the creativity and independence of students (especially for future teachers as this is part of their future professional competencies);
- the presence of feedback tasks that constantly give students the answer if they pay attention and thus achieve a predetermined teaching goal;
- flexibility and complexity in the processing of assigned tasks and issues with the use of multiple sources of information, and visual and graphic aspects;
- diversity and uniqueness of the sources of knowledge;
- teaching in blended learning and e-learning as a less dominant source of information, but rather a guide in building adequate conceptual structures within the topic subject.

In this sense we try not only to explain to students, but also to practically lead them in the use of conceptual mapping methods (Figure 3).

Finally, students are encouraged to use a wide variety of sources and material, and are also led to learn to evaluate and compare the quality and reliability of sources. This is an advantage especially in the development of critical thinking. We also create instructional material (the manual) with a set of tasks to be achieved. The manual contains the following objectives for students in undergraduate teacher education:

- teaching students to evaluate and systematically organise information for application in specific educational and teaching situations;
- teaching students effective orientation in information sources – particularly printed and electronic texts – when creating quotes, excerpts, etc.;
- offering students concrete tasks for a selected curriculum at primary and secondary schools (students are acquainted with both the curriculum, and the actual content of education at primary and secondary schools);

- encouraging students to independently practice the skills of working with teaching software; and
- encouraging students in education through the university e-learning portal.

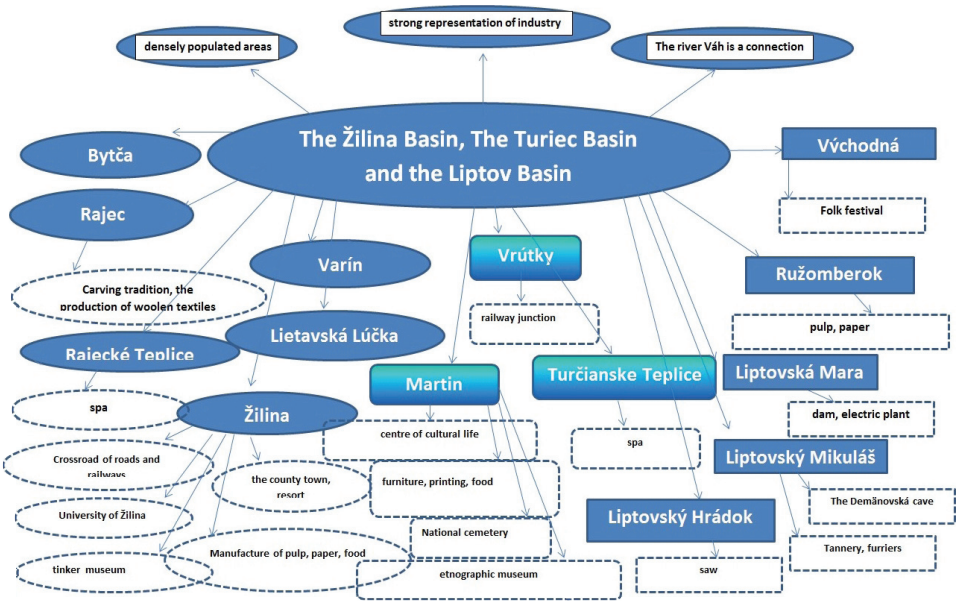

Figure 3. A sample of a conceptual map that serves students to systematise the acquired knowledge and encourage the formation of students' information competencies in the initiating teacher education

Source: a student's work.

In such communication, we use written feedback, in which our students can select the attitude to the following statements (on the 5-grade Likert scale):

1. Access to and communication with the university teacher affects my approach to pupils when realising teacher's practice.
2. Methods and forms used by the university teacher inspire my choice during teacher's practice.
3. The university teacher prepares me for the "reality" connected with working as a teacher.
4. Innovative organisation of teaching (e.g. using ICT, e-learning) should be a routine part of the university students' education.
5. The level of the university teacher's knowledge should exceed the level of his/her teaching skills.
6. The university teacher positively influences my view of the teaching profession.
7. The university teacher's character and personality significantly affect the quality of his/her teaching.

In this paper, we have already indicated that in addition to the application of group or cooperative forms of learning and blended learning at FHV ZU, we also seek to assess and develop university students' metacognitive strategies to support learning processes (especially when working with and learning from text information). Students of humanities and social sciences frequently work with academic texts. Particularly, students in the first year are acquainted with metacognitive learning strategies and effective reading strategies (in subjects like Introduction to the Study, General Education, etc.). We have good experience with strategies that promote students' learning. Examples of this strategy include SQ3R strategy, PLAN strategy, KWL strategies (for more in the guidance for the application of those strategies, see: Heldová, Kašiarová, & Tomengová, 2011). This is particularly true for groups of students with different cultural background. During the courses, students are led to order key information according to certain criteria and to express the information graphically (conceptual maps). We also require students to present the content of the selected topics in their own words and to express their own opinion about the topics. The aim is to develop students' skills to create questions about the selected topics and further analyse the topics through various forms of their own reflection (a weblog, an essay, etc.).

Table 1.
Activating tasks to support students of teachers' programme information competencies in the initiating stage of education

Task
Situation: At the beginning of their teaching practice, teachers may encounter the situation when there is no "support teaching material" which pupils need to work with. How will you solve this situation? Your task: Please prepare suitable teaching material in the form of one chapter of a textbook (at least 4 pages, a title page is not counted, line spacing 1.5, and standard page margins) for a chosen age group (any grade at primary or secondary school) for your teaching subject. Try to maintain the methodological principles of clarity of the information presented, the adequacy of the terms, and explanation as appropriate for the chosen age group of students. Use: • a suitable topic for study material and choose a grade of primary or secondary school to which the material will be directed; • a selection of appropriate text and images from the Internet; • colour differentiation according to the relevance of the information (to distinguish important from less important terms) to create an appropriate structure of the text according to cognitive abilities of students; also, use headings and subheadings; • the toolbar with drawing or sketchbook to create diagrams; • forms of columns, tables, framing the text. Modify the cover page of teaching material (use header and number of pages, and at the end of the study material devise tasks (questions) to identify the level of the knowledge gained from the teaching material created by you).

Source: own work.

Development of students' critical thinking through creation of clear rules when evaluating their work

In connection with the development of students' critical thinking, we emphasise the question of evaluation of material created by students. During direct interaction with students at seminars, we observe the students' work, and we provide feedback in many ways. Students are sensitive to any assessment. Both university teachers and university students have their specific ideas and intentions associated with assessment. Obviously, (Kolář & Šikulová, 2005) any assessment should be an attempt to improve the relationship between teachers and students. Assessment should include formation of the relationship of mutual expectations of work performance, the relationship of cooperation, searching for solutions for handling knowledge, etc. It is possible that this is the way of strengthening a teacher's authority, students' confidence, but also students' ability to think critically about various phenomena and issues (including their own achievement). Existing options for teachers to subjectively evaluate students' achievement are an expression and a symbol of a professional teacher's competence. Thus, teachers have a unique right and responsibility to assess the quality of students' performance (Slavík, 1999).

When students present the created material, we emphasise that the material must be in a form which the audience will understand. In this situation of evaluation, having clear rules is the benefit. The existence of clear evaluation rules is an assumption that both sides will understand and perceive the assessment as objective. As a result, we stress that university teachers and students need to know how to evaluate and continuously develop this skill. It is very important to acquaint students with both the requirements for their presentation and the evaluation criteria. Evaluation criteria can vary. The example given in Table 2 can be modified depending on the situation and needs of students and teachers.

Table 2.
An example of Evaluation Sheet with criteria for evaluating students' presentation

	Evaluation Sheet	Score
1. Visual quality of electronic presentation Terminology, style, and professional text quality	Graphics – quality of charts, pictures, and graphs	
	Clarity, conciseness, and adequacy of the information	
	Adequate text processing (font size, colour) and background in presentation	
	Identification of the sources used in the presentation	
	Systematic arrangement, structure of the information	

2. Quality of work with e-sources	The diversity and uniqueness of the sources
	Connection to the topic
	Using knowledge from practice
	Completeness of processing the topic
	Appropriateness for the selected age group
3. Quality of students' presentation skills	Communication with the audience, eye contact, keeping their attention
	Adequate gestures, appropriate level of self-confidence, inflexion of voice
Total score	

Source: own work.

Conclusions

This article deals with information education in the context of multicultural education. It adresses didactic aspects of the use of ICT in educational environment. Now, more than ever, university teachers and students in Slovakia are in contact with students coming from different cultural backgrounds. This text points out the principles of teaching and learning which should be considered in the design of e-content, with an emphasis on developing students' information competence linking all aspects of multicultural education. In this context, it aims to contribute to the objectives of multicultural education (according to Mistrík et al., 1999). It means the development of students' ability to tolerate and appreciate other cultures (respect for the existence of other cultures), which is, however, not only acceptance of other cultures (ability to empathise with feelings of the people), but also active involvement (care about a different world). By doing this, we empower young people to take an active role in their learning, and subsequently to take an active role in their future jobs and life in general. The authors promote the exchange of information, knowledge, and materials about all relevant issues concerning education in multicultural societies amongst teachers, teacher trainers, and professionals working in the curriculum development, which is one of the main aims of the International Association for Intercultural Education (IAIE).

Appendix 1

Formative evaluation questionnaire

1. How do you evaluate your work with a virtual learning environment LMS Moodle? (Circle only those statements that match your opinions.)
a) I have problems with the work in LMS Moodle when connecting to the Internet.
b) I have connection problems only when I work with the Internet Explorer browser.
c) Access to the Moodle LMS was quick and smooth.
d) At the beginning I could not orientate myself in LMS Moodle.
e) I propose that the tasks should be sent only via e-mail.
f) Moodle environments are transparent.
g) I am not satisfied with graphics and editing virtual environments.
h) Moodle environment is understandable, the "user-friendly" is intuitive.
i) Working with Moodle is pretty good, I prefer it to pen and paper.
j) I am satisfied with graphics editing in virtual environments.
k) I still need help with language because some icons and titles in LMS Moodle are not in English.
k) Other …
2. If you see the positives in the study with LMS Moodle, what are they? (Circle only those statements that match your opinion.)
a) It is appropriate for "blended learning."
b) It is appropriate for the combined form of higher education.
c) It is appropriate for distance learning.
d) Such courses using virtual environment and passing tasks force me to do regular work.
e) I appreciate the choice of time for working on tasks.
f) I do not know about more effective forms of learning yet.
g) I appreciate summarising information from the workshops, I understand it better.
h) Tasks facilitate the preparation for the exam test.
i) I appreciate lectures available in .ppt version.
j) Other …
3. If you see the negatives in the study with LMS Moodle, what are they? (Circle only those statements that match your opinion.)
a) I do not have the ability to connect to e-learning now in school at PC classrooms of FHV.
b) I am not sufficiently motivated to work in LMS Moodle.
c) I miss more active conversations with the teacher.
d) Not all teachers at FHV use this technology in teaching, although it could facilitate study and access to information.
e) Tasks could be more attractive and "in practice."
f) I missed synchronous chat for questions related to the subject or lecture.
g) Other …

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Andrea Kubalíková, Jana Trabalíková

Rozwijanie kompetencji informacyjnych studentów za pomocą edukacji wielokulturowej za pomocą uniwersyteckiej platformy e-learningu

S t r e s z c z e n i e

W niniejszej pracy chcielibyśmy przedstawić nasz sposób myślenia o podejściu do studentów pod względem wykorzystywania e-learningu w kontekście społeczeństwa wielokulturowego. Koncentrujemy się na kwestii rozwijania kompetencji informacyjnych w środowisku edukacji wielokulturowej. Niniejsza praca pokazuje również przykłady dobrych praktyk na Uniwersytecie Żylińskim, zwłaszcza w nauczaniu za pośrednictwem platformy e-learningu i LMS Moodle.

S ł o w a k l u c z o w e: e-learning, alfabetyzm informacyjny, kompetencje informacyjne, edukacja informacyjna, technologie informacyjne, technologie komunikacyjne, kryteria oceny, LMS Moodle, edukacja wielokulturowa

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Развитие информационных компетенций студентов в контексте поликультурного образования с использованием платформы электронного обучения университета

Аннотация

В статье представлены размышления о подходах и перспективе использования студентами электронного обучения в контексте мультикультурного общества. Мы сосредоточены на вопросе развития информационных компетенций в условиях поликультурного образования. В статье также приводятся примеры новых практик, особенно при обучении с помощью платформы электронного обучения, LMS Moodle, в университете Жилины.

Ключевые слова: электронное обучение; информационная грамотность, информационные компетенции; нформационное образование; информационные технологии, коммуникационные технологии; критерии оценки; LMS Moodle, поликультурное образование

Andrea Kubalíková, Jana Trabalíková

Desarrollando Competencias de Información en los Estudiantes en el Contexto de la Educación Multicultural Utilizando una Plataforma Universitaria de E-learning

Resumen

En este artículo se informa sobre las opiniones de los estudiantes sobre el uso del e-learning en el contexto de una sociedad multicultural. Nos centramos en la cuestión del desarrollo de las competencias en materia de información en el ámbito de la educación multicultural. Este artículo también proporciona ejemplos de buenas prácticas, especialmente cuando se enseña a través de la plataforma de e-learning Moodle en la Universidad de Žilina.

Palabras clave: e-learning; alfabetización informacional, competencias en materia de información; educación de la información; tecnologías de la información, tecnologías de la comunicación; criterios de evaluación; LMS Moodle, educación multicultural

IV
Reports

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Report on the Implementation of Work Package 4 "Selection and Testing New ICT Tools" in the Framework of the IRNet Project

Abstract

This article, prepared by an international team of authors – researchers from different scientific areas, connected with ICT, e-learning, pedagogy, and other related disciplines – focuses on the objectives and some results of the IRNet international project. In particular, this article describes the research tools, methods, and some procedures of the Work Package 4 (WP4) "Selection and Testing New

ICT tools": Objectives, Tasks, Deliverables, and implementation of research trips. Researchers from partner universities have analysed the results of WP4 in the context of the next stages and Work Packages of the IRNet project – International Research Network.

K e y w o r d s: Information and communicational technology tools (ICT), road map, skills, Custom Satisfaction Evaluation Model (CSEM)

Introduction

Worldwide research has shown that ICT can lead to improved student learning and better teaching methods. A report made by the National Institute of Multimedia Education in Japan proved that an increase in student exposure to educational ICT through curriculum integration has a significant and positive impact on student achievement, especially in terms of "knowledge comprehension," "practical skill," and "presentation skill" in subject areas such as mathematics, science, and social studies. However, we can see that there are many education technology solutions which may cause confusion among educators about how to choose the right ICT tool. Let us have a look at the advantages and disadvantages of ICT tools for education, and discover what kind of education ICT solution is suitable for your school needs (ELMO).

In their article, Mikropoulos and Natsis (2011) analyse educational virtual environments. Authors McKenna, Baxter, and Hainey (2016) discuss the application of e-portfolio evaluation criteria to the blackboard LMS e-portfolio. Terry and Cheney (eds.) (2016) analyse the use of virtual and personal learning environments in the context of optimal learning. Brown (2004) looks at the development and evaluation of electronic portfolios for advanced degree programmes. Latest technologies and teaching in the new methodologies environment are analysed in Reis (2008), as well as virtual classrooms implementation (Reis, 2010b), and skills expected of teachers in the school of the future (Reis, 2011a). Other authors describe the research tools, methods, and some procedures of the Work Package 4 (henceforth: WP4) "Selection and Testing New ICT tools": Objectives, Tasks, Deliverables, and implementation of research trips (Smyrnova-Trybuska et al., 2014; Smyrnova-Trybulska, Noskova, Pavlova, Yakovleva, & Morze, 2016; Smyrnova-Trybulska et al., 2015; Smyrnova-Trybulska et al., 2016; Cápay et al., 2016). Researchers from partner universities have analysed the results of WP4 in the context of the next stages and Work Packages of the IRNet project – International Research Network.

Road Map of WP4 and Chosen Research Results

As part of Work Package 4, objectives were implemented that related to:

- selecting and testing new IT tools: social media, selected Web 2.0 and Web 3.0. Massive Open Online Courses, etc; evaluating synchronous and asynchronous tools, methodologies, and good practices; comparing and evaluating LMS (Learning Management Systems), CMS (Contents Management Systems), VSCR (Virtual Synchronous Classrooms), SSA (Screen Share Applications), CSA (Contents Sharing Application), cloud computing environment;
- identifying and defining profiles of a virtual campus, a virtual learning environment, and a virtual synchronous classroom; reviewing and comparing virtual classrooms (VCR) based on hardware equipment against the ones based on PCs; identifying VCRs better serving a teacher's or student's activities; comparing, from the technological point of view, the most known VCRs (PC based) available on the market; analysing the technological profile that virtual classrooms should have to ensure a good pedagogic result;
- characterising methodological and technological aspects of multimodal didactic communication; and
- identifying the general methodological aspects of VCR with a special focus on online tutoring, continuous online evaluation, and good practices; testing IT tools in effective developing of ICT and e-learning competencies as well as in design of intercultural competencies.

In this sense, different results have been established with regard to the following statements:

1. Effective use of the ICT instruments in education: "How should one teach in the 21st century? The teacher's skills and tools to work in the education environment;" the teacher's skills in the school of the future;
2. Perspectives of the school of the future;
3. New educational strategies in modern information space;
4. High-tech educational informational environment;
5. Innovations in higher education – modern communications and collaboration at the university using specific IT tools; IT tools – good practice of effective use in education.

The main points of each result were discussed and compared with previous knowledge in the field of ICT tools.

Results 1. Effective use of the ICT instruments in education: "How should one teach in the 21st century? The teacher's skills and tools to work in the education environment"

From a qualitative perspective, some research was conducted, focus groups were created, and debates between countries proved useful in establishing the categories that define the skills of new century teachers. Those skills are related to:

- communication,
- collaboration,
- creativity,
- critical thinking and problem solving,
- productivity,
- social networking,
- reflection and feedback, and
- searching.

Other necessary skills of the teacher of the future are:

- the ability to present content in a multimedia format (presentations and didactic videos);
- the ability to provide face-to-face and online tutoring;
- the ability to make formative continuous assessment and evaluation;
- the ability to use an LMS; and
- the ability to work in a distance mode and to use a virtual classroom.

Results 2. Perspectives of the school of the future

From a qualitative perspective, using e-round table debates, various reflections on, insights into, and scenarios for the school of the future have been analysed. Information about debates is available at http://areis-en-schooloffuture.blogspot.pt/.

Main results point to the following reflections about the school of future:

- the need of developing new models, profiles, and challenges;
- virtual synchronous classrooms;
- MOOC and alternative technology to teach in the school of the future;
- face-to-face and distance learning in the school of the future;
- mobile learning; and
- creating communication bridges.

Results 3. New educational strategies in modern information space

Different papers presented by dos Reis et al. (2015), Alonso et al. (2014), Morze et al. (2014), Noskova et al. (2013, 2014a, 2014b), Smyrnova-Trybulska et al. (2014) have established the main points of new educational strategies in modern information space. At this stage, the researchers and authors emphasise:

- the significance of collaborative and networked learning based on the interactive tutoring feedback model;
- competencies of e-learning and ICT; and
- electronic resources for organising students' independent work.

There are authors who have demonstrated favourable results of network learning to collaborate in their studies; however, contributions are smaller when we try to find a substitute for synchronous learning exchanges. Synchronous virtual classrooms (SVC) are suitable tools to promote collaborative learning by interactive tutoring when they respect the geographical facilities offered by distance learning, promoting the development and exchange of experience and learning. If we add to these circumstances a methodology based on collaboration through discussion and shared tasks, combining video conferencing, documents, synchronous boards, etc., it is possible to develop an attractive learning environment.

Results 4. High-tech educational informational environment

Smyrnova-Trybulska (2015), Švec, Drlik, Cápay, and Tomanova (2015), and Gutiérrez et al. (2015) have analysed high-tech educational informational environment. We assume that the term "innovate" has its origins in the Latin "innovare," which means "change or alter introducing new things." Following Drucker (1985), innovation is a specific tool, a means to exploit change as an opportunity. It is the action of providing resources offering a novel capacity to produce "wealth." Meanwhile, educational innovation has different connotations, as it involves planned and systematic exchange attempts. Thus, this potential change cannot be an isolated experience. However, change at the macro- and microstructural levels (Tejada, 2009) must be involved. This transformation should be new to the system in which it is being introduced, although it is original in itself. When someone innovates, he or she changes the state of things. That is, innovation is associated with an attempt for improvement, educational practice, effectiveness, and comprehensiveness.

In this regard, concerning innovation and ICT as investments, organisation is required, since it allows introducing revolutionary modernisation in the production process of goods and services. Therefore, reluctance to fully adopt innovation should be overcome; also, it is essential for it to be constructive in management, organisation, training, and communication. Needless to emphasise, ICT can represent a significant source of advancement for universities in notable processes that could convey increases in competitiveness and quality (Imbernon, 2008).

Results 5. Innovations in higher education – modern communications and collaboration at the university using specific IT Tools; IT tools – good practice of effective use in education

Smyrnova-Trybulska et al. (2015), Cápay et al. (2015), and Nakaznyi (2015) have taken a close look at students' beliefs and expectations about ICT-enhanced learning and perceived needs for intercultural development in the framework of the International Research Network (IRNet), aspects of distance and e-learning in Ukraine and the Slovak Republic, and substantive pattern of teaching practice organisation for the students of the translation department in higher educational institutions.

Researchers from different scientific areas, connected with ICT, e-learning, pedagogy, and other related disciplines, focus on the objectives and results of IRNet. In particular, they describe research tools, methods, and some procedures: objectives, tasks, deliverables, and implementation of research trips. Researchers from Poland, Russia, Ukraine, the Netherlands, Spain, Slovakia, Portugal, the Czech Republic, and Australia have analysed results of WP3 in the context of the next stages and Work Packages of IRNet.

In the process of reviewing key competencies for lifelong learning, it is important to take into account the recommendations of the European Parliament and the Council of Europe (Official Journal of 30th December, 2006) relating to eight key competencies which are defined as a combination of knowledge, skills, and attitudes appropriate to the context, which all individuals need for personal fulfilment and development, active citizenship, social inclusion, and employment. In addition to communication in the mother tongue, communication in foreign languages, mathematical competence, and basic competencies in science and technology, learning to learn, social and civic competencies, sense of initiative and entrepreneurship, and cultural awareness and expression, digital competencies occupy an important, prioritised position. In this document, this competence is described as "the confident and critical use of technology information society (IST) for work, leisure, and communication."

With regard to teacher training in digital competence, we can say that numerous previous studies in knowledge, attitudes, perceptions, beliefs, and/or practices of teachers on new technologies – as they were called in the 80s and 90s – begin with practicing teachers and initial training, and lately have focused on studying the digital competence of teachers in initial formation.

However, there are few papers that delve into the problems of combining teacher training in digital and intercultural competence, despite the fact that there are some experiences (Borrero & Yuste, 2011). Consequently, there is not very abundant literature in the European context that refers to teachers' digital and intercultural competence in initial or continuing training. However, it should be noted that there are the administrations at various levels that themselves have already begun to engage in political actions and create legislation that will make it possible to deepen work in this emerging field.

This paradigm is taken into account during the implementation of the IRNet project (International Research Network for the study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning and intercultural competencies). Besides, IRSES and the Marie Curie Actions initiative are taken into consideration, too, aiming at helping research organisations either set-up or strengthen long-term cooperation. This study is part of the fourth IRNet Work Package, which aims specifically to identify and define profiles of a virtual campus, virtual learning environments, and virtual synchronous classrooms, to characterise methodological and technological aspects of multimodal

didactic communication, and to emphasise the overall methodological aspects of VCR with a special focus on online tutoring, online continuous evaluation, and good teaching practices.

Research Programme

It was organised in five steps to identify and characterise research activities, to distribute tasks, to make a survey to compare tools, and to present results, with details as follows.

Step 1

18 May 2015 at 11h00 CET – an e-round table

- Agenda: the analysis of the previous experience in the area of effective use of the ICT instruments in education:
  - "How should one teach in the 21st century? The teacher's skills and tools to work in the education environment" – a debate, defining and distributing tasks.
- Documents available:
  - Reflections about scenarios for the school of the future (http://areis-en-schooloffuture.blogspot.pt/), an e-round table debate about "The school of the future." The participants, international experts in the field, were: Prof. P. Veiga (Former Prorector of Lisbon University), Prof. N. Pachler (Co-director of Education Institute of London University), Prof. D. Richardson (English Language Distance Teaching Coordinator at Linnaeus University), Prof. J. Duque (Director of Economy and Business Administration Faculty at Lisbon University), Prof. T. Hug (President of Multimedia Institute at Innsbruck University), Prof. X. Basogain (Multimedia Coordinator at University of the Basque Country), Prof. S. Bedin (WeZupport CEO, Sweden), Prof. Â. Pinto (PFISER international professional trainer), Prof. T. Passos (Dynargie professional Trainer coordinator);
  - Teachers' skills for the school of the future (http://areis-en-teachers-skils.blogspot.pt/). Experts participating in the presentation were: Prof. P. Veiga (Former Prorector of Lisbon University), Prof. A. dos Reis (The Graal Institute, Portugal), Prof. G. Siemens (Athabasca University), Prof. N. Pachler (Co-director of Education Institute of London University), Prof. T. Hug (President of Multimedia Institute at Innsbruck University), Prof. D. Richardson (Linnaeus University), Prof. S. Cubo (Extremadura University), Prof. X. Basogain (University of the Basque Country), Prof. F. Carrera (Lisbon University), Prof. P. Pinto (Lusiada University);

- Comments in the community – The school of the future: methods, technologies (https://plus.google.com/communities/114108209221659023662, short – http://goo.gl/fPJTyf);
- WP4 – blog http://areis-en-irnetseminar.blogspot.pt/.

Table 1.
WP4 Tasks distribution

Research team	Tools
University of Silesia (US, Poland) – Coordinator Borys Grinchenko Kyiv University (BGKU, Ukraine) Curtin University (CU, Australia) Constantine the Philosopher University (UKF, Slovakia) Dniprodzerzhinsk State Technical University (DSTU, Ukraine)	Presenting content in multimedia format
Lusiada University (LU, Portugal) Curtin University (CU, Australia) Abant Izzet Baysal University (Turkey)	Face-to-face and online tutoring
Herzen State Pedagogical University of Russia (HSPU, Russia) University of Ostrava (UO, Czech Republic)	Formative continuous assessment (face-to-face and online)
University of Silesia (US, Poland) – Coordinator Borys Grinchenko Kyiv University (BGKU, Ukraine) Curtin University (CU, Australia) Herzen State Pedagogical University of Russia (HSPU, Russia) Abant Izzet Baysal University (Turkey)	LMS and information and control systems
Borys Grinchenko Kyiv University (BGKU, Ukraine) University of Silesia (US, Poland)	Remote collaborative work and virtual meetings
Herzen State Pedagogical University of Russia (HSPU, Russia) Constantine the Philosopher University (UKF, Slovakia) Abant Izzet Baysal University (Turkey)	Other recommended tools

Source: own work.

Step 2

Actions:

- Forum – May to June 2015, activities until the end of May.
- Team members are expected to identify and recommend not less than 3 tools for each task up until the end of May. Identified tools for each team are expected to be reported in a Google drive document available for remote collaborative work:

Nº	Tool name	Website where to find	Short tool description

- 1 June – IRNet members' e-meeting to debate conclusions about work on progress.
- June – an e-round table to present and discussion about forum conclusions at JUTE: "Educational Technology Resources and Emerging Trends in Teacher Training" (UEX team).

Step 3

Comparison and evaluation of ICT tools (July–September 2015)

- Appointing the team to organise the survey to compare tools.
- July – teams responsible for identifying tools should present items to be used as criteria to evaluate and compare tools by each task to implement a CSEM (Custom Satisfaction Evaluation Model).
- July–August – an appointed team prepares a survey based on identified items by the research members, to be used to compare and evaluate items.
- September–October – a survey to compare and conclude about tools, using a CSEM.

Step 4

- November 2015 – a statistic treatment of survey results and final conclusions.
- December – an e-round table "Recommended and selected IT tools for different teaching methods and processes" to present conclusions.
- Work done:
  - Research reports about each activity and tools identified are available in short papers reports and 34 didactic videos – produced by the researchers about each activity, identifying relevant and necessary tools – available in the following links. All printable documents are prepared to be automatically translated to all languages, and videos are published and prepared to have subtitles in the languages of all members' languages, and open to be shared with the scientific community.
    To be a "blended" b- teacher in the 21st century – reflections
    http://areis-en-bteacher.blogspot.pt/
    Videos available about all subjects
    Details about how to watch YouTube videos
    https://youtu.be/Zb2IwoyKbe8
    Making Presentations and didactic videos
    http://ar-en-wp4-01present.blogspot.pt/
    Publishing documents – Tools and techniques for Webpage – Blog – PPT
    http://ar-en-wp4-02publish.blogspot.pt/
    Online tutoring
    http://areis-en-otutoring.blogspot.pt/
    About LMS
    http://areis-en-lms.blogspot.pt/
    Remote collaborative work
    http://areis-en-rcw.blogspot.pt/
    Learn how to learn
    http://areis-en-lhl.blogspot.pt/
    Search and manage contents
    https://youtu.be/_CretsExdhE

Formative assessment
http://areis-en-fass.blogspot.pt/

- Work-in-progress report of research is made about each activity. Information is available on Google Drive, in the articles, manuscripts, papers, and videos.

Stage 5

In order to implement appointed tasks, a seminar was scheduled to take place on 2 February 2016 during a research trip to Lisbon Lusíada University, integrating IRNet researchers and international invited experts.

More than 30 articles were prepared and submitted, as well as a document on WP4.

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   1) Noskova, T., Yakovleva, O., Pavlova, T., Morze, N., & Smyrnova-Trybulska, E.: "Modern education quality requirements and information technologies in academic teachers' activities."
   2) Gulesha, O., Sadovoy, O., & Voronova, Z.: "Experiment and means of information and communication technologies in teaching mathematics."
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1) Smyrnova-Trybulska, E., Morze, N., Kommers, P., Pavlova, T., & Sekret, I.: "Using effective and adequate IT tools for developing teachers' skills."

7. *IT tools – Good practice of effective use in education*, E. Smyrnova-Trybulska (Ed.). Katowice/Cieszyn: Wydawnictwo Uniwersytetu Śląskiego, STUDIO NOA, 2015. ISBN 978-83-60071-82-3.
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Other Results

5 conferences have been held:

- The international scientific-practical conference *XXIII Educational Technology Conference* (JUTE2015), held at UEx, Badajoz, Spain (11–12 June 2015) (http://eventos.unex.es/event_detail/1738/detail/jute-2015.html);
- International conference *Innovations in Higher Education – Modern Communications and Collaboration at the University Using Specific IT Tools*, held in DSTU, Dniprodzerzhinsk, Ukraine (23–24 June 2015);
- International scientific conference *Open Educational E-environment of the Modern University*, organised by BGKU, Kiiv, Ukraine (20 August 2015) (http://openedu.kubg.edu.ua/, http://openedu.kubg.edu.ua/index.php/conf/2015#.VplWHk8ufX8);
- International conference *Information and Communication Technologies in Education* (ICTE 2015), organised by OU, Czech Republic, in Roznov-pod-Radhostem (14–17 September 2015);

- 7th Annual International Scientific Conference *Theoretical and Practical Aspects of Distance Learning. IT Tools – Good Practice of Effective Use in Education* (DLCC2015), organised by US, Cieszyn, Poland (12–13 October 2015).

IRNet project seminar, (video) conference on WP4:

1. IRNet project seminar, (video) conference on WP4 in remote mode, 18 May 2015: "Work Package 4: Selection and testing new IT tools. Discussion about research tools, methods." Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain;
2. IRNet project seminar (video) conference on WP4 in face-to-face and remote modes, 07 July 2015: "Work Package 4: Selection and testing new IT tools. LMS systems. Presenting first results of evaluation and comparison" (E. Smyrnova-Trybulska). Organisers: prof. A. dos Reis (The Graal Institute , Portugal), Extramadura University, Spain;
3. IRNet project seminar and (video) conference in face-to-face and remote modes, 20 July 2015: "Work Package 4: Selection and testing new IT tools. Tools for making presentation and didactic video. Presenting first results of evaluation and comparison" (E. Smyrnova-Trybulska). Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain;
4. IRNet project seminar (video) conference on WP4 in face-to-face and remote modes, 07 September 2015: "Work Package 4: Selection and testing new IT tools. Tools for making presentation and didactic video. Presenting more important activities" (E. Smyrnova-Trybulska); "Presence and online tutoring," "IT-tools for printing and publishing didactic materials" (I. Sekret, other researchers from Abbaz University). Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain;
5. IRNet project (video) conference in face-to-face and remote modes, 28 September 2015: "Work Package 4: Selection and testing new IT tools. Tools for making presentation and didactic videos. Presenting the pedagogical and methodological aspects effectiveness use in education" (E. Smyrnova-Trybulska); "Social media for face-to-face and online tutoring" (I. Sekret, other researchers from Abbaz University). Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain, University of Silesia, Poland;
6. IRNet project (video) conference in face-to-face and remote modes, 26 October 2015: "Work Package 4: Selection and testing new IT tools. LMS systems. Presenting more important activities" (E. Smyrnova-Trybulska); "Formative continuous assessment (face-to-face and online)" (T. Pavlova, J. Malach). Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain, University of Silesia, Poland;

7. IRNet project seminar and (video) conference in face-to-face and remote modes, 09 November 2015: "Work Package 4: Selection and testing new IT tool. LMS systems. Presenting the pedagogical and methodological aspects of effective use in education" (E. Smyrnova-Trybulska). Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain;
8. IRNet project (video) conference in face-to-face and remote modes, 23 November 2015: "Work Package 4: Selection and testing new IT tools. Presenting the concept of distance learning course and focus group for conducting the next stage of research," "Remote collaborative work and virtual meetings" (N. Morze, R. Makhachashvili, BGKU). Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain;
9. IRNet project seminar and (video) conference in face-to-face and remote modes, Cieszyn 30 November 2015: "Work Package 4: Selection and testing new IT tools. Discussion about research tools, methods." Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain, University of Silesia, Poland;
10. IRNet project seminar and (video) conference in face-to-face and remote modes, 14 December 2015: "Work Package 4: Selection and testing new IT tools. Discussion about research tools, methods." Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain;
11. IRNet project (video) conference in face-to-face and remote modes, 21 December 2015: "Work Package 4: Selection and testing of new IT tools. Presenting and analyzing videotutorials. Final conclusions." Organisers: prof. A. dos Reis (The Graal Institute, Portugal), Extramadura University, Spain, University of Silesia, Poland.

Workshops

1. Research trip of US, UKF, LU academic staff to BGKU (August–September 2015):

- Project seminar and workshop conducted by prof. N. Morze (BGKU) and prof. E. Smyrnova-Trybulska (US): presentation and detailed analysis of the objectives, tasks, deliverables of the WP4 in the context of the research trip to to BGKU (21 August 2015);
- Seminar "Analyzing of conception and road map," elaborated by prof. A. dos Reis about selecting and testing new IT tools (26 August 2015);
- Workshop "E-environment of the Novopecherska school for increase of quality of education and protection of information" conducted by A. Kacharian – IT Director of the Novopecherska School (4 September 2015);
- Workshop on robotics design and use IT-tools for programming of different kind of robotics, conducted by S. Dziuba, IT teacher (Secondary School No. 141 – ORT Lyceum with a profile of technology and foreign language) (04 September 2015);

- Workshop "The main category of IT tools for education. LMS systems, description and items of facilities" conducted by prof. E. Smyrnova-Trybulska (US) (8 September 2015);
- Workshop on 3D technology, conducted by dr M. Cápay (UKF) (9 September 2015).

2. Research trip of DSTU, BGKU, HSPU academic staff to OU (September–October 2015):

- Workshop moderated by prof. J. Malach (OU), setting up the objectives and nearest deadlines of WP4 (22 September 2015);
- Project meeting and workshop moderated by prof. Y. Kapounova (OU). Discussion on project deliverables in the OU collective monograph (24 September 2015);
- Seminar and workshop on formative assessment tools and activities (25 September 2015) moderated by prof. J. Malach;
- Workshop of Formative Assessment tools moderated by prof. J. Malach. A comprehensive list of FA quality indicators according to the educational goals and short-term/long-term objectives was suggested. The integrated system of Formative Assessment tools expertise criteria was elaborated (30 September 2015);
- Workshop with prof. J. Malach at the Dean's office, moderated by prof. J. Malach and prof. K. Kostolányová. Presentation of WP4 results and potential deliverables over the span of stay at Ostrava University (05 October 2015);
- Online seminar and workshop moderated by prof. A. dos Reis and prof. E. Smyrnova-Trybulska. Round table debate presentation test and preliminary discussion (07 October 2015);
- Shadowing during the course of Information Literacy moderated by prof. K. Kostolányová. The IRNet project as part of the international research initiative was outlined for the students (08 October 2015).

3. Research trip of of UEx, UT academic staff to CU (October–December 2015):

- Prof. Sampson's workshop: attending the workshop by D. Sampson about context-aware adaptive and personalised mobile learning system (12 November 2015);
- Meeting, workshop, and team work with the Head of Curtin School of Information Systems (SIS) prof. P. Dell (13 November 2015);
- Workshop and round table "The use of ICT in higher education teaching" (face to face and b-learning) by dr Theodora Issa and dr Tomayess Issa. (14 November 2015);
- Workshop in the Library of Curtin University aimed to introduce the document management system developed by the library staff. Dr K. Delaney described the different document managers and data bases frequently used, together with the services offered to research and teaching staff of CU. As a result of

that meeting, a training session about EndNote software was appointed on 23 November (16 November 2015);

- Seminar and workshop "Presentation of the Spanish educational system": the speakers presented theoretical backgrounds for the Spanish school system throughout each level of the Spanish education system, from primary school, secondary education, higher education, to university entrance examination. On the other hand, a methodological approaching in primary education was analysed (17 November 2015);
- E-workshop "IT Tools for developing teachers' skills. Ideas and questions for emerging trends in education" focused on the so-called "Learning Emerging Technologies," mainly on those catalogued in the NMC Horizon Project Listing (19 November 2015); URL video: http://unex.adobeconnect.com/p81o6nba2of/;
- Training course: "Endnote for research" about the use of Endnote as a resource for research in social sciences with the participation of K. Delaney (Faculty Librarian of Curtin Business School) (23 November 2015);
- E-Workshop "Qualitative research in ICT and education: paradigms analysis and real practice" (23 November 2015);
- Meeting with dr T. Dobinson and J. Chen from the School of Education (24 November 2015);
- Meeting and workshop dedicated to analyses of the software New v5.4 Echo360 PCAP: CU presented the software New v5.4 Echo 360 PCAP. The speaker showed how lecturers can capture, videotape their own lesson so that students receive immediate access to it (24 November 2015);
- Workshop and meeting with Z. Nau and T. Issa. The objective was to share information regarding different Synchronous Virtual Classroom systems which promote the cooperative and self-learning (27 November 2015).

Moreover, during the 7th Annual International Scientific Conference DLCC 2015 *Theoretical and Practical Aspects of Distance Learning. IT Tools – Good Practice of Effective Use in Education*, held in US, Cieszyn, Poland (12–13 October 2015), two workshops were organised:

- "E-learning methodology in practice," conducted by prof. A. dos Reis (Portugal); and
- "Digital inclusion in education – a text alternative and e-learning platforms," conducted by dr I. Mrochen (Poland).

Additional achievements are as follows:

- a new project has been started: a scientific journal – *International Journal of Research in E-learning* (IJREL) (http://weinoe.us.edu.pl/nauka/serie-wydawnicze/international- journal-research-e-learning);
- developing video didactic materials for MOOC on IT tools for effective use in education;
- creating new innovative educational programmes (specialisations) on the basis of the European and national standards and qualification frameworks; and

- conducting research among specialists from education and business, and developing an innovative educational programme for postgraduate studies on e-learning.

Conclusions

In this paper, the authors presented most important results of Work Package 4 "Selection and Testing New ICT tools": Objectives, Tasks, Deliverables, and implementation of research trips, as well as Objectives, Tasks, and Deliverables within the framework of the international research project IRNet – "International Research Network for study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning and intercultural competences" (www.irnet.us.edu.pl). The international team of researchers from the University of Silesia in Katowice (Poland), and partner universities from European and non-European countries from the IRNet consortium will be continuing the study and research according to the Project Documentation and the project scheduler; in the near future, they will publish subsequent papers and manuscripts in the conference proceedings as well as in the scientific journal and monograph.

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Raport z wdrożenia Pakietu Roboczego 4 „Selekcja i testy nowych narzędzi teleinformatycznych” w ramach projektu IRNet

S t r e s z c z e n i e

Niniejszy artykuł, opracowany przez międzynarodowy zespół autorów – badaczy z różnych dziedzin naukowych związanych z teleinformatyką, e-learningiem, pedagogiką i innymi powiązanymi z nimi dziedzinami – koncentruje się na celach i niektórych wynikach międzynarodowego projektu IRNet. W szczególności artykuł ten opisuje narzędzia badawcze, metody i pewne procedury Pakietu Roboczego 4 (dalej: WP4) „Selekcja i testy nowych narzędzi teleinformatycznych”: cele, zadania, rezultaty, realizację podróży badawczych. Badacze z partnerskich uniwersytetów przeprowadzili analizę wyników WP4 w kontekście kolejnych etapów i pakietów roboczych IRNet – międzynarodowego projektu badawczego.

S ł o w a k l u c z o w e: narzędzia teleinformatyczne, mapa, umiejętności, model oceny satysfakcji użytkownika

António dos Reis, Sixto Cubo Delgado, Prudencia Gutiérrez-Esteban, Laura Alonso-Díaz, Eugenia Smyrnova-Trybulska, Tatiana Noskova, Nataliia Morze, Kateřina Kostolányová, Martin Drlik, Tomayess Issa

Отчет о ходе выполнения рабочего пакета 4 «Отбор и тестирование новых ИКТ-инструментов» в рамках проекта IRNet

Аннотация

В данной статье, подготовленной международной группой авторов, исследователей из разных научных областей, связанных с ИКТ, электронным обучением, педагогикой и другими смежными областями, основное внимание уделяется целям и некоторым результатам международного проекта IRNet. В частности, в этой статье описываются инструменты исследования, методы и некоторые процедуры исследования в рамках рабочего пакета 4 (далее: WP4) «Выбор и тестирование новых ИКТ-инструментов»: цели, задачи, ожидаемые результаты, выполнение научно-исследовательских поездок. Исследователи из университетов-партнеров, проанализировали результаты WP4 в контексте следующих этапов и пакетов работы проекта IRNet – Международной научно-исследовательской сети.

Ключевые слова: информационные и коммуникационные технологии (ИКТ-инструменты), дорожная карта, навыки, модель оценки удовлетворенности клиентов (CSEM)

António dos Reis, Sixto Cubo Delgado, Prudencia Gutiérrez-Esteban, Laura Alonso-Díaz, Eugenia Smyrnova-Trybulska, Tatiana Noskova, Nataliia Morze, Kateřina Kostolányová, Martin Drlik, Tomayess Issa

Informe sobre la Implementación del Work Package 4 “Selección y Test de nuevas herramientas TIC” en el marco del Proyecto IRNet

Resumen

Este artículo, elaborado por un equipo internacional de investigadores de diferentes áreas científicas, vinculados con TIC, e-learning, pedagogía y otras disciplinas afines, se centra en los objetivos y resultados obtenidos en el proyecto internacional IRNet. En particular, este artículo describe las herramientas de investigación, los métodos y algunos procedimientos del Work Package 4 (en adelante: WP4) “Selección y Test de Nuevas Herramientas TIC”: Objetivos, Tareas, Productos e implementación de viajes de investigación. Investigadores de las universidades participantes analizaron los resultados de WP4 en el contexto de las próximas fases y Work Packages del proyecto IRNet.

Palabras clave: herramientas de tecnología de la información y la comunicación (TIC), hoja de ruta, habilidades, modelo de evaluación de la satisfacción del cliente (CSEM)

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