Digitally Mature Education:
The Role of Digital Maturity and Educational Leadership in Meaningful Digital Transformation of Schools

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Abstract. *This theoretical paper conceptualizes the digitally mature education. We propose that digitally mature education is to be co-created and co-lead with transformative and distributed practices while using digital maturity as an improvement and reflective framework for guiding meaningful digital transformation. In conceptualizing digitally mature education, we propose a transformative, inclusive, visionary, effective and accountable vision of education. We argue that the same perspective should be taken when thinking about digital transformation and the purpose of using digital technology in education. We claim that two leadership approaches should be combined to influence the meaningful digital transformation: transformational and distributed leadership.*

Keywords. Digitally mature education, educational leadership, school leadership, digital maturity, digital transformation.

1 Introduction

The last decade has witnessed extensive technological investments supporting national educational reforms, encouraged by covid-19 lockdown (among others European Commission, 2020b; Hakansson Lindquist et al., 2019; Kampylis et all, 2016; Toh and So, 2011). The calls for more in depth thinking on how to approach these initiatives to better harness the potentials of technology and avoid the risks of technological determinisms were present even before the transitioning to emergency remote teaching during pandemic, and are reinforced after it (European Commission, 2020; Hodges et al., 2020; European Schoolnet, University of Liege, 2013; OECD, 2015).

Additionally, recent studies have shown that, while more technology and computer equipment is entering schools as ever before and teachers are encouraged to use it, there is a lack of clear vision in schools themselves of why we need technology and which

strategic direction to take (Balaban, 2018; CooperGibson Research, 2022). What kind of technology and how appropriate it is for the students and how do we afford it in the long run, bears tremendous sustainability issues on the shoulders of future policy makers, governments and school heads.

Digital Education Action Plan for 2021-27 states that "education and training system is increasingly part of the digital transformation" (EC, 2020a:p.2). In addition to that direction, we call to look upon the issue from the opposite perspective, in which digital transformation increasingly becomes a meaningful part of education and training system. For this reason, we introduce the term *digitally mature education* that is firstly and deeply rooted in the vision for education, and secondarily supported by meaningful digital transformation. In this article we explore what digitally mature education could encompass and how it can be conceptualized using terms of meaningful digital transformation and improvement/reflective framework of digital maturity.

This paper is a theoretical article that synthesises and adapts (Jakkola, 2020) educational leadership theories in the context of digitally mature education. It synthesises two major theories of educational leadership, transformational and distributed leadership, and it adapts them to the context of technology integration in education, relating them to the concept of digital maturity.

In conceptualizing digitally mature education, the article will propose three claims about how to conceptualize school leadership for meaningful digital transformation and support the claims with argumentations based on literature review, while answering three main research questions.

In the first section, based on literature review and in the context of this paper, we claim that education is a transformative, inclusive, visionary, effective and accountable process of cognitive and social development of a person and her community, aware of the wider global, environmental and digital changes (Anderson and Boyle, 2020; Daniels et al., 2019;

Freire, 1970; Peters and Jandrić, 2017; Townsend, 2011; Underwood and Dillon, 2004).

In the second section, we claim that digital transformation should serve this vision of education, and not take its separate course. Digital technology should support cognitive and social development of individuals and community in transformative, inclusive, effective and accountable ways. We propose to use digital maturity as an organisational improvement and reflective framework designed to guide this kind of meaningful digital transformation (Marshal, 2010, 2012; Teichert, 2019; Volungevičienė et al., 2021).

In the third section, we claim that two leadership approaches should be combined to influence the described meaningful digital transformation: transformational leadership and distributed leadership.

This paper is set to answer the following research questions:

1. What is the role of education when considering global, environmental and digital transformations our societies are experiencing and how can education be part of them? (addressed in section 1)

2. What kind of meaningful digital transformation can support educational processes to become more transformative, inclusive, visionary, effective and accountable and in the same time support cognitive and social development of a person and of her community? (addressed in section 2)

3. What kind of leadership schools need for continuous organisational improvements towards meaningful digital transformation, having in mind the transformative, inclusive, visionary, effective and accountable characteristics of education and related digital maturity? (addressed in section 3).

2 The Role of Education in Global, Environmental and Digital Transformations

The following section discusses the role of education in the present global, environmental and digital turmoil we all are experiencing as global citizens.

Individual growth and transformation are deeply interrelated with social growth and social transformation, and both should be considered as the goals of education (Anderson and Boyle, 2020; Brosio, 2006; Dewey, 1915/2016; Freire, 1970). In this sense the aim of education is to support the development of both cognitive and social abilities of learners (Underwood and Dillon, 2004:213). This is reflected in what Anderson and Boyle understand as 'good' education, "the growth and development of the whole person" (Anderson and Boyle, 2020:page 16).

Individual growth is inextricably related to social growth, reflected primarily in the community in which we live. Education provides "opportunity to become contributing and content members of a healthy society". (Anderson and Boyle, 2020:page 16). Critical educational theory understood education as an altruistic and caring path to social and individual transformation, to democratic empowerment, socioeconomic justice, respect for diversity (Brosio, 2006). Dewey understood education as a vital force in forming democracy and civil society (Dewey, 1915/2016). Using the words of George Bernard Shaw, education is the process of "continual becoming" (St. John, 1931) in cognitive and social sphere. Learner is an active and dynamic participant in her education, a creator of her own future self. This thinking is in line with Freire's liberating potential of a person (Freire, 1970). The knowledge is the person who knows - in terms of Aristotle's "Knowledge [epistēmē], in its being-at-work, is the same as the thing it knows" (Aristoteles, 2001).

The role of education is changing and is influenced by the global, environmental and digital turn (Peters and Jandrić, 2017) of our societies. These shifts are not just negative or just positive but are complex and interrelated. Education is a living organism influenced by its environment, co-created by it and forms part of the wider "ecological system" (Harrison et al., 2014). Education has shifted towards a global market approach, including answering the accountability demands (among others Daniels, 2019; Gumus, 2018; Townsend, 2011). Education is a crucial part of sustainability, and both sustainable thinking and long-term visions should form part of changing the education to respond to the needs of environmental and societal transformations (Michelsen and Fischer, 2017). The digital shift in education is pushed more mainstream after pandemic of covid-19, sometimes with vested interest of commercial solutions in education (Teräs et al., 2020).

We cannot expect education to remain intact when the world is in flux. Education needs to change together with society and respond to the global, environmental and digital challenges we are all facing. In this response education should not be replaced by commodified, global enterprise, but needs to be:

- *liberative and transformative*, with strong mission to prepare students to be critical thinkers, global thinkers, active citizens (Anderson and Boyle, 2020; Freire, 1970; Townsend, 2011; Underwood and Dillon, 2004)

- *inclusive* of to the social needs of all citizens, both elites and marginalised groups, co-creating present and future democratic societies (Anderson and Boyle, 2020; Freire, 1970)

- *visionary*, aware of the challenges of the future job markets, climate change and social impact of digital technologies (Peters and Jandrić, 2017)

- *effective*, striving to achieve the educational outcomes (the school intends to achieve) (Daniels et al., 2019)

- *accountable* to the public that provides finances, by using public resources responsibly to provide the best quality service back to the citizens (Townsend, 2011).

Based on the presented arguments we claim that education should be understood as a transformative, inclusive, visionary, effective and accountable process of cognitive and social development of a person which contributes to both the achievement of the full potential of a person and of her community (Anderson and Boyle, 2020, Brosio, 2006, Dewey, 1915/2016, Freire; Underwood and Dillon, 2004). This process should be accountable to the public it serves, public resources it uses, and mindful of the wider global, environmental and digital transformations (Peters and Jandrić, 2017).

3 Digital Maturity as a Transformative, Inclusive, Visionary, Effective and Accountable Framework and a Reflective Tool for Digital Transformation of Education

This section reflects on the nature of digital transformation needed to support the transformative, inclusive, visionary, effective and accountable vision of education.

We acknowledge that digital turn (Peters and Jandrić, 2017) in education is becoming increasingly important with government-led national initiatives trying to use technology as a lever supporting various educational reforms (Hakansson Lindquist et al., 2019; Kampylis et all, 2016; Toh and So, 2011). However, there is a need for a "radical change" of how technology is exploited in teaching and learning (European Schoolnet, University of Liege, 2013), taking an approach that is "both gradually accepting and sceptical" (OECD, 2015).

We also acknowledge that the digital shift in education is pushed more mainstream after pandemic of covid-19. Closing educational institutions down during pandemic years in many ways transferred the responsibility for education to families of various social and educational backgrounds. This exposed latent social and educational inequalities and reinforced them even further, and brought about

"economic, social, cultural, emotional and digital divides" (Tarabini, 2021:6). If not considered carefully, digital technology can be easily used to perpetuate and reinforce the same inequalities and can contribute to what Tarabini calls the crisis of meaning of the schools in the sense of "crisis of the very process of socialisation and cultural transmission" (Tarabini, 2021:10).

Furthermore, in exploring digital maturity of schools, recent studies have shown that the schools themselves often lack the vision and the strategic approach towards technology, including how to harness and where to lead digital infrastructure and skills already present to some extent in their schools. The research commissioned by the British government Department for Education (DfE) revealed that schools are better prepared in terms of infrastructure, equipment and skills but are missing the strategic direction, documentation, and discussion on how to strategically position technology to serve teaching and learning[1] (CooperGibson Research, 2022). Similar findings were found when analysing the digital maturity of schools based on the Framework for Digitally Mature Schools (FDMS) in Croatia. The results indicated that schools were not aware of the importance and use of overall strategies for technology adoption, while on the other hand having good developmental school ICT plan and programme proved to be an important missing element[2] (Balaban et al., 2018).

There is a lack of clear vision in schools of why schools need technology and which strategic direction to take, what kind of technologies and tools and how appropriate they are for students, how do we afford it in the long run, and consequently, what kind of continuous professional development teachers need, including both technical skills and pedagogical knowledge.

This reveals a need for comprehensive vision, followed by a strategic direction, including planning, management and leadership when using digital technology in school education and thinking about digital transformation in education. Therefore, to follow in the same path as education we want to witness, we claim that digital transformation should take the system-wide ecological perspective (Harrison et al., 2014) and also be transformative, inclusive, visionary, effective and accountable process, mindful of the social changes, having in mind the cognitive and social development education is aimed to achieve. This is especially relevant to school education, if the purpose of schools in the 21st century is still, if not even

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1 „Schools' average scores in terms of their strategy (mean score of 0.27) was lower than their progress in terms of technology and capability (mean scores of 0.58 and 0.62 respectively)" (CooperGibson Research, 2022:p7).

2 ICT plan was found to be weekly or moderately correlated with almost all elements within the FDMS matrix: "Plan and programme of school development from ICT perspective (PML2) weakly correlates with the Management of the ICT

integration into school's business activities (PML4) (rs=.317, p < 0.01), the Learning analytics (PML5) (rs =..391, p < 0.01), and with the Use of ICT in teaching students with special educational needs (PML7) (rs =..293, p < 0.01). Moderate correlation is found with the Management of the ICT integration into learning and teaching (PML3) (rs =.485, p < 0.01)." (Balaban et al., 2018:p9).

more, to ensure socialising and teaching of children and young people (Tarabini, 2021).

Digital maturity is a concept capable of having a holistic view on technology in education because it brings the "social aspects of technology acceptance" (Harrison et al., 2014: p. 1). Digital maturity supports and reflects upon digital transformation of educational institutions across a range of organisational, infrastructural, teaching and learning, competency and cultural issues. It is a "valuable proxy for indicating the extent of technology adoption across the whole eco-system of a school." (Harrison et al., 2014:page 346). It can and indeed should reflect and warn about unequal and insufficient resources schools have in using digital technologies for meaningful instructional and learning activities, both in terms of infrastructure and competencies, but also leadership capacities, to name only the most relevant for the topic of this article.

Digital maturity models serve as a roadmap, a guideline, support for institutional planning, organisational change and benchmarking, support continuous improvement and open space for reflection and understanding of the wider, system context (Marshal, 2010, 2012; Volungevičienė et al., 2021). Digital maturity models connect the complex variables and provide complex narratives of interventions over specific duration, by capturing complexity of evidencing the effects of ICT in educational settings including activities, processes, technologies and skills (Sanchez-Puchol et al., 2018; Underwood et al., 2004, 2010). It has been seen as a potent opportunity for a long-term assessment of digital transformation of institutions as well as large-scale national technology investments, seeking the evidence of the benefits of technological investments across educational systems. See for example Framework for Digitally Mature Schools in Croatia (Balaban et al., 2018) or Framework for Digitally Competent Organisations (Kampylis et al., 2016).

4 Educational Leadership for Digitally Mature Education

The last section proposes the leadership schools need for making meaningful digital transformation and for growing towards digitally mature educational organisations.

We start from a classical definition of leadership as "the process of influencing the activities of an organised group in its efforts toward goal setting and goal achievement" (Stogdill, 1950). We acknowledge that the very general meaning of leadership is the process of influence. If the goal we seek is digital transformation that support the school's vision of education, than what kind of leadership schools should practice?

We argue that (1) the distribution of leadership authority (Dexter, 2018; Gumus et al, 2016; Leithwood et al., 2008; Voogt et al., 2018) is one of the major prerequisites for the influence towards meaningful digital transformatiooon to happen in schools, motivated by (2) a transformational vision for self-actualisation and achievement (Daniëls et al, 2019; Leithwood and Jantzi, 2005) of the individuals, schools, community and the wider system. This claim is supported by Joke Voogt and a group of authors in stating that distributed leadership perspective, together with transformative and instructional leadership actions, are framing main functions of leading technology innovations: developing vision, supporting integration, ensuring the accountability of technology initiatives (Voogt et al., 2018). Distributed and transformational leadership perspectives support the vision of education (described in the first section) in a number of ways:

- To be able to support the variety of paths in which any person and/or community could develop, the leadership influence should be inclusive and participatory. When leadership influence and power are distributed to several individuals, groups and teams without formal leadership positions (usually teachers) individual capacities are enhanced through social interactions. In this distribution the meaning, knowledge and leadership practice are socially constructed and are co-performed (Dexter, 2018; Harris, 2009).

- To be able to transform, this influence should be able to guide and motivate all to strive for individual, school and system improvements. The main role of transformational leaders is to motivate followers to open to self-actualisation and lead to a vision for the school (Leithwood and Jantzi, 2005; Bush and Glover 2003).

- To be able to be effective, this influence should have a strong vision on teaching and learning and students' engagement and achievements in the core of these processes, and distributed leadership has positive effects on teacher effectiveness, student outcomes and student engagement (Harris, 2009; Leithwood et al., 2008).

- To be able to be accountable, this influence should have strong responsibility towards the public good it serves and the public resources it uses, "ensuring the accountability of technology initiatives in terms of ownership and outcomes" (Voogt et al., 2018).

- Finally, to be able to consider the larger context of a global, environmental and digital transformations (Peters and Jandrić, 2017), this influence should take into account the visions of many different people and open the space for their opinions to be exchanged and new meanings and knowledge created in this exchange, but from the perspective of *interactions* rather than actions and states (Harris and De Flaminis, 2016).

To support the liberating and transformative process of a person's development, we claim that less directive and more bottom-up approach to educational

leadership is needed, the one that supports different paths of personal and social transformation and goals achievements. We argue that two leadership approaches should be combined if this influence is to bring fruits: transformational and distributed leadership.

Distributive leadership offers the co-created inclusive methodology while transformational leadership inspires, guides and motivates all to strive for individual and school improvements through cognitive and social development of a person and of a community. In this distributed process of influencing, which is not a directive but inclusive, two-way process, different visions are shared, and common meanings transformed through co-creation. This shared school vision is mindful about both personal and community's potential and is adjusted to changing needs and environment while influenced by school staff, students and community stakeholders.
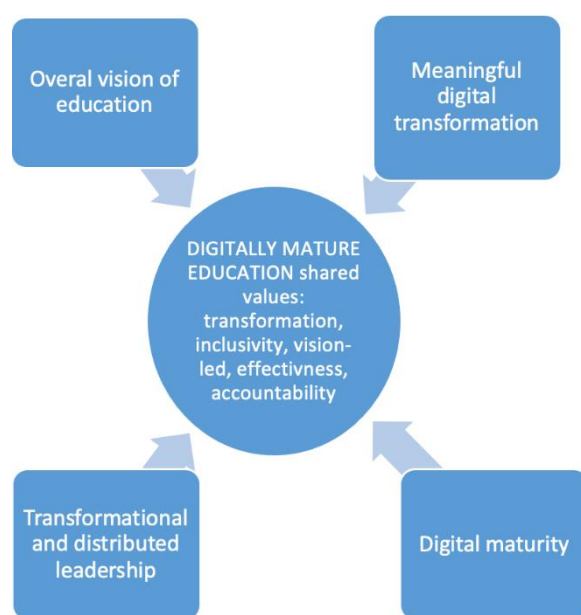

Figure 1. Digitally mature education concept

5 Conclusion

We have asked ourselves what the role of education is when considering global, environmental and digital transformations happening today. We acknowledge that education should be mindful of the wider changes but should always continue to support cognitive and social development of a person who is then able to become active and contributing citizen of the same changing and troubled world.

We acknowledge digital transformation as an important lever for supporting the aforementioned vision of education. We ask what kind of meaningful digital transformation can support a cognitive and social development of a person and her community? We propose to use digital maturity as an organisational improvement framework and a reflective tool designed to guide meaningful digital transformation of education from the system-wide ecological perspective into transformative, inclusive, visionary, effective and accountable process of cognitive and social development of individuals and communities (Harrison et al., 2014; Marshal, 2010, 2012; Teichert, 2019; Underwood and Dillon, 2004; Volungevičienė et al., 2021).

Lastly, we asked what kind of leadership schools need to digitally mature in a way that is meaningful for them and their community? We argue that if this process is to be meaningful, we need educational leadership that is an exchanging process of influence and relationship leading to a shared vision and a common purpose for the school, that is mindful about personal and community's potential and is adjusted to changing needs and environment, co-created by school staff, students and community stakeholders. To be able to support the variety of paths in which any person and/or community could develop, the leadership influence should be inclusive and distributed. To be able to transform, this influence should be able to guide and motivate all to strive for individual, school and system improvements.

We conclude with the idea that distributing leadership to all stakeholders (including teachers and students) in reflecting and devising meaningful digital transformation using digital maturity concept should move schools and educational systems closer towards digitally mature (school) education, in which shared transformative and inclusive vision of education, mindful of wider global, environmental and digital changes leads to cognitive and social development of a person and of a community. Digitally mature education concept, presented in Fg.1., is deeply rooted in the transformative, inclusive, visionary, effective and accountable vision of education, and secondarily supported by meaningful digital transformation. It is based on the shared values between overall vision and role of education on one side, and the role of meaningful digital transformation in education on the other. The shared values are transformation, inclusivity, vision-led, effectiveness and accountability. Both education and digital transformation should share these values and strive towards the same vision of education, and that is to support cognitive and social development of a person and her community. Education and digital transformation should not have disjointed goals and practices, on the contrary, we should strive to make digital transformation increasingly a meaningful part of education and training system.

We propose that digitally mature education is to be co-created and co-lead with transformative and distributed practices in schools while using digital maturity as an improvement and reflective framework for guiding meaningful digital transformation. Leading

towards digitally mature education should be done through transformational and distributed practices, using clear guidelines of digital maturity.

We propose further research that will investigate the digital maturity as an improvement and a reflective framework for meaningful digital transformation of education, leading to a digitally mature education. In doing this, the further research should aim at better understanding the role of leadership in digital maturation of (school) education.

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