METHODOLOGY FOR STRATEGIC PLANNING OF ICT INTEGRATION IN EDUCATIONAL INSTITUTIONS: EVIDENCE FROM PRIMARY AND SECONDARY SCHOOLS IN CROATIA

Marina Klačmer Čalopa, Katarina Tomičić-Pupek, Nina Begičević Ređep

University of Zagreb, Faculty of Organization and Informatics (CROATIA)

Abstract

Through the development of strategic planning of ICT integration, educational institutions (EIs) can identify elements used to support such integration in educational processes and business-related activities. Planning the use of ICT in learning and teaching, and in business activities, in primary and secondary schools in Croatia is becoming more important in terms of preparing schools for educational reform and for aiding the effective and appropriate use of the ICT infrastructure, enhancing digital skills and increasing the digital competences of teachers and students.

In order to help EIs achieve these goals, the Croatian Academic and Research Network launched "e-Schools: Establishing a System for Developing Digitally Mature Schools" [1], an EU-funded pilot project with the aim of increasing the digital maturity of primary and secondary schools in Croatia. Following the aims of the project, we have developed the Framework for Digitally Mature Schools (FDMS), which consists of five evaluation areas and five levels of digital maturity, to allow EIs to assess their current level of digital maturity [2]. After assessing their level of digital maturity, the next step is to empower EIs to plan their ICT use in accordance with their mission, vision and strategic goals. Therefore, we have developed guidelines for the strategic planning of ICT integration in schools.

The main objective of this paper is to present the developed methodology for the strategic planning of ICT integration. There is no doubt that ICT is a key component of a 21st-century education, which is the main reason why EIs must start planning and changing their processes. We can describe the steps and methods used in our methodology by answering three main questions: [A1] What is the school's present position in terms of ICT integration? [A2] Where does the school want to be in the future? [A3] How will the school reach its desired position? The paper focuses on the FDMS area of Planning, Management and Leadership, and it contributes by offering an approach to developing, and the experience of implementing, a strategic plan for ICT integration in EIs in Croatia.

Keywords: strategic planning; digital maturity; ICT integration; primary and secondary schools; e-Schools.

1 INTRODUCTION

Strategic planning is a creative, long-term, comprehensive process focused on the organization (in this case a school) as a whole and which forms part of the overall management process. It is a form of school improvement planning that involves models of school management, the legacy of school effectiveness and the role of school principals [3]. The importance of strategic planning in EIs was recognized decades ago, but research shows that some school principals still devote little time to planning [4]. The same situation is found in Croatia. Today, when relatively rapid technological changes are taking place in all sectors, strategic planning for ICT integration should be one of the main focuses in every educational institution. With such strategic planning, schools can increase their digital maturity and create a more appealing perception of the school in the local, national and international community; using a strategic approach, the schools can also become better prepared to face the new challenges and new approaches to learning and teaching brought by technology and new teaching methods. The European Commission, through its policies and programmes, recognizes the importance of using ICT in education. In Croatia, the importance of ICT integration is recognized through the EU-funded pilot project e-Schools (budget: 40 million euros), which started in 2015 and involved 151 primary and secondary schools (about 10% of all schools in Croatia).

Due to the lack of similar initiatives or approaches in primary and secondary schools in Croatia, we have developed a methodology for the strategic planning of ICT integration that consists of several techniques recommended for developing important strategic documents. The steps and methods we

suggest in our methodology are easy for school principals to apply, in cooperation with a team of teachers and ICT experts, to develop and implement an ICT strategy to increase the school's digital maturity. To achieve that, one of the principal's primary tasks is to create and maintain positive teaching and learning environments for everyone in the school, including the professional staff [5].

The intention was to have a manual, or a set of easy-to-use guidelines (as a template), which could be applicable for all primary and secondary schools in Croatia. By using the guidelines, the EI's policy creators and decision-makers could develop their own ICT strategy, describe it in strategic documents, prepare their institution for strategy operationalization and increase their digital maturity in the evaluation area of Planning, Management and Leadership, one of the areas of the FDMS.

In this paper, we reveal several major outcomes of the ongoing (until October 2018) pilot project. First, we present the methodology for the strategic planning of ICT integration in EIs. Second, we briefly discuss the Framework for Digitally Mature Schools (FDMS). Finally, we describe the experiences and results of the evaluation of the 151 schools that took part in the e-Schools pilot project and implemented the developed methodology for the strategic planning of ICT integration to increase digital maturity in the area of Planning, Management and Leadership.

2 METHODOLOGY FOR THE STRATEGIC PLANNING OF ICT INTEGRATION IN EDUCATIONAL INSTITUTIONS

Some earlier research recognized that ICT integration in schools could be challenging, and that principals and their teams needed guidance to achieve it [6]. The strategic planning process of ICT integration in EIs in Croatia is described through the *ICT adoption strategy continuum in schools*, resulting from the effect and practice of the Strategy Continuum of Kaplan and Norton [7]. The continuum describes the steps that need to be taken to move an EI from the ICT school mission statement to the ICT school strategic goals.

Figure 1. ICT adoption strategy continuum in schools [8].

We split the methodological steps into three main phases following the three questions posed above: [A1] What is the school's present position in terms of ICT integration? (Situational analysis – SWOT analysis, CREDA analysis, PEST analysis and mission); [A2] Where does the school want to be in the future? (ICT core values and vision); and [A3] How will the school reach its desired position? (Strategic initiatives, strategic objectives and annual action plan). This is where the strategic planning of ICT integration in the school starts. In her research paper, Schreurs [9] stated, "*the implementation of ICT in schools requires a vision on ICT use in school, the formulation of clear strategic goals, and the planning and organization of the use of ICT in school*".

Table 1. *Scientific approach to strategic planning of ICT integration in educational institutions.*

	Used methods and analytical tools
Environmental scanning	- situational analysis – what is effective and less effective in the school (SWOT, CREDA, PEST) – impact on planning and principal/founders decisions and future finance; the position must be presented objectively
Strategy formulation	- creating this mission statement (iterations, brainstorming, debate) - creating this vision statement that includes ICT adoption (iterations, brainstorming, debate) - identification of strategic initiatives as a help to visualize and realize the goals - clearly definition/identification of strategic goals (SMART approach) - generating strategies of ICT integration
Strategy implementation	- process of ICT integration in the learning, teaching and business elements - translation of chosen strategy of ICT integration into action to achieve strategic goals and objectives - creating strategy-encouraging policies and programmes (Strategic Plan of ICT Integration in the Schools) - use of strategic leadership (principles, team of teachers, ICT expert) - additional: strategy mapping – data visualization
Evaluation and control	- performance measurement – precise metrics for goals and activities (KPI) - find an effective way of measuring development or progress - define period of evaluation (eg. every fifth year) - taking corrective action

In the first phase, schools need to run a situational analysis to explore contextual impact factors. The most often used tools for analyzing the current position of a school are SWOT analysis or CREDA (cro. KREDA) analysis; it is also possible to use other tools, such as PEST analysis (political [legal], economic, socio-cultural and technological factors). All such tools enable policy-makers to carry out a more comprehensive analysis of the school's position. However, most common is SWOT analysis, which provides a view of what is effective and less effective in the school's systems and procedures [10]. The CREDA analytical tool is used to determine priority areas in terms of school development, as developed by National Centre for External Evaluation of Education experts [11]; CREDA is an acronym for **C**oncrete and **R**ealistic Goals that access **E**nergetic, **D**ynamic and **A**mbitious. These analytical tools can facilitate the school's analysis of its current position, which might include data on available ICT resources, network access (wired/wireless network, access for students or employees only, network security) and the school staff (digital competences, readiness for continuous training, continuous improvement of the teaching process).

After determining the current position of the school, its ICT integration team is in a position to prepare a mission statement that provides the starting point for all other activities. Creating this mission statement is a complex process that requires several iterations and includes brainstorming between the school principal and other involved employees, and sometimes includes external stakeholders.

In the second phase, the school examines where it wants to be in the future, in accordance with technological and organizational possibilities. The tendency towards adopting a learning and teaching process, together with a business process, supported by ICT increases the school's value. A clear vision for the role of ICT in the educational process and business-related activities is an important element of strategic planning. The vision clarifies the school's direction and helps those involved understand how and why all included in the process should support the institution [12]. The vision that integrates ICT qualifies educational staff to recognize the benefits and work together to achieve the goals and a higher level of digital awareness [13].

The school should develop a vision of applying ICT in accordance with its needs and its identified strategic goals (SMART approach). In an ICT vision statement, the school must emphasize that students and teachers must be sufficiently confident in using ICT for teaching and learning, creative processes and self-teaching, and competent in using new technologies, but more importantly that they understand the impact of technology on society. The appearance of ICT in schools is evidence of

global social and technological changes [14]. However, more importantly, it is imperative that teachers are aware of the role of ICT in education and have the level of digital skills and competences required to manage the classroom [14].

In the third phase of preparing a vision statement that includes ICT adoption, it is necessary to identify strategic initiatives that will help the school to visualize and realize its goals. Strategic achievements are the result of the strategic planning of ICT integration in selected initiatives (the five evaluation areas). The result of a successful strategic approach is satisfying all interest groups (employees, students, parents, founders) and achieving effective learning, teaching and business processes. Clearly defined strategic goals are a prerequisite for the school's strategic achievement and a key element of the school's strategic plan. They relate to the situational analysis results (SWOT, CREDA, PEST) and, if well defined, they can remain valid for several years, creating the conditions for creative programs and activities that will contribute to their realization. Thus, well-defined goals contribute to a long-term and achievable vision and to motivation, while achieving goals increases the self-confidence of employees in the process of ICT integration in the learning, teaching and business elements.

After designing the mission and vision statements and defining the ICT strategic goals, each school must find an effective way of measuring development or progress. Performance measurement is a process of assessing progress in achieving the predetermined goals, and including information on efficiency can be a major benefit to the EI [15]. To measure progress according to the defined strategic goals, the school can use key performance indicators (KPI), for which it is important that there is an accurate means of determining and measuring (number of subjects, number of computers, number of teaching units, number of staff).

3   THE FRAMEWORK FOR DIGITALLY MATURE SCHOOLS (FDMS)

The FDMS was developed within the e-Schools project by FOI (Faculty of Organization and Informatics, University of Zagreb) and CARNet (Croatian Academic and Research Network) experts. The methodological approach we used for developing the FDMS was qualitative; it was based on an extensive literature review, pooling the existing frameworks, meta-analysis of selected frameworks (mostly the European Framework for Digitally Competent Educational Organizations (DigCompOrg) [16] and the eLearning Roadmap [17] used for the certification of digitally mature schools in Ireland) and a number of stakeholder consultations [2]. The FDMS describes the concept of digitally mature schools and includes the Instrument for assessing digital maturity of schools. It is structured into five evaluation area – (1) Planning, Management and Leadership, (2) ICT in Learning and Teaching, (3) Development of Digital Competence, (4) ICT Culture, (5) ICT Infrastructure. The main instrument used to assess the digital maturity of a school is a rubric with 38 rows and five columns that indicate maturity levels of (1) basic, (2) initial, (3) e-Enabled, (4) e-Confident and (5) e-Mature.

Self-evaluation and the external evaluation were carried out using a specially designed questionnaire as an accompanying instrument, within which the questions related to a particular area of the FDMS and its elements. Due to the generic approach, the FDMS and the instrument can be applied in educational systems other countries after making only minor adjustments [2]. The schools can use the FDMS as a guide when planning and integrating ICT in learning and teaching, and in their business processes.

In this paper, the focus is on the first area of the FDMS – Planning, Management and Leadership – and its seven elements: Vision, strategic guidelines and objectives of ICT integration; Planning and programming school development from the ICT perspective; Managing the integration of ICT in learning and teaching; Managing the integration of ICT in the school's business activities; Learning analytics (LA); Regulated access to ICT resources; and the Use of ICT in teaching students with special educational needs.

The area of Planning, Management and Leadership is based on the vision and/or strategic guidelines of ICT integration expressed in school documents such as the yearly plan, work program and the curriculum. Strategic positioning determines the level of ICT integration in learning, teaching and business processes, which contributes to greater transparency. This area emphasizes the importance of data management gathered through various information systems (cro. e-Dnevnik, cro. e-Matica and others) to improve student success and to manage the school's business process. At the same time, this area deals with regulations and guidelines for the responsible and safe use of ICT resources and the safe use of the Internet. In addition, the digital maturity of the school is also evaluated by considering the use of ICT in teaching students with special educational needs and disabilities. These

are students with learning, physical and developmental disabilities; behavioural, emotional and communication disorders; and learning deficiencies, including the students with high IQ. [18]

4   RESULTS OF DEVELOPING A STRATEGIC PLAN OF ICT INTEGRATION IN CROATIAN EDUCATIONAL INSTITUTIONS

The FDMS, along with the instruments (questionnaire and rubric) and the software, was applied in the process of self-evaluation and the external evaluation of 151 primary and secondary schools in Croatia at the beginning and the end of the project. The aim was to identify areas for improvement and gather information that could help increase the maturity level of schools in Croatia [2].

For the purpose of this paper, we present the results of two rounds of external evaluation. The external evaluators (experts from the Faculty of Organization and Informatics, University of Zagreb and the Croatian Academic and Research Network, CARNet), in October 2016 and then in March/April 2018, conducted the external evaluation of 151 primary and secondary schools. Due to the complexity of the instrument itself, but also due to the more objective approach taken by evaluators, it was necessary to conduct an external evaluation [2]. The second external evaluation of primary and secondary schools took place after several workshops and seminars were held with principals and school teams to present the steps and methodologies required in the preparation of strategic documents. Meanwhile, both the guideline titled *Strategic Plan of ICT Integration in the Schools* and the *Strategic Documentation Template* [8] were produced, the results of extensive research and consultation with several groups of stakeholders.

Using these documents, schools learned of the guidelines for developing their own strategic documentation focusing on ICT integration in teaching, learning and business processes. The documents were developed with the purpose of assisting principals and their teams in creating a strategic plan for ICT integration and ensuring the effective implementation of digital resources, teachers' skills and digital content in the curriculum. Strategic documents are easy to translate into an action plan for integrating ICT into teaching, learning and business processes in schools over the next school year.

The external evaluation results from the 151 schools show there was a visible difference between the results obtained from the evaluation in October 2016 and that of May/April 2018 in the area Planning, Management and Leadership (see Figure 2). According to the results of the first external evaluation, there were no schools at the fourth or fifth levels of digital maturity; 15 schools were estimated to be "e-Enabled" (level 3); 103 had "initial" digital maturity (level 2); and 33 were "basic" (level 1). Until that point, no workshops had been held and no guidelines for strategic planning of ICT Integration had been produced to raise awareness of the importance of strategic documents for ICT integration. Most schools rated their status in that specific area as relatively low, and the overall reporting in face-to-face meetings during the evaluation was scarce.
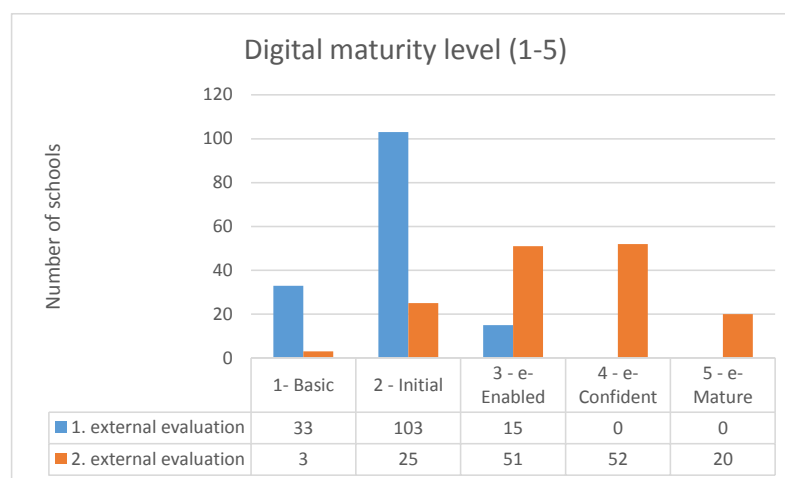

Digital maturity level (1-5)					
	1- Basic	2 - Initial	3 - e-Enabled	4 - e-Confident	5 - e-Mature
1. external evaluation	33	103	15	0	0
2. external evaluation	3	25	51	52	20

Figure 2. Summary results of the first and second external evaluations in the area Planning, Management and Leadership (N=151 schools).

The second external evaluation was performed after the guidelines were released for use in schools and after several workshops and seminars were held. It is clear that by developing and implementing their strategic documents, or/and by upgrading the existing school documents relating to the role of ICT, schools increased their level of digital maturity. The results of the second external evaluation show that 20 schools were "e-Mature" (level 5), meaning that in their strategic documents and development plans, the schools clearly recognized and required the use of ICT in all activities. The management practice relies on the integration and on obtaining data from all school information systems [2]. Furthermore, the results show that 52 schools were "e-Confident" (level 4), which means the schools clearly recognized the advantages of ICT use in their activities and integrated ICT implementation into strategic documents and everyday activities [2]. There were 51 schools estimated to be "e-Enabled" (level 3), which means they were aware of the possibility of using ICT in all activities, and the integration of ICT was included in their strategic documents. In addition, ICT is used when working with students with special educational needs [2]. Two schools were still at the "initial" level (level 2) of digital maturity; they were aware of the possibility of using ICT in learning, teaching and management processes, but this had not yet been implemented [2]. Only one school remained "basic" (level 1), meaning it had not increased its awareness of the possibility of using ICT in learning, teaching and management processes. Therefore, that school had not considered ICT in planning its growth and development [2].

5   EXPERIENCE OF EDUCATIONAL INSTITUTIONS IN DIGITAL TRANSFORMATION WHILE DEVELOPING AN ICT INTEGRATION STRATEGY

During the face-to-face meetings that formed part of the second external evaluation, representatives from most schools reported two benefits of the strategic document development. First, the EIs had developed a plan in the form of strategic documents, and second, they had introduced a practice of reflecting at the strategic level and a culture of discussing and questioning the effects of ICT, which was enabling their institution to develop in the long term.

By exploring the ICT infrastructure, ICT culture and the development of digital competences, schools investigated the effect of ICT integration on their day-to-day processes in conjunction with any EI's most valuable group of stakeholders – students. The presumed effects led the EIs to rethink their learning and teaching processes, and also the way in which other processes were being fulfilled.

Digital transformation is happening so rapidly that principals and other involved stakeholders risk not being able to support it if they do not prepare themselves and improve their own digital skills [19]. While significant benefits have been reported through the e-Schools pilot project in terms of the strategic planning of ICT integration, the possibilities to emerge from all the gained experiences indicate that this is just the beginning of the digital transformation of EIs and the opening up of new possibilities for further improvements in the education sector.

6   CONCLUSION

We have highlighted the experiences and results of introducing the strategic planning of ICT integration in EIs in Croatia, and have presented a developed methodology to aid this strategic planning. The methodology was introduced to EIs to assist them in creating their own ICT integration strategies, thereby allowing them to increase their digital maturity level according to the FDMS. Soft impacts were also reported in the form of self-ICT-reflection practice adoption on a strategic level, changes to the organizational ICT culture, the introduction of discussions about ICT in teaching and learning activities and questioning the effects of ICT in EIs. According to the lessons learned, the contribution of adopting new methods and techniques for the strategic planning of ICT integration in EIs can be found in the fact that the hard- and soft-impact factors change mind-sets in terms of how EIs can digitally transform and respond to new challenges related to ICT use.

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