Doctoral Dissertation Abstract

Digital competence of pupils in the 4th and 6th grades of primary school

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Subject and objective of the study, including scientific justification of the study

Technological progress, digitalisation and the social changes taking place in the information society are phenomena that accompany modern man in many areas of his functioning. One of the types of activities aimed at adapting to changing conditions is the acquisition and improvement of digital competences. They enable, on the one hand, the use of the solutions provided by information and communication technologies and, on the other hand, the recognition or mitigation of the risks associated with them. These formulations are particularly valid for young users of information and communication technologies (ICT), who, as the results of various studies show, independently start using digital devices and tools from the age of 7 or earlier. Research to date in the area of pupils' use of ICT has focused on two strands: 1) identifying how students use ICT in and out of school and 2) determining the level of students' digital competence. Regarding the latter strand, it should be pointed out that the research carried out is based on the self-assessment of the individuals surveyed, and few empirical reports directly measure digital competences, in which pupils would perform practical tasks using digital devices and tools. In addition, there is a perceived gap between the challenges posed to pupils by open access to ICT and the digital competence development efforts undertaken in schools. With a particular focus on the ability to critically evaluate digital sources and information.

Digital skills, which, alongside knowledge and attitudes, are part of digital competence, were the subject of the own research.

Two cognitive objectives were set in this research project, aiming to measure the level of digital skills of students and to clarify potential differences in the level of these skills. In addition, two practical and implementation objectives were set, which concerned the development of an electronic version of a research tool designed to measure the level of digital skills of pupils in the 4th and 6th grades of primary school and recommendations for educational practice in the implementation of curriculum content using ICT.

The cognitive objectives specified in this way allowed for the formulation of two main research problems, which are as follows: What is the level of digital skills of 4th and 6th grade primary school students in the areas of information and data literacy, communication and collaboration, digital content creation? and Are the level of selected aptitudes, socio-demographic variables, and the way ICT is used in and out of school related to the level of digital skills of 4th and 6th grade primary school students?

Research methodology

The research design was embedded in a normative paradigm, and the research used a correlational model. Two quantitative data collection methods were used: the testing method and the survey method. The following research tools were used to collect empirical data, which were the pupils' creations and responses to the tasks and questions presented to them: 1) the Test of Multiple Aptitudes for pupils in classes IV-VI of primary schools (Test Umiejętności Wielorakich, TUW) by Wiesław Poleszak, Robert Porzak and Grzegorz Kata, 2) the author's Test of Digital Skills for pupils in class IV, 3) the author's Test of Digital Skills for pupils in class VI, and 4) a pupil survey questionnaire developed by the author of this paper. The study group consisted of: 208 primary school pupils, including 101 4th grade pupils and 107 6th grade pupils. The research was conducted in primary schools or school complexes located in large cities, small towns and villages in the Kuyavian-Pomeranian region. Each research session consisted of two parts: 1) students solving computer-based tasks in the computer room, 2) completing the Test of Multiple Aptitude for students in classes IV-VI of primary schools (TUW) and a questionnaire survey in the classroom.

Results and conclusions

The analysis of the results revealed that the 4th and 6th grade students surveyed from schools located in large cities present a higher level of selected digital skills than their peers from schools located in small towns and rural areas.

The analysis of the results of the research allows indicating that the most difficult tasks for the examined pupils in 4th and 6th grades were those related to the skills of assessing the reliability of information and digital sources and programming. The easiest tasks for the surveyed pupils concerned the ability to integrate different digital content using available programmes and to send e-mails.

The study further showed the existence of positive correlations between the level of mathematical-logical aptitude and visual-spatial aptitude of the 4th and 6th grade students surveyed and the level of selected digital skills.

The results obtained among the sixth-grade students surveyed further show that gender is a differentiating factor in the level of emailing skills. Girls scored higher than boys.

In addition, several important predictors for the digital skills level of the surveyed students embedded in the way they use ICT in and out of school were revealed.

The results obtained in this research project provide a rationale for the formulation of recommendations for educational practice in the organisation of activities aimed at the development of digital skills of students in the 4th and 6th grades.