Learning Styles within eLearning: Didactic Strategies

IVANA ŠIMONOVÁ, PETRA POULOVÁ; MARTIN BÍLEK
Faculty of Informatics and Management; Faculty of Science
University of Hradec Kralove
Rokitanskeho 62, 500 03 Hradec Kralove
CZECH REPUBLIC
ivana.simonova@uhk.cz   petra.poulova@uhk.cz   martin.bilek@uhk.cz   http://www.uhk.cz

Abstract: - The paper introduces approaches to implementing the learning style theory in the field of eLearning. A software application was designed within the project “A flexible model of the ICT supported educational process reflecting individual learning styles” currently running at the Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic. The application generates the appropriate type of study materials and related learning activities according to the student’s individual learning style detected by the Learning Combination Inventory designed by C. A. Johnston, and thus enables to tailor the process of instruction to the student’s requirements. The project will result in a flexible model of the ICT supported process of instruction. Finally, the strategy resulting from the analysis of widely used learning activities matching or mismatching various types of learning styles is provided.

Key-Words: - Learning styles, eLearning, didactics, application, university education, LMS, project

1 Introduction

It is generally accepted people differ in the way of perceiving a situation, evaluating it, judging consequences, making decisions, i.e. they apply different strategies. In spite of the differences, each person is clever and may be right in his/her own manner. The strategies are called cognitive and learning styles, commonly defined as:
- an individual’s characteristic and consistent approach to perceiving, remembering, processing, organizing information and problem solving [1], or
- a set of cognitive, affective and psychological factors serving as relatively stable indicators of how a learner perceives, interacts and responds to the learning environment (Keefe in [2]), or
- attitudes and behaviour determining an individual’s preferred way of learning [3].

There is an important difference in understanding styles and abilities. According to Sternberg [4], the ability refers to how well someone is able to do something, while the style refers to how someone likes to do something. Thus we understand the style is a preferred way of using abilities which an individual has. Despite some divergence in the field of learning style stability, reliability and validity of measurements, researching this field is expected to be of great importance for the didactics.

On the other hand, there exist conflicting ideas concerning practical application of learning styles in the educational process which should be taken into consideration. Experience gained in the process of ICT implementation opened discussions on the theory of learning and teaching styles and their application in eLearning. Individual learning styles play an important role in the process of instruction, especially if it is managed by any Learning Management System (LMS). It provides designers with a wide range of tools which enable to accommodate needs of all learning style learners. Thus the process of instruction supported by ICT is considered appropriate and beneficial for learners of all styles. The possibility of individualization of the educational process from the both students’ and teachers’ point of view is its greatest advantage [5].

It is apparent that the efficiency of the educational process is influenced by numerous factors, e.g. learner’s intelligence, prior knowledge, level of motivation, stress, self-confidence, and learner’s cognitive and learning style. It is generally acknowledged that the instructor’s teaching style should match the student’s learning style. Felder [6] says that mismatching can cause a wide range of further educational problems. It favours certain students and discriminates others, especially if the mismatches are extreme. On the other hand, if the same teaching style is used repeatedly, students become bored. Gregorc [7] claims that only individuals with very strong preferences for one learning style do not study effectively, the others may be encouraged to develop new learning strategies Mitchell [8] concludes that making the educational process too specific to one user may restrict the others.

It can be seen from the facts presented above that it is important for a student to be aware of his/her learning style, to know what his/her strengths and weaknesses are
and be provided with a variety of instructional methods and approaches to choose the most suitable ones. New challenges evoke new questions, and didactics dealing with the ICT implementation is being developed quickly. It is not an easy task but at the same time there are hardly any other ways how to make the process of instruction efficient.

2 Problem formulation
Only limited numbers of studies have demonstrated [2] that students learn more effectively if their learning style is accommodated. The other ones have proved [9] that there is no statistically significant difference in students’ knowledge formed in the educational process supported by information and communication technologies (ICT) and within the face-to-face instruction. The question is whether tailoring the process of instruction within the LMS to student’s individual learning style results in increasing the 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.”

3 The Johnston´s concept
The above mentioned project arises from the Ch. A. Johnston concept “Unlocking the will to learn” [10]. Johnston emphasizes the traditional learning process is based on belief that all learning occurs as part of learner’s intelligence. The greater the intelligence, the more a child can learn. Johnston attracts attention to the verb can, as no one says will learn [10, p. 16]. She partly agrees with theories of Piaget, Jung, Skinner, cognitive psychologists etc., i.e. with the tripartite theory of the mind (feelings, thoughts, behaviour) which results in cognition (i.e. the processing self), conation (i.e. the performing self) and affectation (i.e. the developing self). The emphasis is paid to interrelationship, interconnectedness and holistic aspects of the mind. Then, another question appears, i.e. what motivates a child to learn. Educational and cognitive psychologists have identified several elements of motivation, such as attention, interest, self-esteem, mindfulness, effort, persistence etc. which use motivation as a link between learning styles and learning environment. For centuries, the will has been closely aligned with the concept of motivation, being described as the passion, the energy that moves individuals to actions. Current psychologists refer to the will as the drive to act that is uniquely individual. According to Assagioli in [10, p. 27] “the will is a specific power which rises up within each of us to give the individual the inner energy to wrestle, cope with, and integrate the whole of ourself.” To work effectively, the will must be supported by the why-question. It can show the learner whether the learning content is relevant, meaningful and applicable to real life. In other words, learners want to discover the wholeness of learning, and it will spark their will to learn. And, the will is the degree to which the learner is prepared to invest in the learning process [10, p. 29]. To describe the whole process of learning, Johnston 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. The will lies in the centre of the model, and interaction is the key. 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 [10, p. 39]. Johnston designed the Learning Combination Inventory (LCI) consisting of 28 statements, responses to which are defined on the five-level Likert scale, and three open-answer questions:
- What makes learning frustrating for you?
- How would you like to show the teacher what you know?
- How would you teach students to learn?
The responses create the schema (pattern) that drives the will to learn. The patterns are categorized into four groups and described as follows [10, pp. 48-50]:
- Sequential Processors, defined as the seekers of clear directions, practiced planners, thoroughly neat workers.
- Precise Processors, indentified as the information specialists, info-details researches, answer specialists and report writers.
- 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.

The LCI differs from other widely used inventories (e.g. by Kolb, Honey and Mumford etc.). It emphasizes not the product of learning, but the process of learning. It focuses on how to unlock and what unlocks the learner’s motivation and ability to learn, i.e. on the way how to achieve student’s optimum intellectual development. This was the main reason why the LCI, not any traditional tool was applied for detecting respondents’ individual learning styles within the above mentioned project.
4 Project Description

The main project objectives are as follows:

First, to adapt the Learning Combination Inventory to the conditions of the Czech university education, i.e. translate it from English to Czech language, and pilot it.

Second, to run a pedagogical experiment to find out whether using such methods of instruction which reflect individual learning styles result in statistically significant difference in the level of students’ knowledge in comparison to the situation when individual learning styles are not reflected. The experiment is based on the pre-test/post-test concept when the increase in knowledge is compared in the experimental and control groups. The process of instruction runs within a distance electronic course (e-course) on the Internet in the learning management system (LMS) WebCT. The e-course deals with the topic of Library services – information competence and education, and it is structured into eight parts covering the crucial content, i.e. Basic terminology, Library services, Bibliographic quotations, Electronic sources, Bibliographic search services, Writing professional texts, Bachelor and diploma theses and Publishing ethics. Students in the experimental group are offered such types of study materials and activities which suit their individual learning styles. The selection is made electronically by an application described below which automatically translates it from English to Czech language, and pilot it.

Students in the control group have access to all types of materials, exercises, assignments, communication and other activities which suit their individual learning styles. The selection is made electronically by an application described below which automatically generates the “offer”, i.e. it provides each student with types of materials appropriate to his/her learning style. Students in the control group have access to all types of materials, and the process of selection is the matter of individual decision, and it is tracked by the LMS. Final knowledge in both groups of students is post-tested after the process of instruction finishes, and the study results are statistically processed and compared.

Finally, according to the received results a flexible model of the instructional process supported by ICT and based on individual learning styles will be designed, and the quality, meaningfulness, effectiveness and limits of ICT/LMS implementation in the instructional process will be evaluated, and proposals to its optimum contribution and extent provided.

5 The Application Generating the Course Content

The application (plug-in) was designed to re-organize the introductory page of the e-course where the Course Content is presented to students. The criterion under which the application works is the student’s individual learning style. Single tools of the Course Content, i.e. Study Materials, exercises, assignments, assessments, communication and other activities are presented in such order which accommodates each student’s preferences. The LCI displays the final “pattern” which presents the individual combination of four approaches to processing information, i.e. it defines the Sequential, Precise, Technical and Confluent Processors. And each items of the Course Content is classified according to the adequacy to a certain learning style, i.e. whether the material is appreciated by the processor (value 1), accepted (value 0) or rejected (value -1). Finally, single types of study materials and activities are matched to each student’s pattern and the course is tailored to the individual student’s needs.

6 Teachers’ and Students’ Didactic Strategies

As mentioned above by [2], [7], [8], matching the learning/teaching styles is generally expected, and it causes that both the teachers and students appreciate the course of instruction. Despite the expectation some frustrating situations may appear. Following strategies were designed and piloted by Czech teachers on the primary and lower secondary school level (approx. 350 learners, 9 – 14-year-old) [11] to provide recommendations how to run and cope with the process of instruction and learning if it does not meet the expectations of both the teachers and learners. Above all, the presented strategies were piloted on the tertiary level (approx. 400 learners, 19+) within the process of instruction supported by ICT, i.e. in e-courses in the LMS WebCT.

6.1 Strategies and recommendations to learners

It is widely accepted that the process of instruction is frequently researched from the learner’s point of view, including the field of individual learning styles. Several proposals what the learner can expect, and recommendations how to act in case of mismatching the teaching/learning style are provided below.

For sequencing processors:
- Do not start work until you know what is expected from you.
- Set the main objective, and keep it.
- Each activity is divided into three parts: beginning, middle and final one. Then follow the procedure.
- Schedule your school day and after-school time to be able to finish the work which is expected from you.
- If possible, plan everything (doing homework, spending leisure time, content, questions, key ideas), and only after planning start the work.
- Have enough time to finish the activity and check your answers.
For precise processors:
- Do not trust your memory – put down times, events, deadlines.
- Learn by practising answers to questions, using data and events.
- Apply elimination and deduction rather than guessing answers.
- Save your assignments and tests for future use.
- Put down your questions to teacher, as well as notes.
- Listen to other students’ questions to understand why some information is important and correlates to the structure.

For technical processors:
- Analyze how things work, what they consist of.
- Plan your school activities to have enough time for others, e.g. sports, culture etc.
- Set the time for doing what you are most interested in.
- Keep your attention to the activity you are working on.

For confluent processors:
- Do not get excited about mistakes, they are a step towards reaching the target.
- Before you start work, consider various approaches.
- Be in contact with others to receive new ideas, and tailor them to your needs.
- Find supporters of your ideas.
- Do not waste time and start with the task even if you do not have all information; corrections can be made later on.
- Approach creatively to some small tasks – after fulfilling them you will feel better in taking risks in important projects.

6.2 Strategies and recommendations to teachers
The following recommendations arose from experience of teachers participating in piloting them. Some items may seem to be well-known and widely used, but when analyzing the process of instruction from the teacher’s point of view we are frequently surprised they are missing or partly applied only.

To teach precise processors:
- Make sure instruction provide detailed content.
- Provide references to other, more detailed sources.
- Expect the requirement for detailed information on instructions, work etc.
- Expect students will take detailed notes on everything what you say.
- Pay attention to both the providing information and finishing student’s work.

To teach technical processors:
- Make sure each student understands the consequences if he does not follow the instructions.
- If possible, perform the relating hands-on activities.
- Let students learn in the hands-on way, apply problem-solving and immediate evaluation of the activities.
- Expect several students will apply the trial-and-error approach, they will not take notes, and then they will need teacher’s advice and support to fulfil the expectation (i.e. assignment) in the paper form.

To teach confluent processors:
- Expect several students will not read instructions and follow them – help them understand when their independent work is desired or acceptable, and in what situations the “follow the instructions” is strictly required.
- Make sure students know that taking a risk in applying new approaches is appreciated.
- Understand that some students learn more by making mistakes.
- Discuss possible ways of doing activities and reaching targets.
- Expect some students will have the same problems for several times.
- Expect that some students will have more ideas and consider more approaches, which may look like they are not able to finish the work and keep the deadline.

7 Conclusion
Although the piloting process ran within the Czech educational system, results of final discussions with both teachers and learners concluded that the provided recommendations could be widely applied under similar conditions.

Despite the learners’ age the education supported by ICT has been spreading because of growing popularity of digital technologies in general. Currently, it enables easier and more complex realization of the process of instruction, both in the present and distance form. It is useful for students to be aware of their learning styles, strengths and weaknesses, and from the teacher’s side to be provided with a variety of methods and approaches to choose the most suitable ones.
Acknowledgment

This paper is supported by the GA CR Project N. P407/10/0632 “A flexible model of the ICT supported educational process reflecting individual learning styles”.

References: