



**Desire Learning Mangement**

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**DesIRE**



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## List of used abbreviations and symbols



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# 1 E-learning

- Principles and concepts of the e-learning.
- The types of e-learning courses.
- Portfolio application useful in e-learning.
- Methodology and basic strategies for e-learning courses.

## 1.1 Introduction

E-learning is in the present school system an often used term which could contribute to the improvement especially of distance learning but also of full-time study. It concerns a manner of education which enables one, to complement and support the standard education with employment of modern computer technology (in most cases of web technologies). E-learning is changing the view on current education and it influenced even the most important pedagogical-psychological theories of learning connected with technologies. If proper procedures are observed while preparing a course, then its application in education corresponds to modern conceptions of cognition: constructivism and connectivism. To the concepts of remembering, recalling, and learning are added the concepts of thinking, creating, and forming.

A proper e-learning course should also pay attention to gradually changing outer motivation of a student into inner motivation, and to accompany individual learning with learning cooperation. Its main attributes should be:

- Open learning materials connected to a number of expanding and elaborating texts.
- Methodological candor.
- Problematic approach with propounding of alternative views and theories, and consequently emphasis on critical and divergent thinking.
- Students can be included in preparing of the content

## 1.2 History

Electronic education as it is known today is a relatively new way of education, its history of which started to be written only in the 90's of the last century alongside with the development of the Internet. Nevertheless, if we choose the broader definition of this notion, then as the first e-learning (in the sense of learning through technology) could be considered learning machines, first of which was constructed already in the 20's by psychologist S. L. Pressey. But this machine did not come into its own. The next attempt at program learning appeared in the 50's and even came to the Czechoslovak Republic where educational automaton Unitutor was created. However not even these automatons were successful, most probably as a result of their expenses.

The next milestone of e-learning was during the period of 1984 and 1993. An idea to support education by the use of personal computers arose with their development. It consisted mostly of distribution of educational content by floppy disks or CD-ROM, this manner of application is often called CBT (Computer Based Training). From the current point of view, this way of education has many problems, such as the inability to update the content of learning materials, or the fact that the student has no contact with a teacher or other students.

The history of the true e-learning starts after the year 1993 (although the term itself was not coined until 1999) alongside with the development of the web. At first there were only static sites, where learning materials were available, and communication with the teacher either did not take place at all, or only through e-mail. This phase is often called WBT (Web Based Training). Later, alongside with the development of Internet technologies, more elaborate courses have begun to appear, which enable better cooperation, contact with a teacher, and feedback. Moreover, also the content could stay up-to-date, due to easy updating of the sites, and become more and more multimedia.

Nowadays, e-learning has found its application not only in the educational system, but also in commercial firms, which use it in lifelong learning of their employees. As a result, there are thousands so-called Corporate Universities, which are one of the main driving forces of this method of learning.

## 1.3 Course creation

Creating an e-learning course can prove rather difficult for many teachers. In order to create such a course it is necessary to be able to create a website. This requires knowledge of creation of html documents and in a case of websites with some active components also knowledge of programming e.g. in PHP.

This is a big problem, because it cannot be expected that every teacher will be knowledgeable in the area of web technologies. Fortunately, so-called web content management systems (WCMS) can be used for creating of e-learning courses.

WCMS are nowadays one of the basic means used for website creation. They are mostly web applications (programs running on the Internet, which are approached through the browser) which enable almost anybody, even without any programming skills, to create and maintain websites. Their main purpose is to enable a visitor to log in and to add some text or other content, which will be saved and subsequently available for other users for viewing as a website (e.g. Wikipedia). However, they often involve advanced functions which would not be easy to create even for a skilled programmer. This includes various forums, discussions, inquiries and others (like e.g. on Facebook, which is a web application but not exactly WCMS). All these functions are moreover very well secured and debugged. For example Drupal, Joomla, or other systems on the basis of Wiki belong among popular management systems.

From that it was just a small step to utilize such systems for education-oriented website creation, and thus developed so-called LMS (Learning Management Systems). They differ from ordinary WCMS by their specialization on creation of specific sites (educational online courses) and by adding some functions specific for education. These systems do serve to creating e-learning courses and their operating and management. The best known LMS in the Czech Republic is probably Moodle.

## 1.4 Definition

Defining of the notion of e-learning proves to be difficult and disunited in spite of its high frequency of use. A number of definitions has arisen during the time of its existence, and many differ significantly from each other. The usual differences are whether it is a definition from a pedagogical or technological point of view, or whether older forms of usage of computers for education (especially CBT) belong to e-learning or whether e-learning means only the use of Internet technologies. For better understanding we will present some definitions of this notion by contemporary experts, see [1]:

- For me, e-learning is studying by the means of electronic media, let it be learning through CD or internet.
- By e-learning I understand educational and training systems (especially on-line ones).
- I understand e-learning to be an education supported by modern electronic means (computers, media, internet) in distant learning, combined and full-time study.
- I imagine e-learning to be an electronic education, i.e. educational course created in LMS which is intended for self-study under supervision of a teacher who communicates with a student in an electronic manner through this environment.

Experts in their definitions of e-learning mostly prefer its more sophisticated and more exacting form.

## 1.5 Utilization of e-learning at Universities

E-learning is being integrated as a part of education at many Czech universities and is created and run by LMS systems. This integration of electronic education is at the present time of three types:

- Electronic support of full-time study, classic education is mixed with elements of individual work of a student with electronic sources.
- Interactive elements are added to electronic support, classic education is in some cases limited.
- Student gets access to electronic courses, and whole educational cycles. Classic education is limited to minimum, or it is omitted

completely. Electronic support is highly interactive and even tests of knowledge are often realized this way.

## 2 The types of e-learning courses

In this part we'll acquaint with different types of usage of e-learning and different types of e-learning courses. We'll also acquaint with usage of modern computer technology for education which we can't consider as e-learning.

### 2.1 Basic types of courses

Use of electronic materials and internet for teaching can be divided to several basic types. Real courses don't have to precisely fit one of these types, they can be some kind of combination.

- Static materials
- Course in which students are involved
- Course with lecturer (asynchronous)
- Course with lecturer (synchronic)

Only last two types are real e-learning but as we mentioned there is no exact divide between what is and what is not e-learning. We will mind all of them.

#### 2.1.1 Static materials

The basic form of use of electronic materials. Materials are only shown on website or distributed on CD-ROM. This form is also known as e-reading because there is no student-lecturer or student-student communication. Advantage of electronic distribution over printed materials are usually lower costs and opportunity of using multimedia elements. It's also easier to update materials if we distribute them as a website.

- Course in which students are involved

Static courses are supplemented by functions which students can use to be actively involved in courses (courses have to be distributed via the internet). Most common are internet forum or possibility to add comments to each page/lecture/whole material. With those options students can communicate with each other. Students can give a hand to other students. We can also enable function for adding own materials by students and let them to cooperate in creating of e-learning course. It's possibility to keep course active without any expenses. One example of active project is Wikipedia.

#### 2.1.2 Course with lecturer (asynchronous)

This is real e-learning. Course is led by lecturer. Students communicate with lecturer and with each other by asynchronous types of communication

(most common are email and internet forum). Usually students have to be active during lectures, they have to do exercises, answer questions, and pass tests. Activity is controlled and led by lecturer. For this type of course all the pros and cons of e-learning which we mentioned are valid.

### **2.1.3 Course with lecturer (synchronic)**

This course also has its lecturer who lead it but lecturer-students communication can be both asynchronous and synchronic. Synchronic communication can take many different forms. The simplest is chat where all people who are at the same moment online in course can communicate in real time. Lecturer can have consultation hours when students know that he will be available for real time answering. Lecturer can also give live lectures as internet conferences. This type of course to a certain extent loses advantage of e-learning that student can study whenever he want because he has to be online at previously given time. On the other hand student gains opportunity to ask about uncertainties and get answers for his questions immediately. This opportunity makes synchronic e-learning closer to convenient education.

By these explanations of each type and their comparison we wanted among other things show that there is no "the only correct", type of e-learning course. We have to consider using of each function according to particular situation. Even first two types that essentially are not e-learning can be used because they have many advantages for creating internet support materials.

## Portfolio application useful in e-learning

Main types of applications used in this topic are:

- **Drill and practice**, which are based on: instructional approach of learning, direct management, questions, answers and usually immediate feedback.
- **Tutorials** – based on creating of new concepts and processes. They enable working with mistake (intelligent learning systems) and adapt based on its analysis.
- **Cognitive tools for learning**, which are based on constructive approach of learning. They lead students to understand given notions, finding connections between findings and construction of own knowledge. Focus on cooperation among students.
- **Simulations** – based on creation of models of real-world situations or imaginary physical, technological or economical nature (laboratory experiment, production line, etc.).
- **Micro worlds** - based on virtual environment that student creates, controls, manipulates with it or stay in it. These “micro worlds” allow students to solve various problems and construct their knowledge on the basis of information gained from contact with the environment.
- **Information retrieval systems** – based on existence of structural information systems like dictionaries, multimedia encyclopedias, online databases, hypertext systems including global information space of www-servers. They allow teachers and students to search and gain relevant information.
- **Communication Tools** – based on online respectively offline communication: e-mail, electronic conference, videoconference or real-time web communication (Chat, VoIP, Skype). These tools enable students to share ideas and information, cooperate on a joint work, share documents, ensure online education (LMS).
- **Productivity tools** – based on existence of word processors and spreadsheets, database systems, graphic, publishing and presentation software. These tools can significantly support learning and teaching process.



Possible solutions for integrating these educational applications to schools are online learning systems. These systems are available for teachers and students via website interface.

### 3 Methodology and basic strategies for e-learning courses

The issue of learning styles is quite extensive. The interpretation of name learning style in professional literature isn't uniform. There is series of typology and classification of teaching styles. Because of these reasons it's not possible to go into detail here. For further study it is possible to point to e.g. Fleming, N.; Gregorc, A.F; Kolb, D.A.; Martón, F.; Mareš, J.; Ross, J.; Sälso, R.; Schulz, R.A.

We'll only look at the issue how to use and fit different teaching styles and educational strategies for e-learning. Emphasis is placed on personalization of electronic learning and effort to take into account personal differences of students e.g. by using of different learning styles. In professional literature is often used classification of learning style based on sensory preference.

- First of them is visual style. This corresponds to the following educational strategies in the form of visualization content.
- Another style is auditory which corresponds to audio content representation.
- Kinesthetic learning is learning style which corresponds to learning strategies that allow student to his active work, activity, movement. For example simulation case studies, simulated dialogues, strategies for getting attention and other active components.
- Another example is learning styles according to prevailing types of intelligence (linguistic, logical-mathematical, visual, bodily-kinesthetic, musical, natural, interpersonal and intrapersonal<sup>1</sup>).

Selected learning styles can be significantly affected by curriculum itself and then just by selection of teaching strategy.

Teaching strategies are choice of learning activities, methods of presentation of content and content layout. In the case of e-learning is particularly valid that it's necessary to select from large spectrum of learning strategies according to the needs. Mostly it is best to combine learning strategies or to offer same content by various forms so that student can choose what he prefer.

Examples of teaching strategies:

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<sup>1</sup> Gardner, H. *Frames of mind. The theory of multiple intelligences.* New York: Basic Books, 1983.

- Visualization of content –for many students, picture or photo is worth a thousand words. Visual representation of curriculum enlarges final educational effect of humble reading. Graphics can also increase interestingness of learning materials for student.
- Audio representation of content – using of audio recordings can significantly increase remembering of content.
- Work aids – if possible, it's appropriate to add tools that allow student to apply gained knowledge and skills immediately in practice. They can be tools which student can use immediately or tools that first have to be edited by student to use them, e.g. worksheets.
- Teaching aids – teaching aids are used only in course compared to work aids which student can use also outside the course. These are tools and documents that serve to further presentation and for practicing the content. These are e.g. various tables, reference documents, graphs, interactive elements simulating results of computation with different input values, practical exercises, etc.
- Examples, demonstrations – ideally combining theory and practice so they demonstrate practical usage of knowledge to students. Their application and frequent usage are very requisite.
- Case studies – it is complex situation that might be in the form of story. On its basis student is invited to examine selected characteristics and possibly search for possible solutions. Solution can be e.g. in the form of questions that student answers and gains feedback at the same time.
- Sample dialogues – interesting alternative and opportunity for student to trace particular pattern of behavior and its possible consequences. They can be used e.g. in teaching of professional skills or skills connected with human behavior. It's possible to supplement simulated dialogue between two or three people in the form of text by audio recording or video recording or photos (if the dialogue is affected by sound effects, face, body language etc.).
- Simulated dialogues – as opposed to sample dialogues which run in fixed scenario, in simulated dialogues learner is required to choose a response in each step. Student can watch the impact of his choice on the outcome, he can freely explore how alternative choices influence result. Simulated dialogues

are suitable in real work situations so student can learn from his own mistakes.

- Simulation – is most often a simulation of real situations, methods or devices. Student can explore, learn by practical application of gained knowledge, and compare impact of his own actions on the outcome. It's one of the most effective form of learning.
- Animation – in cases where other kinds of demonstration fail or in case where it's necessary to keep student's eyes in specific area of the screen.
- Strategy for getting attention – learning program should often get student's attention by various types of interactive elements. For getting of attention is possible to use for example any of following strategy:
  - Gradually uncover curriculum, content of learning appears gradually. Student always uncover next part by particular activity, e.g. pressing mouse or keyboard.
  - Exploration and discovery, in this case student learns more only on the basis of their activity e.g. by moving mouse to corresponding area, graphics etc.
  - Asking questions (asking questions that encourage student to think about the lecture and his relationship with inlaid area, questions should be followed by feedback and show student evaluation, allow him to change his choice and see the differences.
- Strategy of cooperation, mutual cooperation students (internet forums, chats, wiki applications and similar applications designed for social contact and cooperation in solving tasks).

When preparing electronic courses it is ideal to combine these strategies so as many students as possible can find a suitable learning style.

## **1. Learning management systems.**

- Characteristics and summary of LMS systems.
- Specifics of electronic materials.
- Creation of e-courses.

### **Characteristics and summary of LMS systems**

E-learning as well as classic teaching has to be managed to be really effective. These include following specific activities (comprehensive analysis of activities we'll focus in the following text).

- Activities associated with planning of entire e-learning;
- Supporting activities in form of preparation of learning materials and their didactic processing and adapting to various students' learning styles;
- Communication and feedback between teacher and student;
- Multimedia elements.

Useful tool that helps with the management of these activities and the entire e-learning is tool called LMS system. Term LMS (Learning Management System) appeared in late 1990s. It is set of programs (special software) which is usually installed on the server of educational institution (or a solution in form of cloud computing) and is used for creating, managing and distribution of educational courses. Resulting courses are usually distributed via internet or intranet and they are accessible by common web browsers. LMS systems are found very effective for distance learning and corporate training where they keep irreplaceable role. LMS systems are also very effectively used for full-time study mainly on high schools and on universities or colleges as Blended learning form of education. In the past we could meet term Learning Content Management System (LCMS) which was shortcut for system containing extra tools for creation of educational content (in the beginning these tools weren't part of LMS systems). LMS systems of today of course include tools for creation as common integrated part. Therefore LCMS shortcut is meaningless today and we use only shortcut LMS.

Modern LMS systems can handle a large number of features, their basic properties are:

- Basic units of LMS systems like tools for registration of students and for their personal information, user names and passwords, creating of roles (student, tutor, administrator etc.) etc.;
- Tools for creation and management of courses – system that allows you to create, modify and update individual courses;
- Communication tools – tools that allow synchronous or asynchronous communication between students and tutor or students with each other;
- Tools for verification and feedback – tools which for example allow testing of students' knowledge and take information on implementation of learning goals;
- Tools for administration of courses – tools that allow observing of students' work, managing of their progress and collect their results;
- Standardization – standardization of courses allow easy export/import to/from other LMS;
- Evaluation tools – for getting students' feedback.

### **3.1 Let's have a look at basic selected functions of LMS systems in detail.**

#### **3.1.1 One of the basic functions is creation and maintenance of courses.**

Creation and management of courses include creation, modification and updating of each courses. Tools that are available for author in system can be very diverse e.g. from simple recording of prebuilt files via HTML editor to creation of video of lectures by web camera. Each LMS system has some differences.

#### **3.1.2 Administration and management of courses**

This group of functions includes all the tools that allow monitoring of students' work in the course, lead their progress and record their results. Lecturer can see various lists of educational results of registered students, assign exercises and create tests.

#### **3.1.3 Communication tools**

Tools which allow synchronous or asynchronous student-tutor or student-student communication. Typical forms of communication are email address of each member, chat, internet forum, wiki, whiteboard or online

conference. Communication is one of important elements that animates and "humanizes" and socializes environment of electronic course. Therefore let's look at some of these elements in detail.

### ***Chat***

Chat is used by course members for real-time discussion via the internet. This type of communication is useful for getting immediate answer and feedback or to obtain different point of view on the topic. Although discussions are commonly stored on server and searching in them is possible they are usually not organized because topic is changing dynamically.

### ***Internet forum***

Forum unlike chat is used for asynchronous discussion. It is typically used for solving students' problems or to discuss various proposals. New thread is founded for each propose so forum is easily searchable. It is possible to attach various files (mainly pictures) to your messages and also to evaluate (usually click on like or unlike button) messages of other members.

### ***Wiki***

Allows you to easily create documents that will be visible to all participants of the course, each student can participate in creation of course. This tool can be in advantage used for presentation of students' exercises which will automatically expand whole course. In other words wiki allows sharing of materials, various documents (texts, pictures, audio or video recordings etc.). The general principle is that the creation and expansion of content is shared by multiple users. Content is usually quite dynamic. Creators are more involved and engaged in the work.

### ***Whiteboard***

Whiteboard is a tool that allow sharing of "blackboard" to which can participants of the course draw with the mouse. Whiteboard is typically used in synchronously managed courses and serve tutor for creating various visual layouts and for showing keywords. On the other hand whiteboard is not used for longer texts. We share normal documents instead of using whiteboard.

### ***Videoconference***

Videoconference offers sharing in real-time. You can share audio, video or other data and it allows you to lead classes in similar way to traditional teaching so you can also use nonverbal part of communication. Disadvantage is need to be online at a specific time, thereby weakening one advantage of e-learning (opportunity to study at any time). You also need to have quite good internet connection.

## **3.2 Evaluation and feedback**

Tools that allow student to evaluate the course and the authors to get feedback (typically various questionnaires that students fill at the end of the course). This tools is very important for authors because good e-learning course should be constantly developed and improved. It is also possible to use different statistical approaches that are already included as tools. For example we can use item analysis for evaluation of tests included in the course.

## **3.3 Standardization**

Use of standards is very important for the possibility of transmission of components or entire courses between different LMS systems. It enables cooperation among institutions which use totally different tools for creating and managing of their e-learning materials.

Nowadays the most used LMS standard is SCORM (Shareable Content Object Reference Model), which is based on XML. It was created by American initiative (Advanced Distributed Learning Initiative).



## 4 E-Content

In connection with LMS systems is often used word e-content. This term hides all digital content which can be shared in digital form. E-content therefore includes for example web pages, text documents, video and audio files etc. It is essential part of each e-learning course because all study materials which are offered actually fall into this category. Despite its importance e-content is not the only one component and it should not be forgotten by authors of the course.

Theoretical part of creation of courses should primarily answer a few basic questions regarding following materials:

- What makes the difference between those materials and traditional educational texts?
- What do we have to consider during creation?
- What is the proper structure?
- What should they contain?

### 4.1 Differences between e-learning and traditional educational text

Main difference is that we have to "activate" student. Electronic materials are usually made for self-study and it is necessary to consider. Constantly we have to try to motivate students and give them feedback. Without them students can very easily loose interest. For example that's why material, except information that students should gain, consists of parts which guide student through text and manage his progress.

This management usually takes place in three stages:

- Presentation of information – information that we want student to learn are presented to him;
- Managed self-study – We assign tasks to students and give them summaries of lectures with links to further sources;
- Knowledge verification – give students questions which he should answer to know how he understands given issues.

E-learning study materials have to provide significantly wider range of activities than traditional learning textbooks, in particular:

- Provide information about course content;
- Motivate students;
- Ensure activity of students;
- Manage learning process;
- Provide sufficient feedback;
- And of course contain information that we want to give to students.

## 4.2 Creation of e-courses

What do we have to consider for e-learning development?

When creating e-learning content we have to take into account several things, most of them are not different to things that are necessary to consider when preparing any study material. These are mainly basic characteristics such as:

- Who is the course for?

Here we primarily mean: Who are our students? What is the students' age? Do they work or are they full-time students? What is a type of school? What are students' initial knowledge? Why do they attend our course?

- What do we want to teach to students? (specification of basic curriculum)

What are the educational goals we want to achieve? What is the essential part and what is only supplement and what can we skip?

- How to write a good text?

What should contain such a text? What are the basic rules we should follow? What structure should it have?

Only the third group of questions has specifics for creation of e-learning course. These specific requirements arise with differences between e-learning materials and traditional materials.

One way to structure a course or rather its chapters is inspired in traditional combined lecture and it can be characterized roughly as follows:

1. Introduction
  - a. Basic characteristics of things that will be taught in this chapter
  - b. List of goals of this chapter

- c. Time requirements
  - d. Required initial knowledge (we can add a test to check or measure initial knowledge)
  - e. Link to previous lectures (courses)
2. Motivational part
    - a. Examples from practice
    - b. Other applications
    - c. Multimedia elements
  3. Exposure part
    - a. Lecturing itself (supply of content (e-content) with the choice and implementation of educational strategies and activities. It is logically structured and it uses interactivity).
  4. Examples
    - a. Practical examples
    - b. Model situations
    - c. Case studies
    - d. Examples for training (exercises with key, exercises without key which are used as a basis for discussion, discussion forum)
  5. Fixation
    - a. Summary (summary of lecture, summarization text, summary of terms)
    - b. Overview tables
    - c. Multimedia elements
  6. Verification
    - a. Questions (verification of knowledge and skills, tests)
    - b. Tasks
  7. Accessories
    - a. Terms dictionary
    - b. Literature
    - c. Attachments

Some elements in said structure are repeated. It is possible to use them in multiple places and it depends on a specific course. But basic outline of main points should be respected.<sup>2</sup>

The basis of courses is in the first place of course professionalism of study materials. Except these materials we can recommend that course should contain of other units, mainly:

- Study guide (if possible printouts should be available),
- Multimedia elements;
- Study schedule;
- Links.

### ***Study guide***

Study guide is short introducing text which should acquaint students with main goals of whole course and its parts, requirements that student has to follow and other indispensable information. Optimally it should be available in electronic version as well as paper version.

### ***Study schedule***

It's a list of what and when students will do (consultation, task assignment, synchronous part of teaching, deadlines for exercises, etc.). This schedule has to be always up to date and valid, on the other hand here shouldn't be many changes unless it is ensured that students will know about them.

### ***Multimedia elements***

Various other multimedia elements that are not part of the study materials but they are somehow connected to the subject. For example, video of new discoveries in the field, various discussions about studied problems, interactive simulations.

### ***Links***

Each course has a finite length and never can include everything. That's why links to websites or books where students can find more information should be in course.

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<sup>2</sup> Vaněček, D.: *Electronic education. Praha. Česká technika – nakladatelství ČVUT, 165s, 2011. ISBN 978-80-01-04952-5.*

## 5 Creation of complete course

After this short theoretical introduction let's look at how to create practical courses. There are several strategies. Mostly all of them have many same elements. One of the sophisticated approaches is relatively widely used general strategy (model) ADDIE, we will focus on it.

### 5.1 Strategy ADDIE

Addie is a strategy for the design of the general process that is currently very often used for creating e-learning courses in many EU countries.

It consists of five main stages:

1. Analysis – form, content, students
2. Design – structure, multimedia etc.
3. Development – creation according to design
4. Implementation into learning environment
5. Evaluation – important, do it according to standards, questionnaires

#### 5.1.1 Analysis

In this phase we perform basic analysis of target group, estimate necessary budget and time, set basic goals which should be achieved by e-learning course, analyze educational forms and content and we do others necessary preparations.

#### 5.1.2 Design

In the design phase we do detailed planning of each course part, transformation of goals into expected learning outcomes, suggest distribution into chapters, make plans of multimedia interactive units. We also decide about people who will play what role.

#### 5.1.3 Development

During development phase we create course itself according to the plans made in previous section.

#### 5.1.4 Implementation

Educational content is included in the LMS system and the whole course is run.

### 5.1.5 Evaluation

We do continuous and final evaluation. On the basis of final evaluation we determine which goals were achieved and which not and we take further action according to it.

A more detailed example of ADDIE strategy for design of electronic course is suggested in table "Course design using ADDIE strategy".

	Design phase		Design of each activity
A	Analysis	Input analysis of target group, creation of educational model, analysis of educational forms, contents and strategies	Estimate of budget and time  Name and topic Authors, co-authors Version, update Course placement, copyright E-course character  Learning goals  Keywords Target group Type of teaching
D	Design	Design of course (color combination, navigation elements and icons, typesetting, graphics, attention to the length, own structure of e-course, multimediality, interactivity, etc.)	Choice of design according to the age structure  Choice of the learning environment LMS  Transformation of goals  Course structure Mind map  Form of distribution of text (text, table)  Creation of a team + roles
D	Development	Development of course in team or selection of team and distribution of roles (author, tutor, organization of study),	Creation of scenario, time plan and thematic plan

		scenario (work plan), time plan of development, content creation	Breakdown of learning text  Teaching strategy Teacher's/tutor's input Tasks (examples, training) Summary of lecturing
I	Implementation	Deployment of educational content into educational environment, implementation of pilot course, evaluation of pilot course, fixes and changes according to comments	Evaluation of pilot study Own implementation and running of the course Evaluation of the pilot study Fixes and changes Refit
E	Evaluation	Continual and final evaluation creation of questionnaires, evaluation of surveys, determination of the effectiveness of the course	Evaluation Review Effectivity of the course

Table No. 1: Course design using ADDIE strategy<sup>3</sup>

## 5.2 Continuous development

The ADDIE strategy uses model of development where all phases follow others in exact order. However in modern development we can often see strategy which is largely reversed. The course is not planned from beginning as one big unit but it starts as one small piece which is tested and as soon as possible put to practice. Other parts are added after it and they reflect response to previous parts. Of course we do the most necessary parts first. This kind of development has the advantage of lower costs for taking of initial response and we can much better reflect various changes and obtained feedback. Disadvantage of this strategy may be that in the

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<sup>3</sup> Vaněček, D.: *Electronic education. Praha. Česká technika – nakladatelství ČVUT, 165s, 2011. ISBN 978-80-01-04952-5.*

longer term some incompatibility of added blocks can occur and then it is necessary to rebuild some parts.



## 6 Moodle

- Create and set up own e-course.
- Navigation in the Moodle
- Use of prepared materials.
- IMS Content, Captions, text, website, link, adding the resources.
- Creation of various activities for educational materials:
  - principle of program learning: learning module,
  - communication tools,
  - didactic test (calculated task, numerical task, assignment, dichotomous, multiple-choice, short and long-answer questions),
  - analysis of the test,
  - mind map, wiki, vocabulary,
  - inquiry, research,
  - database,
  - various kinds of tasks, etc.

## Selected examples

On the left side of the front page, you'll see the —My Courses tree under the Navigation Block, which includes a list of all the courses you are teaching or taking as a student, as shown in Figure. You can access your courses by clicking on the course name in the block.

Let's start with the upper-left corner of the course page, as shown in Figure 1.

There you'll see the name of your course as entered when the course was created. Your system administrator either entered your course name by hand or she got it from your institution's course database.

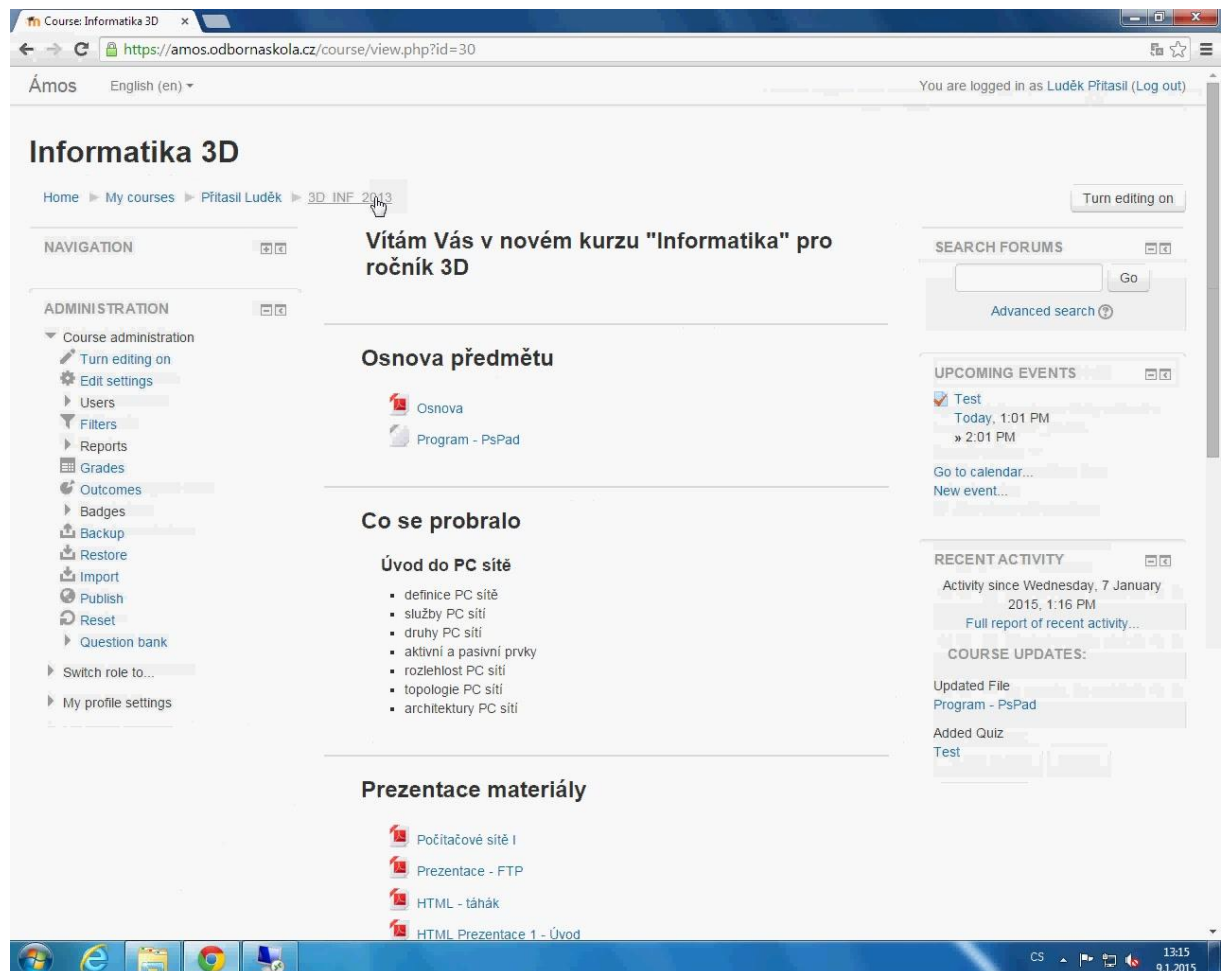


Figure 1: Course page

On the right side of the front page, you'll see the —turn editing on button.

Clicking on this button will present you with a new array of options.

By adding the resources available in the Moodle you can create content directly within Moodle or link to content you've uploaded. We'll describes each of these tools briefly now:

- **Book:** The first tool, —Book|| creates a Book resource on your course page which can be used for creating a multi-page resource with Chapters and subchapters.
- **File:** A picture, a pdf document, a spreadsheet, a sound file, a video file. You can also directly drag and drop the files onto the course home page to add them as a resource.
- **Folder:** For helping organize files and one folder may contain other folders.
- **IMS Content Package:** Add static material from other sources in the standard IMS content package format.
- **Label:** Can be a few displayed words or an image used to separate resources and activities in a topic section, or can be a lengthy description or instructions.
- **Page:** The student sees a single, scrollable screen that a teacher creates with the robust HTML editor.
- **URL:** You can send the student to any place they can reach on their web browser, for example Wikipedia.

All the resources are known as the Static activities in Moodle as they are for sharing the information with the student in a single direction whereas the activities allows you to add interactive tools to your course.

An activity is a general name for a group of features in a Moodle course. Usually an activity is something that a student will do that interacts with other students and or the teacher. There are 14 different types of activities in the standard Moodle. The bulk of this book is dedicated to describing how each of these tools works and how to apply them in your course.

Activity Type	Description
Assignments	Enable teachers to grade and give comments on uploaded files and assignments created on and off line.
Chat	Allows participants to have a real-time synchronous discussion.
Choice	A teacher asks a question and specifies a choice of multiple responses.
Database	Enables participants to create, maintain and search a bank of record entries.
External Tool	Allows participants to interact with LTI compliant learning resources and activities on other web sites.
Feedback	For creating and conducting surveys to collect feedback.
Forum	Allows participants to have asynchronous discussions.
Glossary	Enables participants to create and maintain a list of definitions, like a dictionary.
Lesson	For delivering content in flexible ways.
Quiz	Allows the teacher to design and set quiz tests, which may be automatically marked and feedback and/or to correct answers shown.
SCORM	Enables SCORM packages to be included as course content.
Survey	For gathering data from students to help teachers learn about their class and reflect on their own teaching.
Wiki	A collection of web pages that anyone can add to or edit.
Workshop	Enables peer assessment.

**Table 1: Activity types in Moodle**

The following figures are examples of selected screens of LMS Moodle. For more detailed information on how to create a new course refer to the Moodle manual.

# Informatika 3D

Home ► My courses ► Přítasil Luděk ► 3D\_INF\_2013

**NAVIGATION**

**ADMINISTRATION**

- ▼ Course administration
  - Turn editing on
  - Edit settings
  - Users
  - Filters
  - Reports
  - Grades
  - Outcomes
  - Badges
  - Backup
  - Restore
  - Import
  - Publish
  - Reset
  - Question bank
- Switch role to...
- My profile settings

## Vítám Vás v novém kurzu "Informatika ročník 3D"

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### Osnova předmětu

- Osnova
- Program - PsPad

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### Co se probralo

#### Úvod do PC sítě

- definice PC sítě
- služby PC sítě
- druhy PC sítě
- aktivní a pasivní prvky
- rozlehlost PC sítě
- topologie PC sítě
- architektury PC sítě

Figure 2: Course page

3D\_INF\_2013: Test

https://amos.odbornaskola.cz/mod/quiz/view.php?id=4407

Ámos English (en) You are logged in as Luděk Přítasil: Student (Return to my normal role)

## Informatika 3D

Home ► My courses ► Přítasil Luděk ► 3D\_INF\_2013 ► Testy, závěrečné práce ► Test

**NAVIGATION**

**ADMINISTRATION**

- ▼ Quiz administration
  - Question bank
- Course administration
- Switch role to...
  - Return to my normal role
- My profile settings

## Test

Attempts allowed: 1

This quiz opened at Friday, 9 January 2015, 1:01 PM

This quiz will close at Friday, 9 January 2015, 2:01 PM

Time limit: 30 mins

You are logged in as Luděk Přítasil: Student (Return to my normal role)

3D\_INF\_2013

Figure 3: Activity type - test

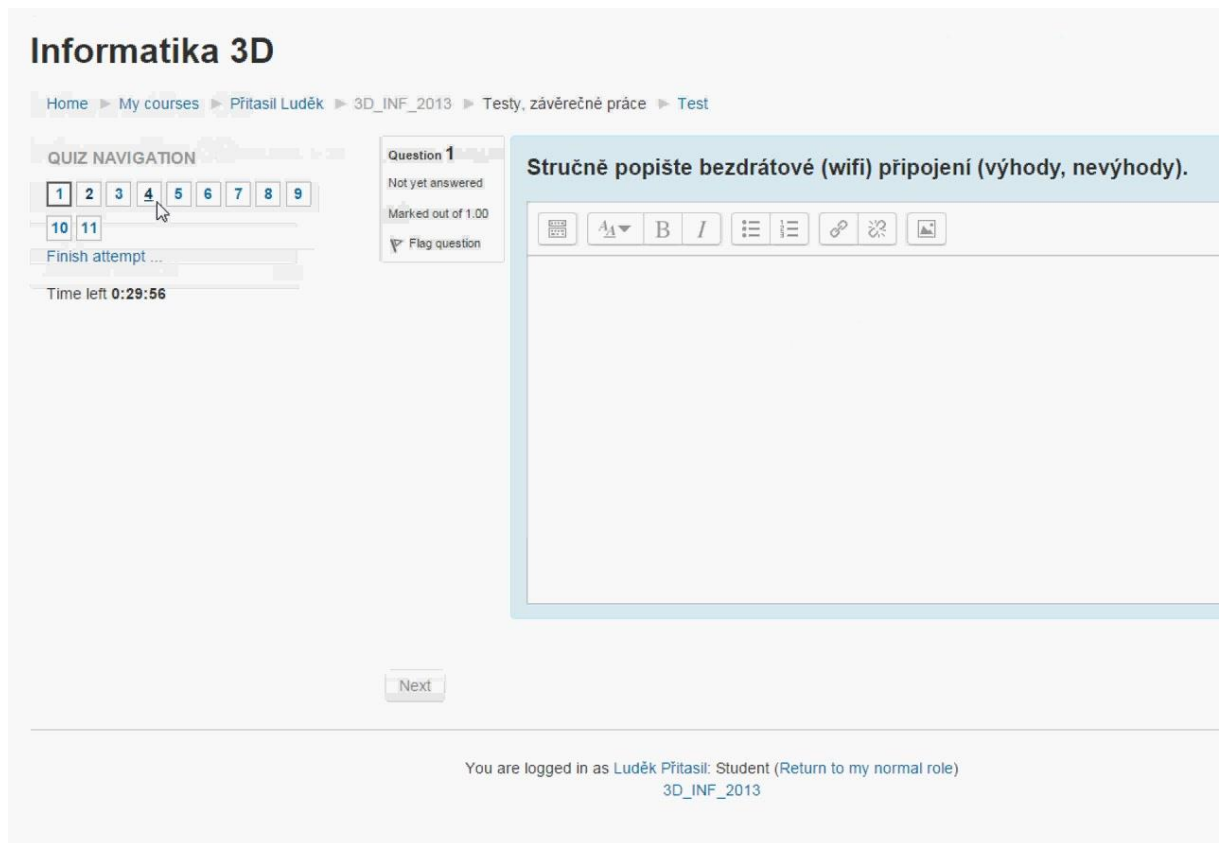


Figure 4: Creating test

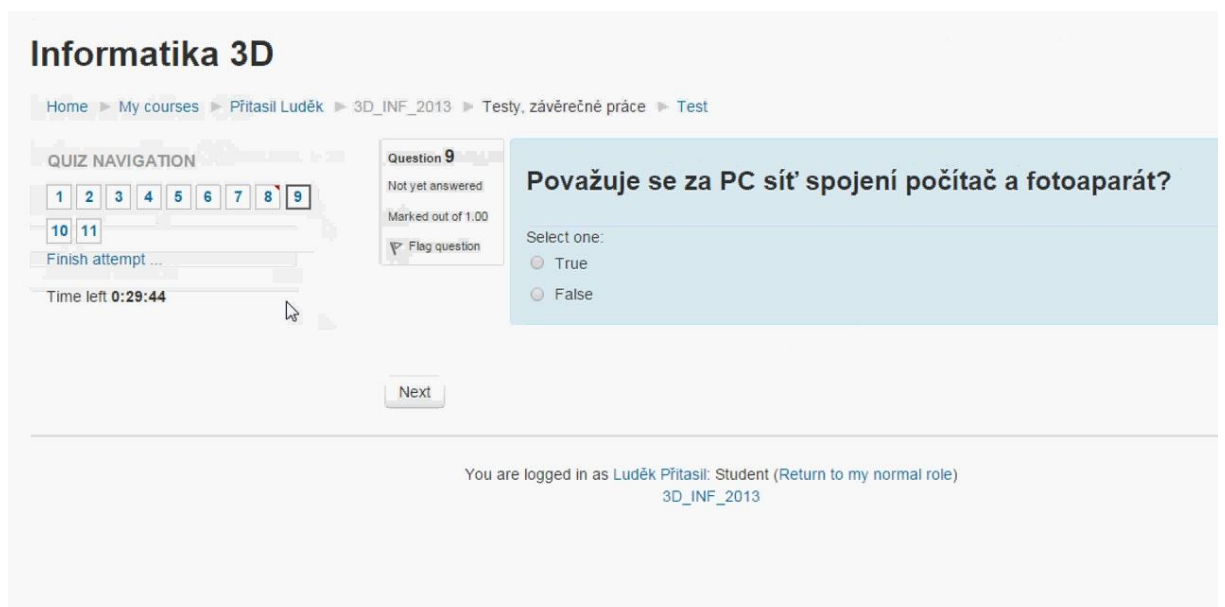


Figure 5: Creating test

**Question bank**

Select a category:  
 Výchozí v 3D\_INF\_2013 (6)

Výchozí kategorie pro úlohy sdílené v kontextu "3D\_INF\_2013".

Show question text in the question list

Search options ▾

Also show questions from subcategories

Also show old questions

Create a new question ...

T ^ Question

Jaký je rozdíl mezi pracovní stanicí a serverem?

**Jaký je rozdíl mezi pracovní stanicí a serverem?**

Napište jaký je rozdíl mezi switchem a hubem?

**Napište jaký je rozdíl mezi switchem a hubem?**

Stručně popište službu pc sítě "sdílení technických prostředků"

**Stručně popište službu pc sítě "sdílení technických prostředků"**

Kolik minimálně správců sítě má síť typu LAN ?

**Kolik minimálně správců sítě má síť typu LAN ?**

Figure 6: Question bank

**Question bank**

Select a category:  
 Výchozí v 3. ročník 3D\_2012 (24)

Show question text in the question list

Search options ▾

Also show questions from subcategories

Also show old questions

Create a new question ...

Question	Created by	Last modified by
	First name / Surname	First name / Surname
<input type="checkbox"/> Co je to SMTP a POP 3 (vysvětlíte k čemu se používají).	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> Jaká je hlavní nevýhoda sběrníkové topologie.	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> <b>Jaká je hlavní výhoda sběrníkové topologie.</b>		
<input type="checkbox"/> Jaké druhy rozlišujeme u drátových typů propojení.	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> <b>Jaké druhy rozlišujeme u drátových typů propojení.</b>		
<input type="checkbox"/> Jaké dva druhy rozlišujeme u optického kabelového přenosu.	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> <b>Jaké dva druhy rozlišujeme u optického kabelového přenosu.</b>		
<input type="checkbox"/> Jaké dva druhy rozlišujeme u optického kabelového přenosu.	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> <b>Jaké dva druhy rozlišujeme u optického kabelového přenosu.</b>		
<input type="checkbox"/> Jaké typy konektorů používá kabel kroucená dvojlinka.	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> <b>Jaké typy konektorů používá kabel kroucená dvojlinka.</b>		
<input type="checkbox"/> Jakou topologii tvoří internet.	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> <b>Jakou topologii tvoří internet.</b>		
<input type="checkbox"/> Jaký je rozdíl mezi aktivními a pasivními prvky.	Luděk Přítasil	Luděk Přítasil
<input type="checkbox"/> <b>Jaký je rozdíl mezi aktivními a pasivními prvky.</b>		

Figure 7: Question bank

## Literature

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## Attachments