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Research article

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Abstract

In the information society, the concept of IL is at the center of educational research. In higher education, university teachers and students need to keep up with current research trends in the application of IL skills. The generation, processing and storage of information has never been more marked in any age, as Manuel Castel writes in his work The World of Knowledge. Information therefore determines all aspects of life, and it is therefore necessary for those who choose a career in the intellectual field to be equipped with information skills. An information literate individual is able to recognise when and where information is needed, to find it, analyse it and apply it successfully. To be considered information-literate a person must be able to recognize the need for information and assess its scope, to locate information quickly and efficiently from a variety of sources and databases. He/she must be able to evaluate information and sources, and be able to organise and process information or create new knowledge, recognise and solve problems. After reviewed the studies and research on information literacy, a questionnaire survey of a sample of 230 university students in Hungary was used to assess students' information literacy. This paper presents the main results of the survey.

Keywords:
information literacy (IL); undergraduate students; abilities.

Zusammenfasung

In der Informationsgesellschaft steht das Konzept der Informationskompetenz im Mittelpunkt der Bildungsforschung. Im Hochschulwesen müssen Dozenten und Studenten mit den aktuellen Forschungstrends bei der Anwendung von IL-Fähigkeiten Schritt halten. Wie Manuel Castel in seiner Arbeit Die Welt des Wissens schreibt, wurde die Produktion, Verarbeitung und Speicherung von Informationen in keinem Zeitalter so stark betont wie im Informationszeitalter. Informationen sind also ein Merkmal aller Lebensbereiche, und es ist daher notwendig, dass diejenigen, die sich für einen intellektuellen Beruf entscheiden, über Informationskenntnisse und fähigkeiten verfügen. Ein informationskompetenter Mensch ist in der Lage zu erkennen, wann und wo Informationen benötigt werden, sie zu finden, zu analysieren und erfolgreich zu nutzen. Um sich als informationskompetent zu qualifizieren, muss man in der Lage sein, den Bedarf an Informationen zu erkennen und deren Umfang einzuschätzen, Informationen schnell und effizient aus einer Vielzahl von Quellen und Datenbanken zu finden. Man muss in der Lage sein, Informationen und Quellen zu bewerten, Informationen zu organisieren und zu verarbeiten sowie neues Wissen zu schaffen und Probleme zu erkennen und zu lösen. Nach Durchsicht von Studien und Forschungsarbeiten zur Informationskompetenz habe ich eine Fragebogenerhebung unter 230 ungarischen Universitätsstudenten durchgeführt, um ihre Informationskompetenz zu bewerten. In dieser Studie werden die wichtigsten Ergebnisse der Umfrage vorgestellt.

Schlüsselworte:
Informationskompetenz (IL); Universitätsstudenten; Fähigkeiten.

1. Introduction/ Statement of problem

The *information society* is a new type of human interaction dominated by the organized production, storage, retrieval and use of information, in which a kind of "*network society*" emerges along with its new institutions, to a large extent transformed versions of familiar social institutions. Thus, politics, economy, and culture are reshaped at the macro level, as well as institutions operating at the meso level, and families and individual identities at the micro level (Castells, 1996). Following Castells' line of reasoning, we can speak of a genuinely new mode of social interaction when quantitative changes (such as increased number of computers, broadband Internet penetration, increased flow of information) qualitatively transform social relations among individuals. The fundamental change that characterizes an information society is a change in the structure of the society.

In his trilogy, Castells describes the transformation of the society as a whole, which in cultural terms means *the emergence of digital reality, where reality and virtuality merge and complement one another*. The logic of the information society affects everyone, but only those who possess the necessary digital and information skills can actively contribute to shaping this new mode of social interaction within networks. In this sense, digital information literacy is indispensable for individuals in the 21st century.

Information is an essential prerequisite for the functioning of every society and every social subsystem, and has thus played an important role in all forms of social organization in the preceding eras. Nevertheless, the communication, reception, processing, storage, interpretation and flow of information did not determine any previous society to the extent that it shapes the current one. Indeed, it is the simultaneous appreciation of all these that distinguishes today's society from previous ones. Discussing the work of Machlup, László Z. Karvalics notes that the nature of the information society requires us to speak of knowledge production, since the term 'production' encompasses everything, including dissemination, in a certain sense, as the recipient acquires new knowledge assets. Production thus encompasses all the key activities of the information society, namely research, discovery, invention, design, planning, dissemination, and communication (Karvalics, 2009).

The aims of this study are to define digital information literacy, to present three information literacy models, and to present the information literacy of students at a university in Hungary.

There is a vast amount of information available in the information society, information seekers are overwhelmed with the flood of data. People suffer from information overload, information anxiety and significant assimilation deficits. It is therefore crucial for everyone, including university students, to have access to relevant information in order to make quality decisions in their studies and work.

2. Theoretical foundation

2.1. The concept of information literacy, information literacy models

The term ‘information literacy’ was first coined by Paul G. Zurkowski in 1974 to denote techniques and skills for utilizing a wide range of information tools as well as primary sources, the ability to measure the value of information, to mould information to satisfy individual needs and solve problems.

2.2. The Big6 information literacy model

Problems that require information for their solution are called information-based or information problems (Eisenberg & Berkowitz 1990). Skills for accessing and using information are prerequisites of solving information problems (American Association of School Librarians 1998; Eisenberg & Berkowitz 1990).

The model developed by Eisenberg and Berkowitz is a six-step process that shows how individuals of different ages solve information problems. It includes the following steps:

“1. Task Definition: It means defining the information problem and identifying the information needed.

2. Information Seeking Strategies: These include determining all possible sources and selecting the best sources.

3. Location and Access: It means locating the sources intellectually and physically and finding information within the sources.

4. Use of Information: It focuses on empowering the information seekers to engage in reading, hearing and viewing to extract relevant information.

5. Synthesis: It includes organizing and presenting information from multiple sources.

6. Evaluation: It means judging the product for its effectiveness and the process for its efficiency.” (Singh & Grizzle, 2021: 246).

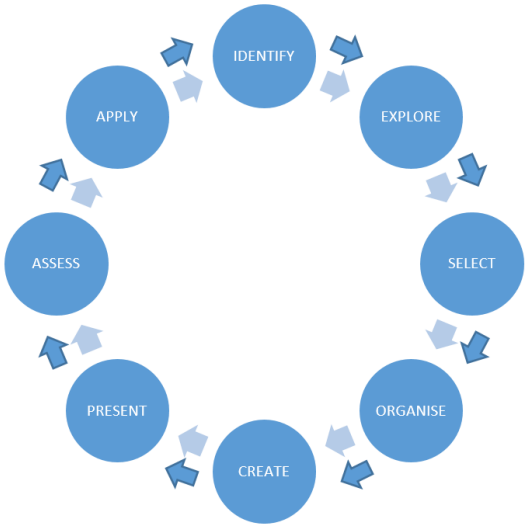
2.3. The Empowering 8 model

In the information literacy model developed by Wijetunge and Alahakoon the teacher and the school librarian provide a joint support for the learner in information processing and information-based learning (Wijetunge & Alahakoon, 2009:36-37). The steps of the Empowering 8 model are the following:

- Identification: determining what information is needed on a given topic, then identifying and selecting the topic, format and sources of information.
- Exploration: identifying relevant information from reliable sources.
- Selection: choosing the necessary and appropriate information, gathering sources and references.
- Organisation: distinguishing between fact, opinion and fiction, organising information logically.
- Creation: creating the information, editing the meaningful corpus of information, finalising the bibliographic format.
- Presentation: sharing the information in a form that is appropriate for the recipients.
- Assession: accepting feedback and identifying missing but necessary skills.
- Application: incorporating feedback and evaluation into the next learning activity.

An appropriate model for supporting information-based learning of students in higher education, which helps systematically examine the underlying causes of learning failures. In the model (see fig. 1), the two arrows represent the teacher and the library professional.

Figure 1. The Empowering 8 IL model (own editing)



2.4. The e-ARTISTS media and information literacy model

The e-ARTISTS information literacy model was developed by Jagtar Singh and Alton Grizzle to address the challenges posed by increasing information overload and assimilation deficits. In what follows we will present the e-ARTISTS model.

- e (exploration): The initial step of the process involves exploring one's knowledge base related to the issue on hand. The learner must assess what they already know about the subject and what they need to learn in order to solve the current problem.
- A (assimilation): The learner assimilates relevant content from analog and digital sources into their tacit knowledge, analysing and attaching meaning to the content of the issue on hand.
- R (reflection): The learner critically reflects on the assimilated content, examining how it supports the achievement of his/her goals.
- T (truncation): The learner truncates content that he/she does not find useful to ensure more efficient storage.
- I (integration): The learner integrates the new knowledge into solving the assignment on hand.
- S (sharing): The learner shares the outcome of their learning process with stakeholders (teachers, peers) and incorporates feedback into the process.
- T (transformation): The learner transforms his/her existing knowledge, incorporating new information to fill gaps.

S (sensitization): The learner is sensitive to the legitimate use of information, an ethical and legal user of information. (Grizzle & Jagtar 2021:248).

2.5. Information literacy - digital competence

The European Commission defines digital competence as "the confident, critical and responsible use of digital technologies for learning, at work and for participation in society" (DIGCOMP 2019:12). Examining one of the most integrative frameworks (DigComp 2.1.), the European digital competence framework, along five dimensions and the 21 competences, we can conclude that it considers information literacy, communication, digital and media content creation, security and problem solving in the exercise of information and media literacy as part of digital competence. Another interesting feature of the model is that it encompasses certain aspects of digital competence, including information literacy and associated skills, abilities and activities, by considering the Internet, the virtual platform of e-learning, as the primary learning environment. The components of digital competence are structured as follows:

"1. Information and data literacy

1.1 Browsing, searching and filtering data, information and digital content

1.2 Evaluating data, information and digital content

1.3 Managing data, information and digital content

2. Communication and collaboration

2.1 Interacting through digital technologies

2.2 Sharing through digital technologies

2.3 Engaging in citizenship through digital technologies

2.4 Collaborating through digital technologies

2.5 Netiquette

2.6 Managing digital identity

3. Digital content creation

3.1 Developing digital content

3.2 Integrating and re-elaborating digital content

3.3 Copyright and licenses

3.4 Programming

4. Safety

4.1 Protecting devices

4.2 Protecting personal data and privacy

4.3 Protecting health and well-being

4.4 Protecting the environment

5. Problem solving

5.1 Solving technical problems

5.2 Identifying needs and technological responses

5.3 Creatively using digital technologies

5.4 Identifying digital competence gaps" (Carretero et al., 2017:21).

Recent research shows that not only objectively describable, measurable skills influence effective digital activity, but also individuals' subjective beliefs about their own competences (Peiffer et al., 2020). In relation to the use of digital tools, on self-efficacy has been shown to predict the effectiveness of digital activity (Ulfert et al., 2022). Competency components, and beliefs about competencies independently effects on learning, motivation and performance (Hughes et al., 2011; Marsh et al, 2017; Pajares & Schunk, 2002).

Ulfert-Blank and Schmidt define digital self-efficacy (DSE) as a predictor of successful performance (Ulfert-Blank & Schmidt, 2022). An individual's confidence in their future successful use of digital systems (competence beliefs) determines whether and how they use digital tools and systems (Eastin & LaRose, 2000), and also whether they are willing to use digital tools (Venkatesh & Bala, 2008).

Digital self-efficacy (DSE) is considered to be the 'building block' of digital competencies in interacting with digital technologies (Janssen et al., 2013, p.478). Digital self-efficacy is therefore a building block of all the digital competence components, including information literacy.

If digital self-efficacy is part of digital competence, the development of self-efficacy can be used to develop digital competence and information literacy (Peiffer et al., 2020). Bandura described the concept of self-efficacy in social-cognitive theory (Bandura, 1977), defining it as an individual's belief in the successful completion of a given task (Bandura, 1997, 2001). Other authors emphasise the cognitive, goal-related nature of self-efficacy as a belief that is always future-oriented and context-dependent (Bong & Skaalvik, 2003; Marsh et al, 2017; Schunk & Pajares, 2007). Self-efficacy expectancy is an individual's belief that he or she is capable of performing a particular behaviour (Bandura, 1977:193).

Based on the information presented above, it can be concluded that the development of information literacy can be understood in the context of digital competence and digital self-efficacy.

3. Research methodology

The aim of the empirical study was to assess students' information literacy at the Faculty of Humanities and Social Sciences of Pázmány Péter Catholic University. To measure information literacy, we employed the information literacy questionnaire developed by Bibi Abida Hussain, Si Li, and Ahmed Alsanad, along with three additional tasks that examined the practical application of information literacy.

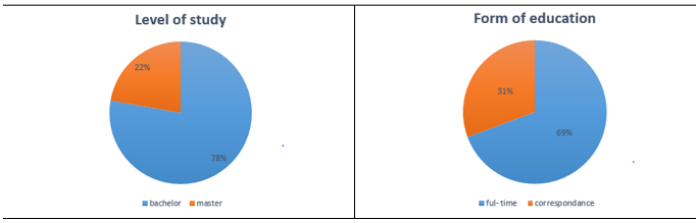
3.1.The sample

The non-representative sample consisted of 238 university students who were surveyed in writing. The majority of participants were enrolled in daytime programs and pursuing undergraduate studies (BA level).

Figure 2. The characteristics of Sample

Frequency Distribution Table

Class	*Count*	*Percentage*
18 - 24	178	74.5
25 - 31	35	14.6
32 - 38	16	6.7
39 - 45	4	1.7
46 - 52	6	2.5



Students from every department were represented in the sample, and the questionnaire was anonymously and voluntarily filled out. Data was collected between March and April 2023 using Google Forms. The questionnaire consisted of multiple sections. This paper discusses the descriptive statistical analysis of the data collected in relation to information literacy. The first section of the questionnaire focused on demographic data regarding students' field of study, gender, duration of studies, and schedule. As regards information literacy, the following areas were examined using a Likert scale:

How do students evaluate information?

How do students identify possible sources of information?

How do students identify and understand sources of information?

How do students evaluate the purpose of accessing and using information?

How ethically do students use information?

How do students use information technology tools in their studies?

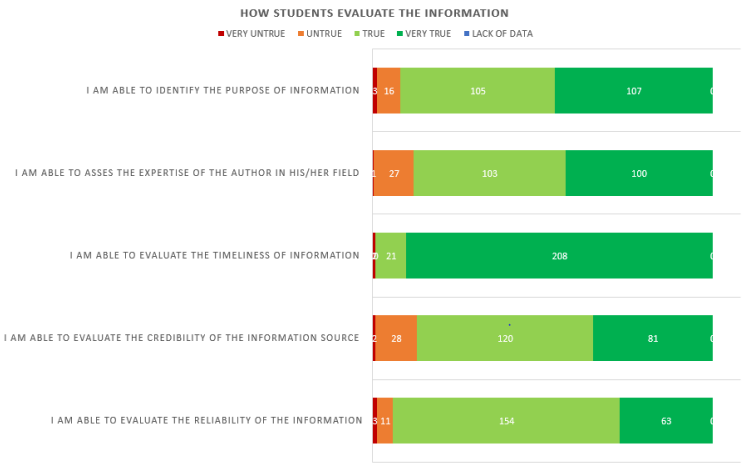
After cleaning, the data were processed using SPSS v.20.0.

4. Results

4.1. How do students evaluate information?

Encouraging results were obtained regarding the evaluation of information. 20% of the respondents stated that they are not able to verify the author and the credibility of the information source, while the majority claimed to be capable of evaluating the credibility of information sources, the reliability of the information, assessing the author's recognition and expertise, identifying the purpose of the information, and evaluating the timeliness of the information (Figure 3).

Figure 3. The evaluation of information

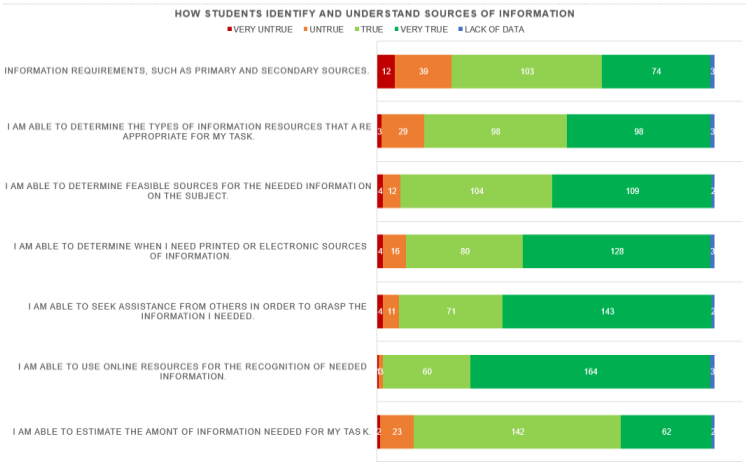


4.2. How do students identify and understand sources of information?

In identifying and understanding sources of information, only ¼ of the respondents had problems distinguishing between primary and secondary sources, and 32 of the respondents indicated that they had problems identifying the type of information they needed.

The majority of respondents perceived themselves as being able to estimate the amount of information needed for a given task, use online resources to identify/find the information they need, seek assistance from others to understand the information they need, determine when they need printed or electronic sources of information, and identify possible and necessary sources of information and the appropriate type (e.g., primary and secondary sources).

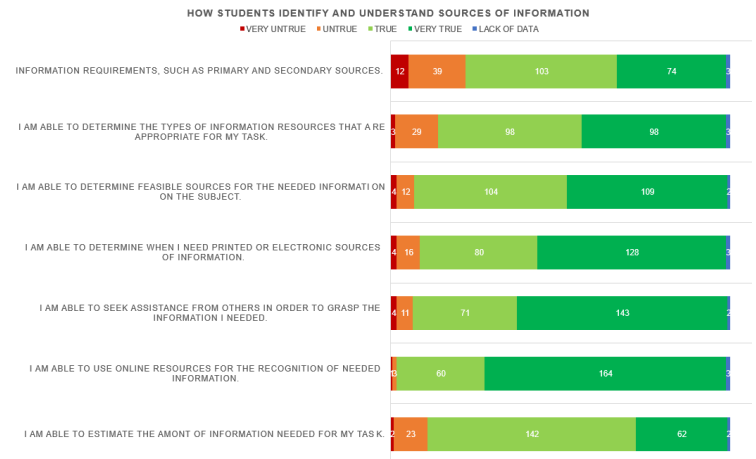
Figure 4. The identify and understand information



4.3. How do students identify possible sources of information?

When it comes to the ability to identify possible sources of information, the picture is slightly more nuanced. Less than 1/4 of the respondents struggle with using search engines, while 1/4 of them do not use dissertations as sources of information. More than 1/4 do not use library catalogues, encyclopaedias, and databases. It is encouraging that ¾ of respondents do not consider magazines as an appropriate source of information for their academic activities (Figure 4).

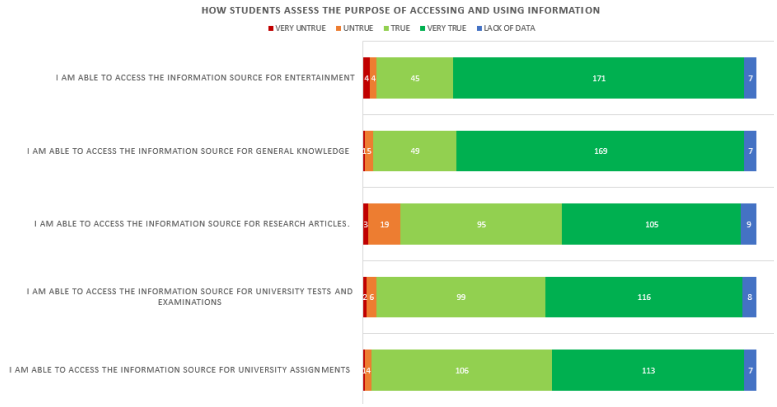
Figure 5. The evaluation of information goal



4.4. How do students evaluate the purpose of accessing and using information?

Finding information for various activities such as entertainment, research, exams, assessments, etc. does not pose a problem for students. The majority of respondents consider their ability to collect information for specific purposes to be fully adequate (Figure 6).

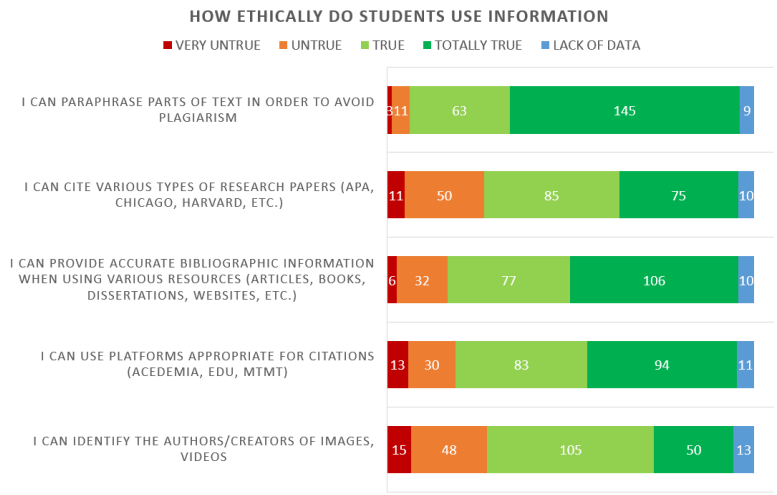
Figure 6. Identify potential source of information



4.5. How ethically do students use information?

¼ of the respondents have difficulty identifying the authors or creators of images and videos, and have problems using citations. Less than ¼ of the respondents struggle with providing bibliographic information as well as using appropriate platforms for citations. Relatively few participants found the use of paraphrasing problematic (Figure 7).

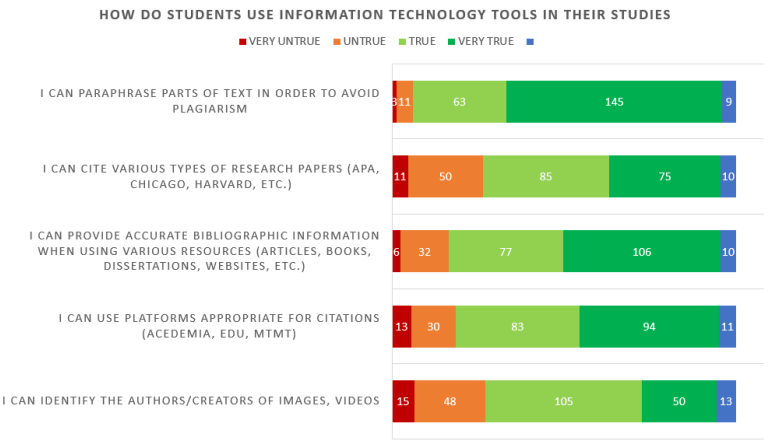
Figure 7. The ethically use of information



4.6. How do students use information technology tools in their studies?

The vast majority of respondents do not use programming languages or data analysis software, and half of the respondents have difficulties creating infographics. A third of them admit to being unable to create videos to present their work. They are comfortable using PowerPoint, text editing software, laptops and personal computers. Most of them also have access to e-databases, e-books, and e-journals (Figure 8).

Figure 8. Technology tools of students



4.7. Information processing

Students were questioned in connection with a relatively recent news item and the results of their information processing were rather interesting. Less than half of the respondents provided a correct answer for one of the statements (The news is true), information that could be checked relatively quickly on the internet. As regards the other true statement (AI cannot be sued), which could not be verified with one or two search words, less than 1/3 of the respondents marked it as correct. The two false statements (The activities of artificial intelligence cannot be subject to copyright; Anything posted on the internet cannot have exclusive copyright claims) were considered correct by a quarter of respondents.

Read the news item below and decide which of the statements are true:

A few years ago nobody would have thought that … human beings will sue artificial intelligence. The artists who filed the suit … consider that the activity of AI platforms violate copyright laws of several million artists. The class-action lawsuit targets platforms such as Midjourney, which operates Stability AI. …Plaintiffs claim that in order to train the AI system, companies have made use of billions of images from across the internet, without asking for artists' consent. They have made huge revenues from copies of copyrighted images causing „not only theoretical" harm to artists, whose work was used by image generators and sold on the internet.

An amount of 3% of the respondents (7/213) provided correct answers. Based on the subjective perception of their self-efficacy, a very positive image emerges regarding the information literacy of the sample. The literature states that subjective

competence beliefs and positive digital and information self-efficacy predict the success of information activities. However, when examining the results of the task in which students were asked to perform a specific information literacy-related activity, we found that students were not as successful as could be inferred from their subjective assessment of their information activities.

5. Conclusions

Findings show that in order to obtain a more realistic picture of students' information literacy, their actual information activities should be investigated by means of various information processing tasks. The adapted questionnaire presented their information and digital self-efficacy, not in a task situation, where it could have had a positive impact on performance, but rather in a compact section of the questionnaire, where they had to express their beliefs related to information literacy based on a total of 38 statements.

Despite the positive and reassuring picture of students' information literacy based on the 38 statements, intervention points can be identified, in particular in relation to the development of applied information literacy. No correlation was found between self-efficacy and information task performance.

Authors note:

Szőke-Milinte Enikő ia a Staff member at Pázmány Péter Catholic University since 2002; acting head of the Vitéz János Teacher Training Center from 2017, appointed director of the institution from 2020; in charge of teacher training. Instructor in teacher training since 1996, in the subjects of methodology related to the training of media, film and communications teachers, and in various subjects of educational science focused on the shared pedagogical and psychological foundations of teacher training. Research areas include pedagogical communications, conflict management, digital and media pedagogy, and educational theory. Author of a number of professional volumes, studies and textbooks on media instruction and pedagogical communication. Member of the public body of the Hungarian Academy of Sciences, member of the Teacher Training Subcommittee.

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