Education Through Technology

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The course covers a number of traditional topics: basics of digital technologies and educational concepts; using digital educational tools; new media as learning environment; and a new form of web presence. Additionally, the course is complemented by a subject of a computer simulation, presented in the course as one of the most important innovative technologies in education.

The course comprises four main parts:

1. fundamentals of digital technologies;
2. fundamentals of education;
3. simulation based learning environments;
4. learning in hyper-connected world.

The goal of the first part of the course is to provide students with the understanding, what are the critical characteristics of the digital technology, that make that technology so important in the modern human life. Among fundamentals of the digital technology, not only the pure technological ones, but also the history and the philosophy of digital technologies will be presented and considered.

The second part of the course is devoted to fundamentals of education considered in the historical perspective. The main pedagogical concepts as well as contemporary educational ideas will be studied.

The third part of the course is devoted to the fundamental approach to learning – constructionism considered as an alternative approach to the traditional instructionism. Computer simulations as form of learning environments will be presented. Computer simulations are presented as a natural research methodology, which provide a powerful tool complementing both theoretical and speculative studies.

The main goal of the fourth part of the course is to introduce students into the digital, networked world. Up-to-date networked learning environments will be presented. This part of the course requires some practical work and the use of number tools, which allow experiencing such new phenomena as: social media, personal publishing, personal identity online, context aware computing, etc.

The proposed class for students will be half theoretical and half technical. The class will require learning and using some technical skills (for example, for exploring social networks or a number of applications such as: Evernote, Omnifocus, Scoop.it, simulation software and others). It will be required: to develop the students' web presence via a social network, to create computer simulations for various fields of humanities by using a simulation software (Excel,

Scratch, Stella).

This course will:

1) Allow the students to understand modern digital technologies both as a fundamental phenomenon, and as a synergetic component of the modern human life.

2) Provide the students with factual knowledge in terminology, classification, methods and trends of the digital technologies.

2) Allow developing competency, points of view and specific skills needed for professionals in the fields closely related to this course.

3) Teach the students how to use computer means for solving problems in class.

Syllabus

1. Introduction. The main goals of the course. The structure of the course. Main concepts. Main problems. Grading policy. Requirements. Assignments.

2. The concept of technology. Definitions of Technology. Philosophy of technology. The problem of instrumentalism.

3. Information Technologies. Evolution of Information Technologies. From Antikythera to iPad: Pascal, Babbidge, Zuze, von Neumann, Microsoft, Apple, Google, Facebook. Social computing. Ubiquitous phenomenon.

4. Fundamentals of Digital Technologies. Main concepts of computing. Automata. Algorithms. Information. Codes.

5. Fundamentals of education. History of pedagogical ideas: from Confucius to Papert. Main pedagogical concepts. Contemporary pedagogical ideas. Education in digital age.

6. Instructionism vs. Constructionism. Seymour Papert and his powerful ideas. Personalization of Learning. Microworlds. Constructive Learning Environment.

7. Evolution of personal learning environments. Logo-programming.

8. Contemporary personal learning environments. Scratch-programming.

9. Modeling in education. Simulation tools. Simulation of processes. System Dynamics simulation. Stella programming.

10. Ontologically neutral learning environments. Excel based modeling. Behavior and Structural simulations.

11. Digital technologies in Humanity class. Construction. Explanation. Prediction. Experimentation. Discovery. Justification.

12. Social vs. Personal. Social Learning Environment. Personal Information Management. Personal data. Identity online. Digital life.

13. Cloud computing. Mobile computing. "Get Things Done" applications: Evernote. Omnifocus. Workflow. Priority Matrix.

Bibliography

1. Landriscina, F. (2013). *Simulation and Learning: A Model-Centered Approach*. Springer.
2. Martinez, S. L., & Stager, G. (2013). *Invent to learn: Making, tinkering, and engineering in the classroom*. Constructing Modern Knowledge Press.
3. Mitcham, C. (1994). Thinking through technology: The path between engineering and philosophy. University of Chicago Press.
4. Papert, S. (1980). Mindstorms: Children, computers, and powerful ideas. Basic Books, Inc.