# E-learning environment compared to traditional classroom.

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# E-learning environment compared to traditional classroom

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**Abstract - Throughout history, the educational process used different educational technologies which did not significantly alter the manner of learning in the classroom. By implementing e-learning technology to the educational process, new and completely different innovative learning scenarios are made possible, including more active student involvement outside the traditional classroom. The quality of the realization of the educational objective in any learning environment depends primarily on the teacher who creates the educational process, mentors and acts as a moderator in the communication within the educational process, but also relies on the student who acquires the educational content. The traditional classroom learning and e-learning environment enable different manners of adopting educational content, and this paper reveals their key characteristics with the purpose of better use of e-learning technology in the educational process.**

## I. INTRODUCTION

Educational environment, at any level, includes three basic elements: a person who teaches (a teacher), a person who is taught (a student) and an educational content. The quality of the realization of the educational goal, i.e. the actual educational success of the person who is being taught, depends on two key factors: the teacher who creates the educational environment and the student who receives the educational content.

Throughout history, different technologies have been used (radio, television, records, tape recorders, etc.) which enabled the presentation of the educational content in textual, audio and video format. The introduction of the Internet created the possibility of acquiring educational material from any place at any time, and gradually, a new form of teaching and learning was developed - e-learning.

The practice indicates that the e-learning technology, as the fourth element of the education system, is becoming increasingly used in the higher education, but also that it is being introduced at different levels. E-learning technology enables students to step out of the unnatural learning environment, the classroom, and it simulates the natural learning environment.

Designing the educational process in any educational environment starts by defining the outcome of learning and predicting the method of knowledge assessment, on which the educational content and educational process are based. During the educational process, different teaching and learning strategies are used which motivate and encourage students to self-directed learning..

## II. HIGHER EDUCATION

The most common forms of classes in Croatian higher education, according to Jurić [13], are: lecture, seminar, exercises, mentoring/consultations and exams.

The lecture is defined as a form of executing the educational process where a lecturer delivers certain information about theoretical knowledge to a number of students and those information are the guidelines for further individual work. The lecture is one of the "irreplaceable, useful and required forms of higher education" [13]. Due to problems in educational communication within large groups of students, forms of classes such as seminars and exercises are organized in certain courses. Jurić points out the importance of seminar work dominated by two-way communication between the teacher, students and educational content, as well as problem-based approach. "Research is the key characteristic of seminars" [13]. Practical work and other activities conducted in laboratories or special cabinets, field work, etc., where students experience study material in a specific way, are organized in the form called exercises. Jurić points out that exercises are extremely important element in higher education lessons and that they achieve "perfection in a professional sense"[13]. He also emphasizes the importance of mentoring/consultations which are delivered through two-way communication between one student and a teacher and are initiated by "student's personal interest". The final form of lessons in higher education are exams (evaluation) where teacher's task is to give students feedback about their progress, which is the basis for the advancement in the next level. To execute the lessons in the higher education, teachers are expected to possess not only the knowledge about the subject, but certain pedagogical competences as well. The publications on the topic use the term *higher education pedagogy* even though "students are not children", therefore Jurić [13] recommends the term *higher education andragogy*.

However, the term *pedagogy* is so widespread that it has become the synonym for instructional design [3].

According to Whitmyer [3], the basic differences between traditional pedagogy and andragogy are presented in Table 1.

TABLE I. BASIC DEFFERENCES BETWEEN TRADITIONAL PEDAGOGY AND ANDRAGOGY (ACCORDING TO WHITMYER [3])

| Underlying Assumptions | | |
|---|---|---|
| Topic | Traditional Pedagogy | Adult Learning |
| Learners/emloyees | Dependent | Independent |
| Subject matter | One right way | Many ways |
| Motivation to learn, change, or improve | External, dictated by others | Internal, response to personal/career needs |
| Role of experience | Unimportant or even discounted | A rich resource that can be the basic for learning, change or improvement Must be integrated |
| Learner/employee self-concept | Need outside direction | Capable of self-direction |
| Learning orientation | Subject-centered Logic-oriented | Life/career-centered Process centered |
| Objective | Minimum requirements | Self-betterment |

On the other hand, Pew [12] emphasizes the importance of both pedagogy and andragogy and the problem of the wrong approach to motivating students in higher education, especially the difficulties occurring when applying pedagogical methods where the knowledge in andragogy should be used. According to Pew [12], to apply pedagogical models means to convey the knowledge in *controlled conditions* where teachers have the role of encouragers, rather than conveyers of knowledge. In andragogy, the focus is on creating the learning environment which enables acquiring the ability of critical thinking about the content, the application of the knowledge in practice, more student control of their educational activities and acquiring knowledge, as well as determining the learning outcome as a measure of student contentment [12].

Therefore, teachers choose the educational methods, technology and activities according to students' characteristics, subject characteristics and learning outcome, and they create a suitable learning environment which enables students to reach the favorable outcome.

III. CHARACTERISTIC OF THE E-LEARNING ENVIRONMENT

Besides the term e-learning environment, the publications also use terms online learning environment, virtual learning environment, web-based instruction, web-based learning environment [11]. Mishra [11] points out that the e-learning environment are not materials available on web pages.

To create e-learning environment the following resources are needed [4]: content, technology, instructional support, technology support, infrastructure and organization. Therefore, to create a high quality e-learning environment a team of experts are required:

teacher, programmer, multimedia expert, expert in both e-learning technology and pedagogy, the so-called instructional designer, and administrator, where certain roles can be performed by a single person.

One of the e-learning definitions states: "E-learning is an innovative approach to delivering electronically mediated, well designed, student-oriented, interactive e-learning environment, independent of the place and time, whether by using Internet or digital technologies according to the instructional design principles" [8].

The definition mentions key characteristics of the e-learning environment, among others the instructional design and the design of the user interface which have a special role in the quality of the e-learning environment.

A. *Instructional design for e-learning*

To successfully design an e-learning environment it is important to understand the ways in which people learn, therefore Ally [10] stresses that the education strategy contained in educational materials is more important than the technology used for its conveying. For that reason, numerous models of instructional design have been created based on the traditional teaching and learning schools: behaviorism, cognitivism, constructivism and their combinations.

Generally, instructional design combines knowledge in technology and pedagogy, and it includes: determining the learning objective, comprehension of the educational context (culture, students' characteristics such as previous knowledge, age, competence, etc.), availability of the resources, material development, the use of teaching and learning methods, and learning outcomes assessment [8].

Nam and Smith-Jackson [2] divides the models of instructional design into three main categories:

- objectivist instructional design models – based on the behavioral (goals developed as the means of measuring learning outcomes) and cognitivist (learning schemes organized in advance) learning theory

- constructivist instructional design model – based on the constructivism where learning outcomes are not always predictable

- combined instructional design model – depending on the educational context, it combines all three learning philosophies

Nam and Smith-Jackson [2] defines constructivism as the most effective model for the advanced level of knowledge.

Due to the imperfections of the traditional learning theories, Siemens [7] has developed a new learning theory called *connectivism* which is regarded as *a learning theory for the digital age* and it integrates the chaos theory, complexity, self-organization and network (technology, people, learning community). Some other learning theories are: Adult Learning Theory (P. Cross), Andragogy (M. Knowles), Double Loop Learning (C. Rogers), Social Development (L. Vygotsky), Experimental Learning and others [3].

To simplify the learning theories, the following models are used. Dick and Carey, rapid prototyping, Knirk and Gustafson and others, among which the most commonly used in higher education is ADDIE (Analyze, Design, Develop, Implement, Evaluate) model and COSE model. What is characteristic for the COSE model are the three layers, primary, secondary and advanced, organized through three basic elements: learning goal, learning activities or the learning environment, learning outcomes and the skill [3].

Ally [10] stresses the importance of a good selection of online learning strategies which need to present educational material in a way to enable effective student involvement. Behavioral strategies can be used for teaching facts, cognitivist strategies for teaching principles and processes, and constructivist strategies for teaching the application of knowledge in real life and for contextual learning [10].

Holzl [1] points out that a trend of globalization in the field of education results in increasing level of diversity between higher education students and there is a greater interest for designing a constructivist e-learning environment where students can create their own knowledge from the information presented in the online material [1], [10]. According to Jonassen (1998), the components of the constructivist e-learning environment are: question/case/problem/project/issue, related cases, information resources, cognitive (knowledge-construction) tools, conversation and collaboration tools, social/contextual support [7].

The educational content can be presented in different multimedia formats: textual, audio, video, web page, PowerPoint presentation, animation, simulation and other.

Creating the educational content is a process which involves creation and testing of the media elements [4].

Teachers can download educational content in digital format from a repository or they can create their own. The advantage of the digital format is its ability of multiple use, with or without new content upgrade, in different educational contexts.

According to Gillan, while creating the multimedia educational content it is important to integrate knowledge from four fields: technology, learning theories, interface design and educational process design [5].

*B. Educational user interface design*

The design of the effective user interface is extremely important in e-learning environment as it is one of the factors for student success, because it determines how students can focus on acquiring educational content (Lohr, 2000) [1], [5]. When creating the e-learning environment, the designer needs to take into consideration "the way in which the educational material is presented in terms of visual, audio, interactive or navigation modality and the organization of knowledge" [10]. The lowest level of interaction is the one between the student and the computer screen. Students use different senses to receive information. Various strategies should be used to enable maximum sense ability, such as: proper information arrangement on screen, screen characteristics (color, text

size, graphics, etc.), the order of information and the format of their delivery (audio, visual, animated, video). It is important not to overload the interface design with unnecessary information which could be *counterproductive* for the learning process [10]. Students should be able to choose their own learning process. The structure, including the navigation, should be intuitive, and compatible with computer configuration [9]. Due to the reduced quantities of unnecessary text, graphics, animation, video and audio should be used, taking into consideration the data transmission speed.

There are numerous e-learning systems on the market, and the most commonly used are open source LMS Moodle, Claroline, and the more commercial LMS WebCT and Blackboard. The e-learning system has different synchronous and asynchronous tools integrated which enable: the creation of the content according to the principles of instructional design, the content delivery to the students, communication and collaboration, monitoring and managing the teaching and learning process, and administrative task execution.

IV.   THE COMPARISON OF THE KEY EDUCATIONAL CONTEXT ELEMENTS IN TRADICIONAL CLASSROOM LEARNING AND THE E-LEARNING ENVIRONMENT

The following tables show the comparisons of key elements: teacher, student, educational content, infrastructure and motivation, evaluation, communication and the manner in which the educational process is executed in traditional classroom learning and e-learning environment. Some new roles have been ascribed to teachers in e-education. Based on the research results of various authors ([3], [12], [11], [10], [5], [9], [6], [1]), Table II shows key differences between the teacher's role in the traditional and the virtual classroom.

TABLE II.        THE TEACHERS'S ROLE (ACCORDING TO [3], [12], [11], [10], [5], [9], [6], [1])

| THE TEACHERS'S ROLE | |
|---|---|
| *Traditional classroom learning* | *E-learning environment* |
| <ul><li>Identifying the learning outcomes and evaluation method on the basis of previously determined plan and program</li><li>Preparing educational material</li><li>Creating educational activities, exercises and assignments</li><li>Creating the educational process</li><li>Evaluating students' knowledge</li><li>Lecturing, practice work</li><li>Giving instructions, mentoring students, holding consultations</li></ul> | <ul><li>Analyzing students' characteristics, learning outcome, educational content</li><li>Creating educational process according to the principles of instructional design (the choice of education strategy and e-learning technology)</li><li>Creating different e-learning environments for several groups at the same time, based on the same assignments but for different needs (e.g. advanced and intermediate students)</li><li>Creating the multimedia educational content (for different learning styles)</li><li>Moderating online discussions</li><li>Online mentoring</li><li>Creating automated knowledge assessment</li></ul> |

One of the main advantages in e-education is positioning the student in the center of the educational process, which means that the e-learning technology enables more active role of the student towards the teacher, the educational content and towards other students. The students' motivation is one of the main success factors in the educational context so numerous researchers are oriented towards finding the factors that influence students' motivation in the virtual learning environment. According to Whitmyer [3], Pew [12], Mishra [11], Ally [10], Eastmond [5], Siragusa [9], Dondi [6], Hozl [1], Table III presents key differences in the roles and motivation of students in different learning environments

Designing the educational content with the help of e-learning technology makes it possible to adapt to different learning styles and to deliver the content regardless of time and place, which is one of the main advantages of e-education in comparison with traditional classes, and according to the authors [3], [12], [11], [10], [5], [9], [6], [1] some of the key differences are shown in Table IV.

Time and place of executing the educational process is the disadvantage of the traditional classroom which is hoped to be overcome by the e-learning technology. Due to this reason (according to [3], [12], [11], [10], [5], [9], [6], [1]), Table V has been singled out.

TABLE III.    THE STUDENT'S ROLE AND STUDENT MOTIVATION  (ACCORDING TO THE AUTHORS [3], [12], [11], [10], [5], [9], [6], [1])

| THE STUDENT'S ROLE AND STUDENT MOTIVATION | | |
|---|---|---|
| *Element* | *Traditional classroom learning* | *E-learning environment* |
| THE STUDENT'S ROLE | • Passive listening to the teacher's lecture<br>• Writing and presenting papers (individual or as a part of the team)<br>• Self-directed work outside the classroom<br>• Actively involved in practice work<br>• Writing papers under teacher's supervision<br>• Time-limited consultations | • Possibility of active involvement during and after lecture<br>• Influencing the creation of educational content<br>• Communicating with the teacher and other students regardless of time and place<br>• Actively creating the learning community based on the subject, institution or on global level<br>• Active use of automated formative knowledge assessment<br>• Active learning, critical thinking development, idea sharing, contextual learning<br>• Self-directed work with the possibility of receiving feedback regardless of time and place<br>• Influencing the educational process (continuous online evaluation) |
| STUDENT MOTIVATION – ENCOURAGING SELF-EFFICACY AND SELF-DIRECTED LEARNING | • Aplying motivational models in conditions limited by time and place<br>• Motivation depends on subject characteristics and teacher's perception | • Possibility of applying different motivational models, separate for intrinsically and extrinsically motivated students<br>• Extrinsically motivated: positive feedback, rewards, recognition, collaborative learning, learning within community, etc.<br>• Intrinsically motivated students: selection of contextual educational content, activities, etc.<br>• Additional motivating factors are: choice of e-learning technology, visual design of the educational materials, quantity of interaction in the environment, etc. |

TABLE IV.    EDUCATIONAL CONTENT (ACCORDING TO AUTHORS [3], [12], [11], [10], [5], [9], [6], [1])

| EDUCATIONAL CONTENT | |
|---|---|
| *Traditional classroom learning* | *E-learning environment* |
| • Textual, audio (tape recorder, radio) and video (TV, VHS) format<br>• The same for all students<br>• Limited access regarding time and place<br>• Teacher chooses the content | • Multimedia format (using different program tools)<br>• Adapted to different learning styles<br>• Possibility of multiple use in different educational contexts<br>• Unlimited access regarding time and place<br>• Possibility of simulating real life and business situations |

TABLE V.    TIME AND PLACE FOR THE EDUCATIONAL PROCESS (ACCORDING TO AUTHORS [3], [12], [11], [10], [5], [9], [6], [1])

| TIME AND PLACE FOR THE EDUCATIONAL   PROCESS | | |
|---|---|---|
| *Element* | *Traditional classroom learning* | *E-learning environment* |
| Place | • Classroom, laboratory, cabinet<br>• Field work | • Independent of place (from any computer anywhere) |
| Time | • At set time | • Communication – depending on the type (synchronous or asynchronous communication)<br>• Access to learning materials – independent of time |

The term communication in this context refers to the communication between three main elements of the educational context: teacher, student and educational content. The communication between the teacher and the student, and between two students in the traditional classroom and the virtual environment, can be synchronous and asynchronous, but the difference is in the limitations relating to time and place. However, from the aspect of educational content, in the traditional classroom the student is passive receiver, while in the virtual learning environment he or she can influence the development of the educational content. Table VI (according to the authors [3], [12], [11], [10], [5], [9], [6], [1]) presents the key differences in communication between educational elements in traditional classroom and the virtual environment.

TABLE VI. COMMUNICATION IN EDUCATIONAL PROCESS (ACCORDING TO THE AUTHORS [3], [12], [11], [10], [5], [9], [6], [1])

| COMMUNICATION IN EDUCATIONAL PROCESS | | |
|---|---|---|
| Type | Traditional classroom learning | E-learning environment |
| Student-student | Limited | Unlimited |
| Student-teacher | Limited | Unlimited |
| Student-educational content | No influence | Influence on selection and design |
| Student-other resources | Library | Encouragement to do self-directed content research – the use of different online sources |

A team of experts hold a special place in e-education, while in practice there is usually only the administrator who helps teachers and students in working with e-learning technologies. Emphasis should be put on the help of the instructional designer, who assists the teacher in designing the virtual learning environment, and key differences, according to the authors ([3], [12], [11], [10], [5], [9], [6], [1]) are presented in Table VII.

TABLE VII. INFRASTRUCTURE ( ACCORDING TO THE AUTHORS [3], [12], [11], [10], [5], [9], [6], [1])

| INFRASTRUCTURE | |
|---|---|
| Traditional classroom learning | E-learning environment |
| • Institution support, student registry office | • Administrator – student and teacher support in working with e-learning technologies<br>• Teacher support in creating educational materials (programers and multimedia experts) |

Evaluation in the educational process is one of the main phases in every instructional design model. E-learning technology enables teachers and students, as well as educational institution, to receive different feedbacks regardless of time and place, and, based on these information, evaluate their accomplishments more often. Table VIII shows some key differences between traditional classroom and virtual environment within the context of evaluation in the educational process.

TABLE VIII. EVALUATION IN EDUCATIONAL PROCESS (ACCORDING TO THE AUTHORS [3], [12], [11], [10], [5], [9], [6], [1])

| EVALUATION IN EDUCATIONAL PROCESS | | |
|---|---|---|
| Type | Traditional classroom learning | E-learning environment |
| Student's acquired knowledge | Written exam in traditional classrooms | • Unlimited automated formative assessment at any time or place<br>• Possibility of automated summative assessment |
| Educational process | Survey – written form –at the end | • Redesign possible while educational process is being performed<br>• Automated survey – at the time of and after the educational process |
| Educational content | Survey – written form | • Redesign possible while educational process is being performed<br>• Automated survey – at the time of and after the educational process |
| Teacher's work | Survey – written form | • Automated survey – at the time of and after the educational process |

## V. Conclusion

In the educational context, teacher is expected to design a learning environment which will facilitate the process of learning for the students. Modern educational technology enables the creation of very innovative learning environments adaptable to different learning styles.

Both approaches, traditional and online, lead to positive results but in different ways, so usually in practice both approaches are being combined. Numerous studies and practice have indicated the problem of not understanding the advantages of virtual learning environments in relation to the traditional classroom. This lack of understanding is usually being connected to the lack of pedagogical knowledge which is essential when using e-learning technology.

For this reason, the teacher often designs the virtual learning environment without the guidelines of instructional design, therefore the advantages of introducing e-learning technology into the educational process are not realized to the fullest. The application of instructional design model requires the knowledge of pedagogy and technology, which are very complex and teachers need to be offered help in these aspects while creating the virtual learning environment.

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