



# Univerzita Hradec Králové

## Fakulta informatiky a managementu

### *The ICT integrated within the tertiary education: the software solution*

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#### Abstract

It is generally agreed that people vary in the view upon the same problem; they do not do things and see the world in the same way as the others do. They differ in the way of perceiving a situation, evaluating it, judging consequences, making decisions. In spite of these differences, each person is clever and may be right in his/her own manner. That is the reason why students should be provided with a variety of instructional methods and approaches to choose the most suitable ones. The question is whether tailoring the process of instruction running within the LMS to student's individual learning style results in significant increase of knowledge. To discover this is the main objective of the three-year research project currently running at the University of Hradec Kralove "A flexible model of the ICT supported educational process reflecting individual learning styles."

#### Learning patterns

The project is based on the Ch. A. Johnston's concept "Unlocking the will to learn". The author attracts attention to the verb *can*, as no one says *will* learn. To describe the whole process of learning, she uses the metaphor of a *combination lock* saying that cognition (processing), conation (performing) and affectation (developing) work as interlocking tumblers; when aligned they unlock an individual's understanding of his/her learning combination. She compares human learning behaviour to a patterned fabric, where the cognition, conation and affectation are the threads of various colours and quality. It depends on individual weaver (learner) how s/he combines them and what the final pattern is. Johnston designed the Learning Combination Inventory (LCI) which describes the schema (pattern) that drives learner's will to learn.

Respondents are categorized into four groups:

- **Sequential** Processors, defined as the seekers of clear directions, practiced planners, thoroughly neat workers.
- **Precise** Processors, identified as the information specialists, info-details researches, answer specialists and report writers. It hides the original content of the Course Content page.
- **Technical** Processors, specified as the hands-on builders, independent private thinkers and reality seekers.
- **Confluent** Processors, described as those who march to a different drummer, creative imaginers and unique presenters.

#### Several limits of this solution

The plug-in has been designed for the WebCT, version CE 6.0.3 (12.0.11.15), and considering the strong dependence on the concrete HTML page structure, it is highly presumable the potential adaptation to another version will require additional modifications.

Due to the impossibility to adapt the WebCT source codes and absence of suitable API, it is necessary to implement the plug-in on the client side using JavaScript which modifies the content of the displayed page and uploads other necessary sources from the WebCT server using AJAX requirements. The data are received by parsing of the uploaded HTML pages. The implementation uses the jQuery of 1.4.2 version mainly for the manipulation with the page content (of the DOM model) and defining the AJAX requirements to receive additional data from the server.

Several limitations have been discovered, e.g. the WebCT shortens file names in the Course Content tree, which the plug-in uses to receive links to learning objects, up to approx. 11 characters plus the length of the classification chain including brackets. That is why the file names in the newly generated Course Content page are shortened and filled with three dots. The problem can be solved by re-naming the links using the appropriate length (i.e. number of characters) or making a relatively complicated change in the plug-in code, which will result in the increase in higher frequency of inquiries on the server (the total number will correspond to the number of topics in the e-course).

#### SW solution: the plug-in

An e-application (plug-in) running within the LMS WebCT was designed in order to match appropriate types of study materials and activities to individual student's learning style pattern. ... is implemented in the JavaScript language and inserted in the e-course directly in the source form to the Heading of the introductory page. The plug-in is activated in the student's browser at each access to the Course Content page, and it accomplishes following sequence of activities:

- It hides the Expand button of the Course Content in Student view of the e-course so that the student is not able to access the Course Content tree.
- It hides the original content of the Course Content page.
- Applying the AJAX inquiry it detects the student's ID and uploads data containing classification of single study materials according to their suitability to each learning style and the evaluation (i.e. pattern) of the logged-in student according to his/her user name.
- Having evaluated each type of materials and detected the individual student's learning style, it considers and counts the adequacy (appropriateness) of the item to the learning style within the topic.
- It re-organizes the Course Content page according to the provided data and displays a newly arranged page instead of the original one.

Each learning object in the folder is classified by four figures of the value of -1, 0, 1 which correspond to four types of processors (Sequential, Precise, Technical and Confluent) as follows:

- **minus one** (-1) means this type of study material, activity, assignment, communication etc. is rejected, i.e. does not match the given learning style;
- **zero** (0) is the middle value, i.e. the student neither appreciates, nor rejects, but accepts this type;
- **one** (1) means this type is appreciated and matches the given learning style.

The figures are presented at the beginning of the link to the object in the field of "User name of the link", e.g. in the form "(0, 1, -1, -1) Basic terminology".

#### Conclusion

*From the results presented above it can be seen there is no definite solution. It is important for a student to be aware of his/her learning style, know what his/her strengths and weaknesses are and be provided a variety of instructional methods to choose the most suitable ones; and the e-application can support the process. In the days of fast technical and technological development, globalization, demand for further, lifelong education, the importance of education is increasing.*