

THE INFLUENCE OF DIGITAL LITERACY LEVEL OF PRINCIPALS ON THE SCHOOL'S DIGITAL TRANSFORMATION MANAGEMENT PROCESS: RESEARCHED USING THE ESHET-ALKALAI MODEL

L. Luić, D. Švelec-Juričić

University North (CROATIA)

Abstract

In a wider context of digital competence, digital literacy means the attitudes and abilities of individuals to appropriately use digital tools and resources to locate, access, manage, evaluate, analyze, create content, expression in the media and to communicate. According to Eshet-Alkalai, digital literacy is a survival skill in the digital age that significantly depends on the level of certain types of digital skills: photo-visual literacy, reproduction literacy, branching literacy, information literacy, socio-emotional literacy and real-time thinking skills. Whether, and how, does the level of digital literacy of school principals affects the management of digital transformation of the school is a research question addressed by the authors of this paper, the aim of which was to determine the strength of the correlation between variables determining management experience and their digital literacy using the Eshet-Alkalai model. The research was conducted in two phases on a sample of primary school principals from three geographically and economically related regions of the Republic of Croatia, which have similar educational policies, in order to examine management practices in the digital transformation of schools. The first phase of the research was conducted using a questionnaire method that contains original metrics of influencing factors of information and data literacy. The results show the need for incremental steps in the context of informatic literacy, which were used to design the reference framework and were the starting point for the second phase. The second phase of the research was conducted with the method of a focus group, created from the same sample, using the semi-structured interview method to examine the attitudes and opinion of principals on the importance of applying certain digital skills in the process of managing digital transformation of schools, by interpreting the latter a conclusion arises that information and photo-visual literacy, due to the specifics in which the educational system functions, are the most important predictors of the successfulness of the process of digital transformation of schools. The combined comparative analysis of the results of both phases of the research set the foundation for the conceptual model of systematic education of leaders in educational establishments in the field of digital literacy by using constructs contained in the Eshet-Alkalai model, since the level of digital literacy significantly affects the management of digital transformation of schools which represents a starting point for further similar research.

Keywords: Digital literacy, digital transformation, school management, Eshet-Alkalai model.

1 INTRODUCTION

In accordance with technological achievements and changes that due to the general process of introduction of digital technologies in business began to necessarily occur in the educational system, the Republic of Croatia institutionalized implementation of digital transformation in schools in 2015 with a pilot project "e-Schools: complete informatization of school business processes and teaching processes in order to create digitally mature schools for the 21st century" which covered 10% of all schools in the Republic of Croatia. II. phase of the project, which will be implemented by the end of 2022, will digitally transform teaching and business processes in all schools in the Republic of Croatia, the goals which derive from the European Framework for the Digital Competence of Educators DigCompEdu. [1]

Schools, whose success largely depends on successful leadership, cannot operate in a static environment, so it is necessary to adapt the educational system to the current needs of society, given that expectations of schools and principals have changed significantly, placing before schools the obligation to implement new approaches to teaching and learning based on the latest trends in education. [2]

Such an environment requires from principals, who manage the process of digital transformation, an appropriate level of knowledge, skills and abilities that in digital discourse ensure redefining the role and harmonization of integrated practices with the new conceptual framework of the educational system.

The digital transformation of the school is an integral part of the strategic plans at the national level, but also at the level of each school individually. Strategic leadership is a skill that requires designing the future, is guided by vision, directs action, and determines the purpose of change and analyzes the context of events. Given that strategic leadership is not a micro-management strategy but a macro view that allows the identification of various activities, the use of tactics and plans, [3] part of the strategy must certainly be to improve the digital literacy of principals.

Digital literacy is most often defined as literacy that includes knowledge, skills, attitudes and abilities of individuals to properly use digital tools and resources to find, access, manage, integrate, evaluate, analyze and synthesize digital resources, create new knowledge, media expression, communicating and acting through work, education and leisure. [4]

Digital Education Action Plan 2021-2027 [5] of the European Commission emphasizes digital literacy, as one of the main principles, as crucial for life in the digital world, emphasizing the importance of education on digital technologies in which it is necessary to promote healthy, safe and meaningful use of digital tools and resources and critical evaluation of information.

The use of digital technologies to access, understand and create content and to communicate with other users, including the social component, makes the environment in which digital literacy develops as one of the skills not acquired as an individual skill throughout lifelong learning. [6]

The rapid development of digital technology during the digital age puts an individual in a situation where he must use constantly evolving technology and in parallel develop and improve his technical knowledge, cognitive and social skills to be able to follow the requirements of the digital environment and successfully solve problems. [7]

For the purposes of this research, a holistic conceptual model of digital literacy Eshet-Alkalai created in 2004 was used, which considers digital literacy a key skill for survival in the digital age, and which enables intuitive and efficient solving of complex digital tasks. Functioning in the digital environment implies the possession of a wide range of complex and layered cognitive, motor, social and emotional skills based on which, putting the individual as a starting point, five types of literacy is defined: photo-visual literacy, reproduction literacy, branching literacy, information literacy and socio-emotional literacy, [8] and in 2012, a sixth digital literacy - real-time thinking – is added to the revised model. [9]

Photo-visual literacy helps users intuitively and easily “read” and understand instructions and messages presented visually. People who are photo-visually literate have a good visual memory and sharp intuitive-associative thinking, they use the visual to think. Photo-visual communication speaks the language of the users of the digital environment using the capabilities of a sophisticated, interactive and multimedia digital environment. **Reproduction literacy** is the ability to create meaningful, authentic and creative content or their interpretation using and integrating existing autonomous pieces of information. Reproductively literate individuals possess good multidimensional logical thinking that helps them create meaningful new combinations of existing information. **Branching literacy** is the ability of nonlinear thinking that allows users of hypermedia technology a high degree of freedom in “navigating” through different sources of knowledge. People who are hypermedia literate have a high degree of ability not to lose orientation by surfing through a hypermedia maze, they can produce new knowledge by reaching a large number of independent pieces of information in a nonlinear way. **Information literacy** is the ability to evaluate information in a digital world in which the amount of information is growing unstoppably so information literacy acts as a filter. A person who is information literate thinks critically, evaluates information critically, always doubts the quality of information, and never takes information for granted. **Socio-emotional literacy** is the most complex of all literacy and enables the recognition of the dangers of the digital environment. To master this literacy, users must be very critical, analytical and mature, and have well-developed information and hypermedia literacy. Socio-emotional literate individuals are those who want to share data and knowledge with others, are able to evaluate information, have developed abstract thinking, and are able to collaboratively construct new knowledge. [8] **Real-time thinking** is a cognitive skill that allows users of an advanced digital environment to function efficiently and generate new knowledge from a large amount of information that appears simultaneously, at high speed and high intensity. Real-time thinking is pivotal skill in present digital environments such as multimedia, digital games and advanced machines. [10]

This paper starts from the assumption that the level of digital literacy of school principals influences the management of digital transformation, where the aim of the research was to determine the strength of the correlation between variables determining managerial experience and variables used to examine their literacy level. Whether the level of digital literacy of school principals influences the management of digital transformation of the school is a research question of this paper.

2 METHODOLOGY

The research was conducted using the constructs of the conceptual model of digital literacy Eshet-Alkalai and is a continuation of the previous research of the authors of this paper, conducted by a questionnaire on a sample of principals of three geographically related counties, which have similar educational policies in the school management process. The results of this research show that principals consider IT, information-data and digital literacy to be the most important skills in the school management process. Given that the results provide insight that principals in certain areas of information and data literacy have an initial or intermediate level of complexity, incremental progress is needed in terms of introducing sequential, systematic and specific education of principals in the field of information and data literacy. [11]

This research, as a continuation of the previous research, is based on a qualitative method in the form of a semi-structured interview on a selected sample of principals created from the same sample as in the previous research. Five principals (3 female, 2 male) participated in the research, and the selection took into account the experiential component in such a way that principals with 5 to 25 years of principal experience were included. The interview explored the attitudes and opinions of principals on the impact of individual literacy on decision-making in the process of digital transformation of the school where by describing the results and comparing the results of previous research it is possible to lay the foundations of a conceptual model of principal education in digital literacy.

The survey was conducted in March 2021 by video call on the Zoom platform, with the written consent of the principal to participate and record the interview. In the introductory part, along with the identification of researchers, the purpose and goal of the research were presented, after which the principals were introduced to the interview topic where they were briefly presented the basic elements of each literacy Eshet-Alkalai model accompanied by an example and open discussion of each literacy. To acquaint the respondents with the constructs of the theoretical model of digital literacy Eshet-Alkalai that will be used in this research, a PowerPoint presentation was used as shown in Figure 1.

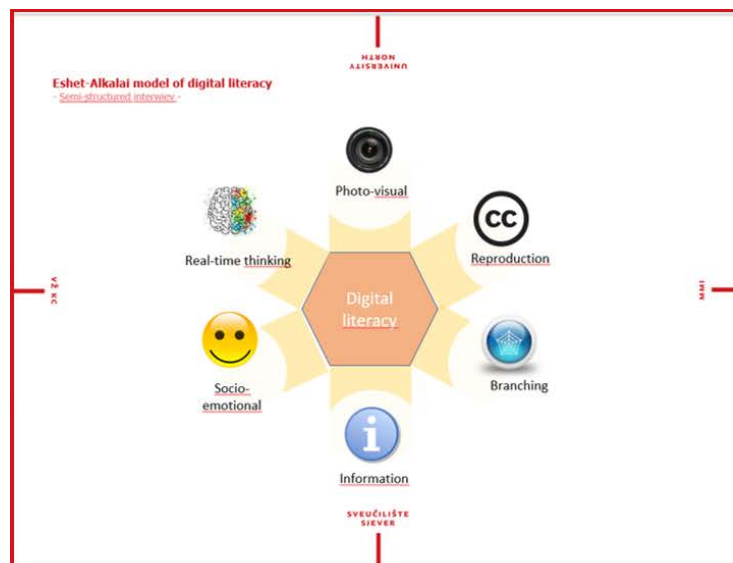


Figure 1. Eshet-Alkalai model of digital literacy

Source: authors according to David Millard ppt retrieved from <https://slideplayer.com/slide/10452693/>

The descriptive-statistical method with a tabular presentation for individual questions was used to present the obtained results.

3 RESULTS

The semi-structured interview involved 5 primary school principals (3 female, 2 male) with 5, 8, 13, 17 and 25 years of principal experience.

When asked about the importance and impact of **photo-visual literacy** on decision-making in the school's digital transformation process, principals answer that it is extremely important in the decision-making process because it affects the speed of decision-making. All principals express the opinion that

the messages they receive must be short, clear, accompanied by symbols and signs, those that will be able to process quickly and make a decision. They also emphasize that the degree of development of photo-visual literacy affects the speed and quality of decision-making, shortens the time of decision-making which principals consider one of the key elements. One respondent further points out that she considers herself a visual type and that her content, which is dominated by visual signs that can be read quickly and act intuitively and suggestively, influences decision-making and easier and faster navigation and memorization of searched content.

On the importance and impact of **reproduction literacy**, principals express the opinion that it is not so important in making a decision, but in communicating with employees and disseminating information within the organization. In this regard, principals feel that the ability to create meaningful and creative content and their interpretation is important to them in order to convey the message accurately and unambiguously. One respondent points out that reproductive literacy also helps her in making decisions because she is often in a situation where she has to create new meaningful content from existing pieces of information that will be the basis for making a decision in the process of digital transformation of the school. There is no separate opinion on this element and the conclusion is that reproductive literacy is important for decision making, but also for the transmission of information in internal communication.

Principals consider it important to have developed **branching literacy** primarily because of the rational use of time spent in the workplace because the lack of such literacy puts them at risk of getting lost in the hypermedia space, and thus losing focus from what they are currently doing. The principal (25 years of work experience) believes that based on the experience and knowledge she has gained, she organizes her working time in a way that is rationally used and considers hypermedia literacy important because it helps her find the information she needs to make a decision. When asked if they save the content they find when searching, which they do not need at the moment, and estimate that they will need it later, two out of five principals state that they save such content so that they can use it later. There is a dissenting opinion of one principal who says that when searching, he finds it difficult to resist links that appear as distractors following often links that are not thematically related to the aim and purpose of the search.

When asked about the importance of **information literacy**, all principals agree that it is extremely important in decision-making in the process of digital transformation. They believe that it is extremely important that for quality decision-making, the principal has the ability to distinguish true, accurate and credible information from false, incomplete, unreliable and biased information. Principals emphasize the importance of them being a filter that will assess what information they will pass on to their employees or on what basis they will make decisions. The principal (17 years of experience) believes that it is extremely important to have the ability to think critically and evaluate information, because the consequences of a decision made on the basis of unreliable information can be huge. When asked about the criteria for evaluating information, all principals point out that the most important criterion in determining the reliability and credibility of the source of information is whether the site is official. There is no separate opinion on the importance of this literacy in the decision-making process.

Socio-emotional literacy respondents consider it important in the decision-making process, believing that it is important to share data and knowledge with others because such a way of transmitting information develops critical and abstract thinking, increases knowledge, self-confidence and credibility of the decision. Respondents with less managerial experience believe that developed socio-emotional literacy is very important during the decision-making process because sharing data and knowledge with others increases credibility and contributes to professionalism.

Real-time thinking respondents consider literacy to be important but not crucial in decision making. Principals believe that real-time thinking helps process large amounts of data and information coming at the same time, but agree that the intensity and speed of stimuli such as text, visual cues, sounds and movements in their professional environment is less pronounced and does not require a high degree of developed real-time thinking.

The results presented in Table 1 provide an assessment of the importance of individual literacy in the process of managing the digital transformation of the school where principals orally ranked from 1 (most important) to 6 (least important) digital literacy according to importance. All principals ranked information literacy in the first place, photo visual literacy in the second place, branching and reproduction literacy followed by the same average grade, followed by socio-emotional literacy, and real-time thinking in the least important grade with an average grade of 5,6.

Table 1. Assessing the importance of individual literacy in the process of school digital transformation management.

	<i>M</i>
information literacy	1
photo-visual literacy	2,8
branching literacy	3,6
reproduction literacy	3,6
socio-emotional literacy	4,8
real-time thinking	5,6

Self-assessment of digital literacy level where principals assessed their own literacy level on a scale from 1 to 5 where 1 is the lowest level of literacy which implies possession of skills and attitudes, understanding of concepts and approaches, average grade 3 which implies use of digital tools in the process of digital transformation to the highest level 5 which implies innovative and creative use of digital tools and resources in the process of digital transformation. Principals give high average grades for each of the literacy, considering that they have the highest level of literacy in socio-emotional literacy (4.2), followed by information literacy (4), then branching and reproduction literacy (3.8), and the lowest grades for the level real-time thinking.

Table 2. Self - evaluation of digital literacies level

	<i>Principal with 5 years of experience</i>	<i>Principal with 8 years of experience</i>	<i>Principal with 13 years of experience</i>	<i>Principal with 17 years of experience</i>	<i>Principal with 25 years of experience</i>	<i>M</i>
information literacy	4	4	4	3	5	4
photo-visual literacy	4	4	4	3	4	3,8
branching literacy	4	4	4	3	4	3,8
reproduction literacy	4	4	4	3	4	3,8
socio-emotional literacy	4	5	4	3	5	4,2
real-time thinking	4	3	4	3	3	3,4

Regarding the type and manner of possible training in the field of digital literacy, principals express the opinion that they need additional education and that professional training is necessary for decision makers in areas where they do not have sufficient competences. They also emphasize that they are very happy to go to professional gatherings and trainings in certain areas and that they would enroll in a more extensive and systematic education if it existed. There is a separate opinion of one respondent who believes that self-education is the best way of education.

4 DISCUSSION

The analysis of the conducted qualitative research provided insight into how the level of digital literacy affects the processes of managing the digital transformation of schools, and a comparison with the results of previous research provides clearer frameworks for systematic education of principals in digital literacy.

The principals who participated in the interview expressed a unique view that their level of digital literacy affects the process of digital transformation of the school, emphasizing the constant need to monitor modern technologies and introduce them into the business of schools. In the presented interpretation of the way of solving and the approach to problem situations that result in decision making, it is possible to recognize the experiential component as an added value to the knowledge, skills and abilities needed in decision making in the process of digital transformation.

Decision-makers in educational institutions consider information and photo-visual literacy to be the most important literacy for quality work. Such an opinion and position of principals can be linked to the level of their responsibility where accurate, truthful and impartial information can be crucial in making a

decision and their awareness of the enormous consequences of decisions based on inaccurate, false or biased information. The high importance of photo-visual literacy, according to the principal, is argued by the need for rational and efficient use of working time, where they emphasize that photo-visual literacy allows them to make faster and better decisions by searching content and receiving messages that are short, clear and concise with photo-visual signs.

5 CONCLUSIONS

Previous quantitative research conducted on a sample of principals of three counties showed that information and data literacy is extremely important for decision makers and school management processes during the digital transformation, while this qualitative research confirmed the high importance of information literacy for decision making. Comparing the results of these two researches, it is concluded that in some areas of digital literacy there is a need and space for systematic education of which principals are aware and feel the need to improve their knowledge, skills and abilities to increase the quality of school management, professionalism and credibility. The combined comparative analysis of the results of both phases of the research set the foundation for the conceptual model of systematic education of leaders in educational establishments in the field of digital literacy by using constructs contained in the Eshet-Alkalai model, since the level of digital literacy significantly affects the management of digital transformation of schools which represents a starting point for further similar research.

ACKNOWLEDGEMENTS

The publication of this paper was possible by the funds of the University of the North, intended to support scientific research of the development project "E-learning - digital curriculum for digital time", for which the authors of this paper are extremely grateful.

REFERENCES

- [1] C. Redecker, *European Framework for the Digital Competence of Educators: DigCompEdu*. Luxembourg: Publications Office of the European Union, 2017. doi:10.2760/159770
- [2] B. Pont, D. Nusche, H. Moorman, *Improving School Leadership Volume 1: Policy and Practice*. Paris: OECD, 2008.
- [3] L. Luić, *Strategic planning and managing schools*. Zagreb/Croatia: CARNet, 2018.
- [4] A. Martin, J. Grudziecki, *DigEuLit: Concepts and Tools for Digital Literacy Development*. Scotland: University of Glasgow, 2006.
- [5] European Commission, *Digital Education Action Plan 2021 - 2027*. Bruxelles: European Commission, 2020.
- [6] J. Hartley, *Communication, Cultural and Media Studies: The Key Concepts*. Fifth Edition. London and New York: Routledge, 2020.
- [7] Y. Eshet-Alkalai, Y. Amichai-Hamburger, "Experiments in Digital Literacy," *CyberPsychology&Behavior*, Volume 7, no. 4, 421-429, 2004.
- [8] Y. Eshet-Alkalai, "Digital Literacy: A Conceptual Framework for Survival Skills in the Digital Era," *Journal of Educational Multimedia and Hypermedia*, Vol 13 (1), 93-106, 2004.
- [9] Y. Eshet-Alkalai, "Thinking in the Digital Era: A Revised Model for Digital Literacy," *Issues in Informing Science and Information Technology*, Volume 9, 276-276, 2012.
- [10] Y. Eshet-Alkalai, "Real Time Thinking in the Digital Era," *Encyclopedia of Information Science and Technology*, Second Edition, Category: IT Security&Ethics, 3219-3223, 2004.
- [11] L. Luić, D. Švelec-Juričić, "The Importance Of Information And Data Literacy Of Principals In The School Management Process During And After Covid-19," *12th International Odyssey Conference on Economics and Business, 2021. (in review process)*