Abstract: This project presents some new problems facing the study process in the distance learning system (DLS), and also tries answering the central question: “Why do we need personalized e-learning curricula?”.

Key-Words: - e-learning, learning style, personalized curriculum

1 Introduction
The main approach when developing an e-learning curriculum is still defined by assuming that the student in a DLS is an ideal student. This student is always motivated, likes to learn via the PC and is satisfied with the level of communication provided by the Internet. But the reality shows a different picture. The advantages of DLS and using e-curricula are often not enough to overcome the negative effects which are the result by studying in the isolated and stand-alone environment. To sum it up, the following can be clearly stated: most people are not able to study independently.

2 Problem Formulation
The students who are studying in a DLS mostly miss the relationships with the teachers and classmates (asking, answering, motivating and talking to each other etc.). This type of communications can not be compensated by the use of any possibility of new information technologies (chat, forum, free-access social network etc.). In spite of the fact that the lack of relationships and communication may affect the learning process rather negatively, focus will be on another factor which could also have negative effects. This factor namely is the style of how the student usually learns.

Every student has different requirements and goals for a given course. The learning style for each student is also unique. In order to achieve better results, the teacher must adapt his or her teaching or pedagogical style to suit the variety of students in the classroom. When designing an e-learning curriculum these facts must also be considered. Today it is widely accepted that during the design and development of educational materials attention must be focused on the learner’s characteristics and requirements (Del Corso et. al, 2002). This means that personalized courses must be developed. For example, if an e-curriculum is developed without considering the preferred learning style for the student, it could cause the student’s discomfort level to rise to a level which then will hinder or prevent learning or further use of the learning system.

Students learn in many different ways. A number of factors influence the learning process. It is almost impossible to take into consideration each one of them. And after all it is very difficult to measure the outcome of different learning styles. Until now the psychology of cognitive styles still remains a poorly developed research field [Holodnaya, 2002]. In 2004, at Newcastle University, the researchers, lead by Coffield, found 71 different learning styles. Some of the more well-known styles include those identified by: Dunn & Dunn, Kolb’s, Honey & Munford, Gregorc model.

The following section will present the Felder-Silverman learning style model which can be easily implemented in a DSL with e-curricula.

2.1 The Felder-Silverman Model
According to the model developed by Felder and Silverman a student’s learning style may be defined by the answers to four questions:
1. What type of information does the student preferentially perceive: sensory (sights, sounds, physical sensations) or intuitive (memories, thoughts, insights)? Sensing learners tend to be concrete, practical, methodical, and oriented toward facts and hands-on procedures. Intuitive learners are more comfortable with abstractions (theories, mathematical models) and are more likely to be rapid and innovative problem solvers.
2. What type of sensory information is most effectively perceived:
visual (pictures, diagrams, flow charts, demonstrations) or verbal (written and spoken explanations)?

3. How does the student prefer to process information: actively (through engagement in physical activity or discussion) or reflectively (through introspection)?

4. How does the student characteristically progress toward understanding: sequentially (in a logical progression of incremental steps) or globally (in large “big picture” jumps)? Sequential learners tend to think in a linear manner and are able to function with only partial understanding of the material they have been taught. Global learners think in a systems-oriented manner, and may have trouble applying new material until they fully understand it and see how it relates to the material they already know about and understand. Once they grasp the big picture, however, their holistic perspective enables them to see innovative solutions to problems that sequential learners might take much longer to reach, if they get there at all.

2.1.1 The current state

On the Internet there are only few educational hypermedia systems to be found which are in some way adapted to the users’ learning style. Those systems create model of the student base on the answers given in questionnaires or some other collected information. The students who have similar learning style are characterized by the same model (profile). When the profile is determined the student accesses the curriculum in whichever formats most suits his or her preferred learning style. At this moment new problems appear:

How much does the determined profile really mirror the student’s profile, and to what extent does the system’s “preferred curriculum” really match the student’s preferences? These questions are based on those facts that the learning style is not an exact parameter; it could change with time (age-group) and could also depend on the topic (curricula content). Besides that, forming the curriculum, processing and presenting it, is strongly connected with the learning style of the assembling expert(s).

3 Problem Solution

This project has two main goals. First, to examine if there is a change in the learning style if the subject to be learned is one of the programming languages, and second, to collect as much information about the presented preferred curriculum as possible. The goal is to use the attained information to determine some form of regularity which can be used to develop similar e-learning contents. The aim is to define some type of methodology for creating learning objects using adaptivity approach to the student’s learning style.

For achieving the previously described goals, a web application was developed based on PHP, Apache and Linux solutions. The application distributes the e-learning contents and collects information from students. The lessons are pre-composed dynamic html pages. Every lesson has four versions, one for every dimension of the FS learning style model. The lessons are created using the structure and presentation style which follows the guide line described by the learning style model.

The application can handle the students’ profiles, categorize students by their learning style, distribute in advanced prepared preferred curricula, track the students’ knowledge progress (such as results of tests), and assure asynchronous type of communication (e.g. forum) with the other students. The information collecting part of the application collects data about student’s activity in the system, as described in the following example:

1. Information is gathered regarding how satisfied the student is with the presentation and content processing of curriculum and examples. The external contents are also evaluated. The point is the student can give a mark to every part of the application. The marks are from 1 to 5 and there is also a possibility to evaluate with textual comments or notes. With this feedback we can measure, for each profile to what extent (how much is preferred) the given lesson structure and presentation style is preferred. This information can help to form aspects of how to create e-learning materials.

We can gather information about student’s activity on the system and the e-learning material. The following activities are tracked:

- Did the student leave a note, or to intend to see some other student’s notes?
- Did the student follow the hyperlinks to the examples page and to the external links collection page?
- What is the pathway of visiting the lessons?
- Did the student play the multimedia file on the page (sound, video or flash animation)?
- Did the student ask for printer friendly versions of the lessons?
What are the time spending statistics on lesson pages and on the example pages?

Did the student select a bigger picture option on the page?

How often did the student communicate via the forum?

Did the student use a glossary?

Did the student change the color theme of the application?

By gathering these information one can learn about the student’s special needs, to what extent does the student match the profile determined for him by the system, and did the learning style change during the course.

The current web application as developed in order to implement learning styles and measure the level of satisfaction, so that eventually some form of methodology for creating learning objects can be defined.

The goal of this application, beside the information distribution is collecting them. With the feedback from students we can build a kind of methodology for developing those e-curricula and learning objects, which are adapt learning styles in the programming languages courses.

3.1 The application so far

This particular application was tested at the Polytechnical Engineering College of Subotica in the spring semester of 2009. The students had an obligatory course of C++ programming language consisting of 14 classes in a typical frontal-teaching style. The students were given the option to use the web application as an additional learning tool (with 5 e-lessons). Out of 100 first-year students of informatics, 56 of them had opened accounts at the system. At the end of the semester, a great amount of information was collected. Primarily, this information will be used to perform changes in the application, in a manner the students indicated. Further, based on the collected information, changes will be applied in presentation styles, lesson structures, and types of examples of the existing as well as the new e-curricula.

In order to get more relevant information about learning styles in the courses of programming languages, the author’s aim is to develop e-curricula for the Java programming language course to be held in the following semester with the same group of students.

4 Conclusion

This paper presents some problems which may appear in a DLS, when the students learn in an isolated and stand-alone environment, affecting the learning process negatively.

References: