Abstract

Background and objectives: The European Parliament and Council set (2006) the objective of 'lifelong learning' and competence-based education and defined eight key competences which are closely connected with skills development and digital competence. Being aware of this objective, studying the possibility of information technology tools and skills development, Greenfield (2009) found that visual attention, the ability of simultaneous processing and spatial-visual capacity are also developed by the usage of the internet. Sung and co. (2008), Yang, (2012) made digital, game-based and effective development programmes to develop cognitive skills. According to Shaffer and co. (2004), the problem solving and cognitive skills of students are improved by computer games. According to the research of Dávid and co. (2016) in connection with spatial memory, children who use the computer less perform poorer. This thesis focuses on this issue, examining the possibility of the development of attention, memory and cognition in an information technology environment. The aim of the study is to examine the efficiency of information technology - based development of cognitive skills (attention, memory, cognition) in 5-8 grades of elementary school. This thesis aims at finding out what results are produced by a continuous cognitive skills development based on information technology and interactivity. Furthermore, in order to become more familiar with the students and the background factors, creativity, learning motivation and orientation were also examined. The study also includes the impact assessment of the experimental group, the effect of sample variables on the results of the pre,-and post- studies and the correlation of study variables. *Methodology*: In the longitudinal study, the background factors and the development of attention, memory and cognition of the participants of the experimental group (n=174, 89 male, 85 female) and those of the control group (n=174, 91 male, 83 female) (agg. n= 348) were followed and examined from grade 5 to 8, over the course of four school years. Testing instruments: Bourdon-test (attention test), verbal memory test, visual memory test, reasoning test (Meili's number sequence test), visual problem solving test (figures), intelligence test (Raven SPM), Kozéki-Entwistle's learning motivation and orientation questionnaires, creativity questionnaire (TKBS-Tóth's creativity scale), test on interest in information technology (author's own). During the development, tasks related to subject blocks (mathematics, Hungarian language and literature, natural sciences, history) supported by information technology were applied. The development lessons took place in information technology rooms in one extra lesson per week. *Thesis-like enumeration of results*: 1) The results of the students in the experimental group – in the fields of attention (quality, quantity), memory (verbal, visual), cognition (mathematical logic, visual problem solving) indicate a greater, more intensive and steadier development than those of the control group. After development, a significant difference could be found between the two groups. 2) During the course of the longitudinal study, there was no significant difference in developability and between the scores of male and female students in the control group. 3) In the experimental group, students of better abilities show greater development than those of weaker abilities. The initial advantages emerge in developability. The students who have higher scores at the input measurement also got higher score at the output measurement. 4) The results of the study of background factors: as an effect of the development, learning motivation and orientation (organization, thoroughness) were significantly improved. With regard to creativity, the experimental group performed significantly better in nonconformity, preference of complexity, independent thinking, impatience, dominance, curiosity-interest, energy and playfulness-humour than the control group. *Summary:* The tests confirmed the raison d'etre of information technology –based skills development and thus the applicability of the methodology. The practical significance of the study is that a developmental method comprising four full years - which proved to be efficient - has been developed and tested. The methodology might be applied in talent development and in groups of students of special needs. Further research opportunities might be provided by an application of the method in secondary schools in which vocational training and a higher-level competence in information technology is already present thus the development could be focused on connections between subjects which are central to the interest and higher education of students. Moreover, the continuous improvement of information technology tools provides opportunities to continually develop the 'tools' of the method.

Key words: skills development, cognitive skills, opportunities with information technology