Learning Styles in the e-Learning Environment: 
The Approaches and Research on Longitudinal Changes

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ABSTRACT

The paper focuses on the field of learning styles in e-learning. The study is structured in two main parts: (1) a brief overview of traditional approaches to learning styles is presented and their role in the process of instruction is set; this part results in the reflection of current state, when learning styles are considered within e-learning; (2) results of meta-analysis dealing with learning styles in the e-learning environment are introduced focusing on two periods (2001-2007, 2008-2014) and journals in selected databases ProQuest Central, Elsevier Science Direct and ERIC. Totally 5,361 papers were collected and structured according to three criteria: (1) time period, (2) relevancy of information sources and (3) relevant key words. Collected data underwent the chi-squared test for independence and the analysis of adjusted residuals on the significance level $\alpha=0.05$. No statistically significant changes were discovered in the research sample, however, some shifts were detected in this field. Finally, the results were discussed and relating conclusions provided.

KEYWORDS
Cognitive Styles, Comparison, E-Learning, ICT, ISCED, Learning Styles, Longitudinal Research, Meta-Analysis

INTRODUCTION

Within previous years the technical and technological development and social and political events were running in the society and evoked changes in all spheres of the society, including education. General development towards democracy and information and knowledge society transformed the existing structure of the educational system,

- New teacher´s and learner´s competences were defined and reflected in the learning content
- New teaching methods, organizational forms, ways of evaluation and new relations between elements participating in the educational proces were needed
- Humanities and foreign languages, informatics, environmentalistics were emphasized in curricula, as well as learner´s responsibility for his/her own education, creativeness and motivation
- Economic aspects of education, competitiveness was considered
- And last but not least the call for lifelong education appeared
These features were steadily included into the current educational system, which is hardly to be imagined without the implementation of modern information and communication technologies. All the changes aimed at optimizing the educational process, i.e., at taking on appropriate teacher’s activities towards increasing students’ knowledge and motivation. However, this new approach does not only mean adding new aids, methods and forms to the existing ones. It requires revision of the whole system and active ICT implementation in the process. Having undergone the starting period of material and technical problems, the time came we seriously and systematically dealt with didactic aspects of ICT implementation into the process of instruction. There exist numerous approaches, methods, strategies how to reach this target, and learner’s individual preferences and needs reflecting the learning style should be an inevitable part of the process. Therefore, we focused on the area of learning styles in the e-learning environment with the aim to research the question whether any longitudinal changes came about in publications on learning styles reflection in the e-learning environment in the last period.

THEORETICAL BACKGROUND

As generally accepted, learners vary enormously in learning styles (LS), i.e., in ways and speed of collecting and processing information, forming knowledge and applying it under new circumstances. Individual differences are apparent, but what are the underlying actions in the personality? Cognitive psychology can provide the answer (Coffield et al., 2004). It deals with the term of cognitive style; it includes thinking, processing and epistemological styles which result in meta-styles to supersede the whole multitude of them. However, individual strategies applied in the process of learning are also called cognitive and/or learning styles (Rayner & Riding, 1997) and have been defined by numerous authors as e.g., an individual’s characteristic and consistent approach to perceiving, remembering, processing, organizing information and problem solving (Simonova & Bilek, 2010). Some conflicts may occur, e.g., in the field of degree of learning style stability, reliability and validity, and in the impact on the educational process in general (Coffield et al., 2004; Felder, 2010; Gregorc, 1981; Kolb, 2013; Mitchell, 2004 and others). Moreover, new studies appeared (e.g., Simonova & Poulova, 2012), often bringing more contradictory facts instead of answering the existing questions. Despite this situation, exploring this field is expected to be of great importance for education sciences, particularly for general and field/subject didactics.

There exists a wide variety of definitions of the cognitive styles and learning styles. Those considered the most fitting the purpose of learning, are presented below.

Cognitive styles may be defined e.g., as an individual’s characteristic and consistent approach to organizing and processing information (e.g., Tennant, 1999), or an individual’s consistent approach in perceiving, remembering, processing, organizing information and problem solving (e.g., Stash, 2007). Learning styles are described e.g., as

- Preferences of one mode of adaptation to the others; the preferences do not operate to the exclusion of other adaptive modes but vary from time to time and situation to situation (e.g., Kolb, 2013)
- 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 (e.g., Keefe, 1979)
- Attitudes and behaviour determining an individual’s preferred way of learning (Honey & Mumford, 2002)

There is an important difference between the styles and abilities. According to Sternberg (1999), the ability refers to how well someone is able to do something, while the learning style refers to how someone likes to do something. Therefore, the style is a preferred way of using abilities which an individual has.
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