TEACHERS PERCEPTION ON INNOVATIVE SERVICES AND ICT IN TEACHING AND LEARNING IN PRIMARY AND SECONDARY SCHOOLS IN CROATIA

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Abstract

The focus of the paper is on researching and analysing teachers perception of using ICT in teaching and learning and for innovative services in primary and secondary schools in Croatia. The research was conducted in spring 2014 using qualitative methodology in small guided groups discussions, covering 10 schools, 26 focus groups and over 150 teachers of both primary and secondary schools in rural and urban, geographically dispersed locations of Croatia. The purpose of investigating the teachers perception was to inform the preparation of the large-scale national project of ICT in education called e-Schools, in which teachers should have the key role as change agents, and to engage teachers early in the project preparation. SCALE CCR model was used for data analysis. The results of the study show that most of the teachers still perceive ICT in education mainly as infrastructure, but are also very well aware of the advantages of using technology for learning, mainly for learning by exploring and meaningful activities.

Purpose of the study

The main purpose of conducting the demand analysis study for using ICT in primary and secondary schools in Croatia was to prepare for future investments in large-scale implementation of ICT in Croatian primary and secondary schools. This large-scale implementation is planned under the umbrella of a national project called *e-Schools* that encompasses use of ICT in two directions: (i) for school administration purposes; (ii) for teaching and learning. The project is led by CARNet, with partners from major stakeholders in Croatian school education sector (Ministry of Science, Education and Sports, agencies for teacher training and vocational education, universities) and is to be implemented in phases between 2016-2022. The major goal of the project is to support Croatian public funded school to become digitally mature or digitally supportive schools by 2022, in accordance with Digital Agenda for Europe, and Republic of Croatia's Strategy on Education. E-Schools are digitally mature or digitally supportive schools, connected to ultra-fast Internet, highly equipped with adequate ICT, with a high level of digitalization of administration and education processes. Teachers attending these schools are digitally competent and pupils are taught and

encouraged to become digitally competent themselves. Both of them use ICT in education on daily basis, including, but not restricted to, education applications and digital education resources, thus ensuring that pupils of today become competitive workers on job markets of tomorrow. This should be done through the following:

- Education, empowerment and support for teachers and school administrators in the field of digital competences;
- Development of e-services for school administration, teaching and learning;
- Production of digital content and accompanying pedagogical methods;
- Deployment of local school networks (LANs).

In these processes, teachers are being recognized as change agents and key persons to carry out the change in education system toward student-centred, competency based education, that technology can facilitate. With the demand analysis study CARNet wants to research how teachers are perceiving the role of technology in their everyday work, to be able to: (i) better and more precisely plan the project; (ii) meaningfully engage teachers in preparation of the project and in that manner in the future project activities.

Several other research studies have been carried out or are planned (for example, survey for headmasters, school founders etc.), however, this paper focus is on teachers demand on the use of ICT in teaching and learning in Croatian schools.

Literature and CARNet experience

CARNet experience shows that present state of using ICT in Croatian schools is on different levels of digital maturity, in various aspects:

- availability and speed of Internet in a school;
- level of ICT equipment in the school, including LANs;
- teachers' digital competency;
- support of the school management towards teachers to use ICT in education and to professionally;
- digitalization of administration processes.

School principals are more inclined towards recognising the importance of ICT in teaching and learning then teachers, and among teachers, those in primary schools are more inclined then the secondary school teachers. However, only 7% of schools created strategic documents for planning and defining use of ICT in teaching and learning (EU average 22%). From the perspective of pupils (last grade of primary school) the ICT is used for learning activities almost never, or couple of times per month, depending on the school (1.61 average on the scale from 1-4). On the other hand, 38% of primary school teachers say they use ICT in their work. (The hypothesis that teachers use it for their preparation, and not for learning activities, is being checked in the described demand analysis as well.) (European Schoolnet, University of Liège, 2013)

The importance of the role of the teachers in managing change, both in administration and teaching and learning, facilitated by the use of ICT, has already been documented, stressing the importance of the bottom-up approach and contextualising ICT policies for teachers (Meyer & Kristensen, 2011), but also combining bottom-up with top-down approaches with specific activities that focus on awareness, education, implementation, promotion and support (Mudrinić Ribić & Quien, 2013).

Many large scale project introducing ICT in education worldwide, recognised the key role of the teachers as well, starting from 1:1 initiatives, or regional or national project of implementing ICT in education (Kampylis et al., 2013). Barrier framework for accepting and managing change have been proposed in related fields as well, such as knowledge management (Pirkkalainen & Pawlowski, 2012; 2013), and have been tested and used in the e-learning practice in projects such as Open Discovery Space (Open Discovery Space, 2014).

SCALE CCR multi-dimensional concept was chosen as an evaluation tool for the large-scale project planning, e-Schools. The same model was introduced for the purpose of data analysis of the focus groups and world café group as well as for the purpose of testing the model itself in the context of Croatian schools and project preparation in CARNet. (Bocconi, Kampylis, Punie, 2012a; 2012b).

Research questions

If the starting point of the large-scale implementation of ICT in education processes in Croatian school system is the acknowledgement that teachers are the key carriers of the change, than it is vital to understand the teachers' point of view, in relation to advantages and barriers they see in managing that change. For that reason, the key questions for this part of the demand analysis were:

What advantages from using ICT in teaching and learning do teachers in Croatian primary and secondary schools perceive?

What are the barriers, and possible solutions to overcome them, in using ICT in teaching and learning that teachers perceive?

Methodology

A decision was made in CARNet to use the focus group methodology for this research. In the opinion of the project team this qualitative research method would provide CARNet with the insight in the attitude of teachers in primary and secondary schools towards the implementation of ICT in teaching and learning. Conducting the focus groups was planned for the spring 2014, and the process of preparation also served a particular purpose. Project team selected 10 schools in which the focus groups were to be conducted, making sure that both primary and secondary schools would be represented and having in mind the size and the geographical location of the school (in addition to the differences between a school in the

village and the one in the city, in Croatia there are cultural differences among different regions). In two of the selected schools two separate focus groups were organised which resulted in the larger number of contributions than previously expected. Communication with schools during the focus group preparation was used as an opportunity to inform the school management about the project. Whenever possible a short presentation about the project was given to the school management and the focus group participants.

Focus group, as a form of a guided group discussion in which several related questions can be addressed, enabled CARNet team to ask questions such as:

- How, in your opinion, can ICT support your work as a teacher?
- What benefits/advantages from using ICT in teaching and learning do you see?
- What barriers for using ICT in your work do you see?
- In your opinion, what can be done to overcome the barriers you noticed?
- How do you understand the term "digital educational resources"? What kind of digital educational resources would you like to be available for your work as a teacher?
- How do you understand the term "ICT support"? What kind of support can you envisage?

During the focus group discussions groups were asked to summarize on paper their input on each issue, for which purpose they were given a template. For example, when they were asked about advantages and barriers of using ICT, they filled a two-column table with their lists of perceived advantages and barriers. Groups were advised to express themselves as freely as possible, in incomplete sentences if necessary (typical responses to the question about barriers were: "unreliable infrastructure", "not every pupil has Internet access at home" etc.). These written responses were analysed by the researchers after completing the focus groups in all schools.

Due to the limited length, this paper focuses only on questions about advantages and barriers to ICT implementation. The results of the focus groups can be used in textual format that is sufficient to provide a deeper understanding of an issue in the sense of better explanation or multiple perspectives. However, they can also be quantified, which is what the researchers did in this case. For the analysis of the results, the authors used a SCALE CCR model described in literature. This circular model represents the European Commission's Joint Research Centre JRC concept of Creative Classrooms i. e. learning environments in which ICT is used to innovate teaching and learning. The model places different aspects of ICT implementation in 8 categories and 28 subcategories (Bocconi, Kampylis, Punie, 2012a; 2012b). The 8 categories are: Content and Curricula, Assessment, Learning practices, Teaching practices, Organization, Leadership and Values, Connectedness and Infrastructure. These categories and the respective subcategories were used for coding the results of the focus groups. The number of responses in the same category were then calculated and presented graphically (see the Analysis of the results). Barriers, however, are only analysed as text.

Analysis of the results

When asked about existing or possible advantages/benefits from using ICT in teaching and learning participants of the focus groups offered a variety of responses. The blue line on the radar-type graph below represents the number of responses that could be assigned to each category of the SCALE CCR model, which are here placed on the outer edge of the radar. The longest arm on the graph pointing towards the Learning practices means that participants of the focus groups thought that using ICT in schools has multiple benefits for the process of learning. They also saw some benefits for the process of organizing the education and many express great expectations and place a lot of trust in infrastructure. Some respondents noticed potential benefits for the content and curricula. In the same time, even though the respondents were teachers, they perceived fewer benefits from the ICT for the process of teaching. The areas of Assessment, Leadership and Values and Connectedness seem to have escaped the participants' attention entirely.
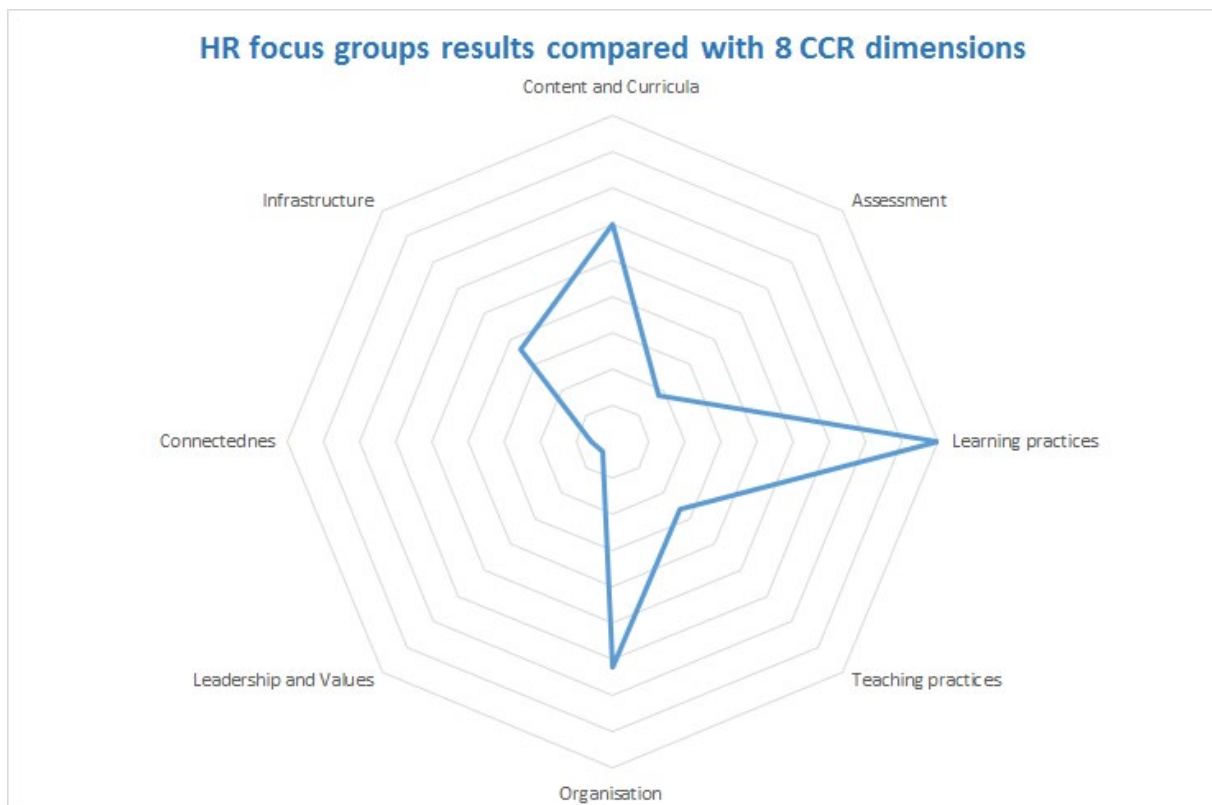

Figure 1. HR focus groups results compared with 8 CCR dimensions

For a more precise analysis the authors used a breakdown of 8 CCR categories into 28 "building blocks", each of which represents one element of practice in creative classrooms (Table 1).

Table 1: Building blocks analysis

Content and Curricul	Assessment	Learning practices	Teaching practices	Organisation	Leadership and	Connectednes	Infrastructure
1. Emotional intelligence / 13. cross and transdisciplinary / 20. meaningful activities / 22. OER	7. recognition of informal and non-formal learning / 23. engaging assessment formats / 24. formative assessment	14. learning by exploring / 15. learning by creating / 16. learning by playing / 18. self regulated learning / 19. personalised learning / 21. pear-to-pear collaboration / 2. Multiple mode of thinking / 3. Individual strenghts / 4. soft skills	17. multiple learning styles / 8. monitoring quality / 9. innovative timetables / 11. innovative services	5. (Social) enterpreneurship	6. social inclusion and equity / 27. information management / 25. learning events	26. social networks / 28. networking with real world	10. ICT infrastructure / 12. physical spac

The results are shown on the radar graph in the figure below. The two graphs look quite different as the first one divides a perfect circle into 8 equal-size sections. This cannot be followed in the second graph as each of 8 dimensions consists of a different number of building blocks.

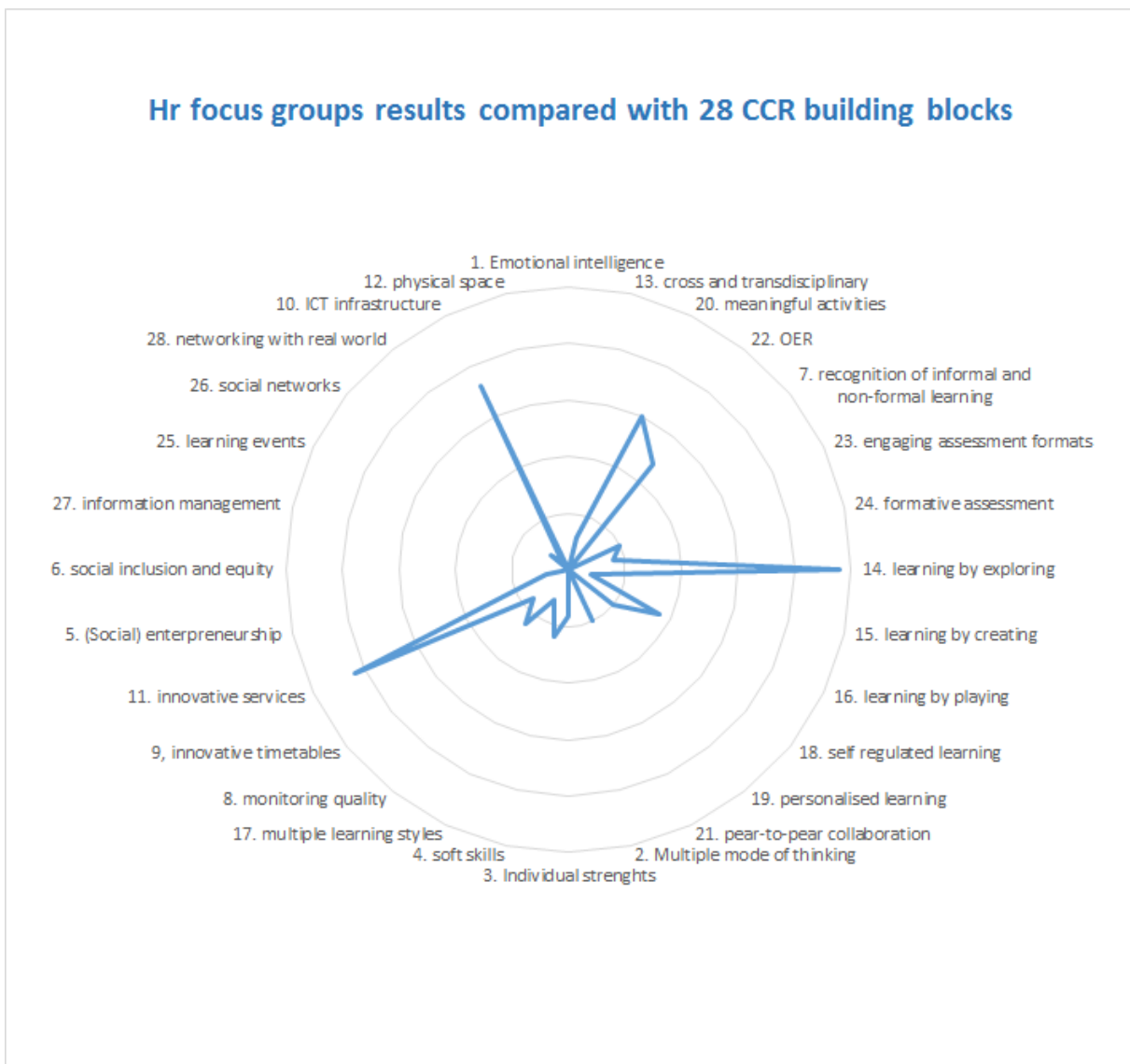Hr focus groups results compared with 28 CCR building blocks

Figure 2. HR focus groups results compared with 28 CCR building blocks

However, on this figure it is much more evident that there are great differences in perception within each category. For example, while participants of the focus groups valued the benefits of ICT implementation for the dimension "content and curricula", they actually mostly believe that ICT provides opportunity for meaningful activities and allows cross-disciplinary learning, while they do not think of it fostering emotional intelligence. Similarly, in the otherwise well represented category of Learning practices, only "learning by exploring" was emphasised by the participants, while they do not envisage the potentials of ICT for "learning by creating". An even greater discrepancy is shown in the area of infrastructure. While participants emphasise the importance of the infrastructure, they have not started thinking yet that the same infrastructure could be used for overcoming obstacles in and making necessary changes in the physical space.

The question about barriers for ICT implementation also offered a variety of views. Many participants expressed disappointment with the basic infrastructure (lack of Internet access, old equipment, insufficient number of computers, need for permanent technical support…), while others noticed more subtle insufficiencies, such as need for continuous teacher training, additional time for teacher preparation, lack of digital teaching and learning materials in Croatian language and lack of computer applications in Croatian language. Participants also expressed their concern about the very large number of potential risks for pupils originating from either overly extensive or insufficiently prepared use of ICT in education (from ICT being supportive of copy-paste culture to health hazards). CARNet acknowledged the concerns but is more oriented to the solutions as participants were also required to propose some. Although some suggested solutions were not realistic as would require unavailable financial resources, some proposals are very innovative and are appreciated by CARNet. They include ideas about involving parents and other stake-holders into organisational changes required by use of ICT, balancing the use of ICT with more physical education and even changing the micro-schedule of school class to accommodate work with computers. All of these could be considered very innovative solutions for the Croatian context.

Conclusions

The purpose of the research study described in the article was to dig deeper into the teachers' perspective on using ICT for teaching and learning, especially with regard to barriers teachers perceive in implementing ICT and their overcoming. This is necessary in order to understand better the teachers position in relation to supporting and managing change in large-scale projects that introduce ICT in education. Another important reason for asking teachers the described questions early in the project preparation is to engage them in the meaningful way in the project planning, to re-shape the project structure according to study result with the main goal of supporting teachers later in the project implementation.

The results of the study have showed that more informed and more experienced the teachers, wider spectrum of ideas about using ICT and capability of noticing its advantages they have, together with higher expectations and variety of uses they show.

On a national level, it is evident that Croatian teachers still perceive ICT mostly as infrastructure (10), innovative services (11), however, they do perceive potentials and the need to use the technology for deeper learning, such as meaningful activities (20) and for learning by exploring (14). The results also show that teachers are not yet capable or have not yet endeavour in to using technology for social inclusion, social entrepreneurship, learning events, and that the changes technology use can have in the physical space are not thought about. These are the areas that CARNet can promote and should think of incorporating in the large-scale e-Schools project.

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