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Digitalisation and organizational learning in schools

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Doctoral Dissertation

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Budapest, 2024

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Acknowledgements

First and foremost, I would like to express my deepest gratitude to my supervisors, György Drótos and Tibor Baráth, for their invaluable guidance, and expertise throughout this journey. Their professional and personal support has been instrumental in shaping my academic growth.

I am also grateful to Gergely Kováts, Anna Hidegh, Ágnes Fazekas, and all the anonymous reviewers for their thorough and thoughtful reviews of the three articles that form the backbone of this dissertation. Their insights and constructive feedback greatly enhanced the quality of my work. I am also indebted to the educators in the doctoral programme, whose teachings directly influenced my research interests and ideas, helping to shape the direction of my dissertation.

To the leaders and colleagues of the five schools who participated in my research, I am truly in debt. Their cooperation and contributions were vital to the success of this work, furthermore, they provided me with an experience of a lifetime and invaluable insight and knowledge about education in Hungary.

I would like to extend my sincere thanks to Mart Laanpere and the kind members of the Centre for Educational Technology at Tallinn University's School of Digital Technology. My research visit to their institution and to Estonian schools, was a transformative experience, adding immense value to my professional life. I am grateful to Gábor Michalkó, head of the doctoral school, for his continuous support of my doctoral progress, including the facilitation of my scholarship, which enabled my visit to Estonia.

I would like to express my deep appreciation to Réka Matolay, who first encouraged me to embark on this doctoral journey. Furthermore, I cannot express my gratitude enough to Gabriella Kiss, who mentored me across my multiple roles at the university. Words cannot fully capture how much her support has meant to me.

I would like to thank my friends for their support during what has often been a challenging and demanding process. To Máté Baksa, my dear friend and colleague, I owe a special thanks. Always one step ahead in his own career, but walking in tandem, he guided me through the PhD process with unwavering support.

Finally, I am grateful to my parents and grandmother, who made it possible for me to not only to be the first graduate but also to be the first with a doctorate in our family. Their encouragement and belief in me have been my foundation, and I am forever grateful.

I. Introduction

I.1. Research framework and outline

In my doctoral research, I explore the topic of digitalisation in the school with the perspective and methodological tools of qualitative research from the perspectives of both organization and management theory. I introduce my research approach and research questions as well as my paradigmatic stance before presenting the findings of my previous research papers.

I compiled my doctoral dissertation using three of my papers. Details of the articles are the following:

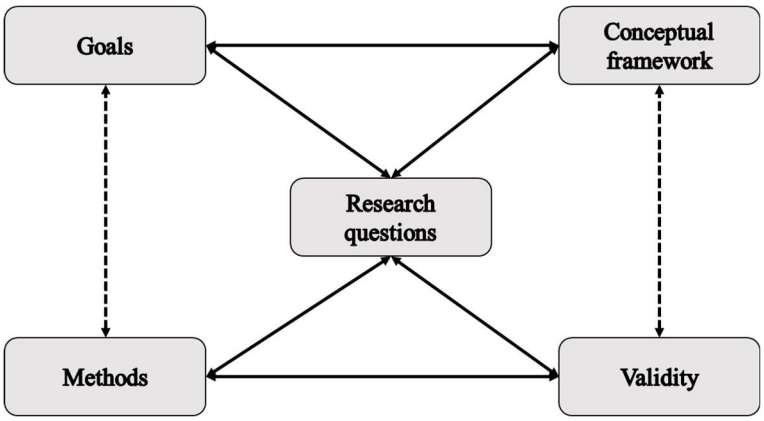
1. Fazekas, N. (2023). Iskola a digitalizálódó világban. *Educatio,* 32(2), 339-347. https://doi.org/10.1556/2063.32.2023.2.12
2. Fazekas, N. (2024). Digital utopia and dystopia of schools after the COVID-19 pandemic. *Research in Education,* 119(1), 44-64. https://doi.org/10.1177/00345237231219149
3. Fazekas, N. (2024). Understanding crisis perception and organizational learning–A case study of school organizations in the COVID-19 pandemic. *Vezetéstudomány-Budapest Management Review*, *55*(7-8), 45-58. https://doi.org/10.14267/VEZTUD.2024.07-08.05

The first article explores the complex interplay between institutional pressures, organizational learning processes in a digitalising world, and the resulting transformations in educational institutions through an interdisciplinary lens. The second article applied a utopian-dystopian theoretic approach to explore sociotechnical imaginaries of schools. Finally, in the third article, I set out to identify factors influencing the learning paths of schools in a crisis focusing on digital competence building. The first article is a conceptual paper, and the following two empirical papers explore different lines of thoughts originating from the first one, however they can be understood as separate investigations as well.

As the published journal articles should be able to be interpreted in themselves, various parts of the doctoral dissertation (e.g., introduction, theoretical background, research goals, methodology) do not appear in one place, but rather as parts of the aforementioned papers. Theoretical concepts and models that are key for the investigation of the research topics are sometimes repeated in more detail or in a specific context.

To present my research framework, I use Maxwell's (1996) model (Figure 1). In this interactive model, research questions are not the starting point but the centre of the design that informs and is sensitive to all other components i.e., goals, conceptual framework, methods, and validity. The upper triangle is the conceptual part of the research design that usually comes to be developed first in the process, while the bottom triangle represents the operational part of the design (Maxwell, 1996).

Figure 1 The interactive model of research design



Source: Maxwell (1996, p. 5), own editing

The roles of the five main components of the model can be characterized as follows:

1. Goals: Clarifies the questions of why the research is worth executing, what issues it will clarify or influence, and ultimately why it is important.
2. Conceptual framework: Points to all the previous and current scientific and professional discourse on the topic that the research draws from and contributes to.
3. Research questions: Formulates the research problem that calls for research and translates it to questions that are adequate to answer. It also specifies how these questions are connected to one another.
4. Methods: Describes activities that will be done in order to answer the research questions. It elaborates on the myriad of operative aspects like relationship with the research participants, researcher roles, sampling, time, frequency and setting of data collections, data sources, data types, and data analysis techniques.

5. Validity: Asks the question of why and how the research results are valid and what measures have to be taken to assure it.

As Maxwell (1996) notes, qualitative research is more a "do-it-yourself" than an "off-the-shelf" solution, which requires not only the careful design of the specific elements of the research design but a continuous interaction and adaptation among those elements. Consequently, the research design is an interconnected, flexible systemic structure.

I present the research framework of my doctoral dissertation aligned with Maxwell's model with a slight modification supporting a clear line of thought for the dissertation: first, the research objectives are presented, then research questions are defined based on the research problem and research context, then I introduce the paradigmatic stance of the scientific traditions I attach my research to, as well as my basic assumptions about the research to be carried out. Next, the conceptual framework and the methodologies used for empirical research are described, and last, I present the structure of the doctoral dissertation.

I.2. Research goals

Even as a bachelor's student, I was fascinated by public education and its struggles. I have been in contact with this sector in my civilian life for several years now, my view about education has been formed by many school leaders, teachers, students, educational scholars, and professionals. As a result of my personal experiences, I picked up several phenomena I found critical in the workings of the Hungarian public education system. The one that carried the highest relevance and that I could serve best with my academic background at the time of the beginning of my doctoral studies was digitalization and digital competence development in school organizations.

With my research, I wish to fulfil several goals. These I organize by Maxwell's (1996) typology of research goals.

My personal goal with this project was to learn as much as I could about my research topic so that I could be of service and make a difference in the Hungarian education system. I aimed to educate myself as an academic in the doctoral programme in order to have all the necessary theoretical knowledge and methodological skills to fulfil this goal.

My practical goal for this doctoral research was to create educational management knowledge that can serve education and policy professionals by collecting and creating theoretical and

practical knowledge on digitalisation, digital competence building, crisis learning and crisis management. Moreover, I wanted to contribute to the discourse about digitalisation in education and strengthen its organizational and management approach, as I find that these aspects are lagging behind pedagogical considerations, even though they are similarly important.

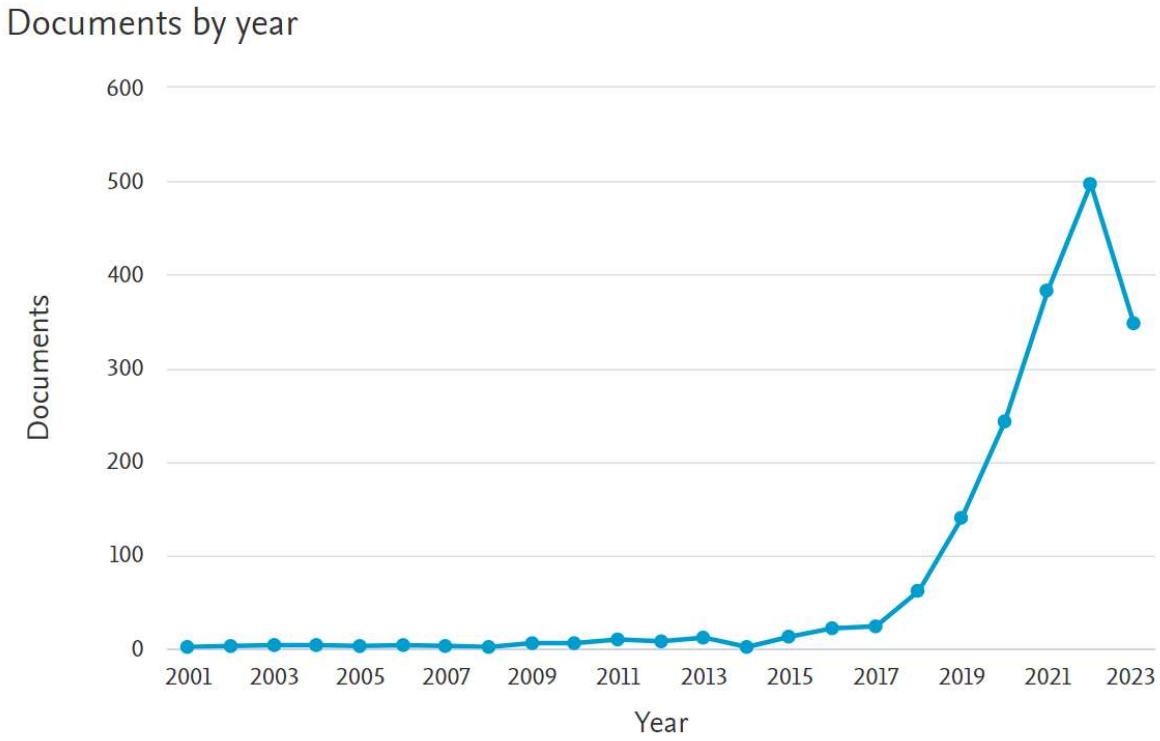
My intellectual goal was to understand how the school changes and what the school is like in a new digitalised society. What do we do to change it? How do these changes affect us in return? How can schools stay relevant in society? I believe that organizations are the key level of investigation if we wish to gain an understanding of the answers to these questions. I also believe that school organizations are the units, that can bring meaningful change in education. But more than that I wished to understand our local, Hungarian context, and the meaning-making of actors in education, to gain an understanding of understandings.

I.3. Research problem and relevance of the research

At the time of planning my doctoral research, the building of digital competence in schools was a central development field in public education in Hungary. It has been since before the necessary digital education period caused by the COVID-19 pandemic. Policy institutions in Hungary as well as all over Europe have been setting goals and taking the necessary steps to improve the digital competence of schools, teachers, and students.

Despite the efforts, it seemed to me that digital competence was rather hard to master at the envisioned level in public education institutions. Generally, schools seem to struggle with digital transformation more than organizations in the for-profit sector, even in the face of pressures caused by the COVID-19 pandemic, as we could see later, that has brought schools a significant leap forward.

Figure 2 Papers published about educational and school digitalisation



Source: Scopus

My observation was supported, as the growing academic interest in educational digitalization was clearly visible from 2018 and 2019 in the number of articles written on the topic (Figure 2) (search terms in Scopus: "digitalization" AND "education" OR "school*"; academic journals, journal articles, English language, 2000-) when I started my doctoral studies. While in this time the focus on digitalization was rather general effects and phenomena of digitalization, in later years articles have been mainly investigating the pandemic-related processes and outcomes (e.g., Dhawan, 2020; Williamson et al., 2020), as well as distance/online/remote education and e-learning (e.g., Appolloni et al., 2021; Damşa et al., 2021). Growing but still scarce are publications in the field about recent technologies that are impacting schools such as AI and machine learning, virtual reality, big data, internet of things, blockchain etc. (e.g., Kaufmann, 2021; Qureshi et al., 2021), especially from an organizational viewpoint. However, the very fundamental social aspect of the digital divide and digital inclusion (e.g., Castaño Muñoz et al., 2022; Lythreatis et al., 2022) appears more frequently in the literature.

To understand the relevance of the research we have to get to know the national, and local educational context first. Since 2011 a strong centralization process has been in place in the education system. In 2012 the Klebelsberg Institution Maintenance Centre was founded, which, since 1st January 2013, incorporated all Hungarian schools (3.000+), and employed all Hungarian state schoolteachers and school employees (150.000+), that were formally bound to municipalities. Besides a myriad of technical, operative, management, and pedagogical issues that emerged, the Centre struggled with a great amount of debt after three years of operation. Financial deficiencies presented themselves in everyday issues, such as supply procurement, or on-time teacher payments (van Dommelen, 2021). In 2016 the government took steps to de-concentrate the system to a manageable level, creating 60 school districts with higher levels of authority. In this period, however, no real significant digital infrastructural investments were possible. Since 2016 the structure of the general education system remained relatively stable. In 2022 general education was reallocated from the defunct Ministry of Human Capacities to the Ministry of Interior, signalling a stagnating focus on educational affairs.

Vocational education was also reorganized in line with the centralization and de-concentration measures. Schools providing vocational education were transferred from the Ministry of Human Capacities first to the Ministry of National Economy in 2014-2015, then from 2018 to the Ministry for Innovation and Technology, now since 2022, they have operated under the Ministry of Culture and Innovation. The structure is similar to the system of general public education: there is an intermediary institution, the National Office of Vocational Education and Training and Adult Learning coordinating 44 centres of vocational training.

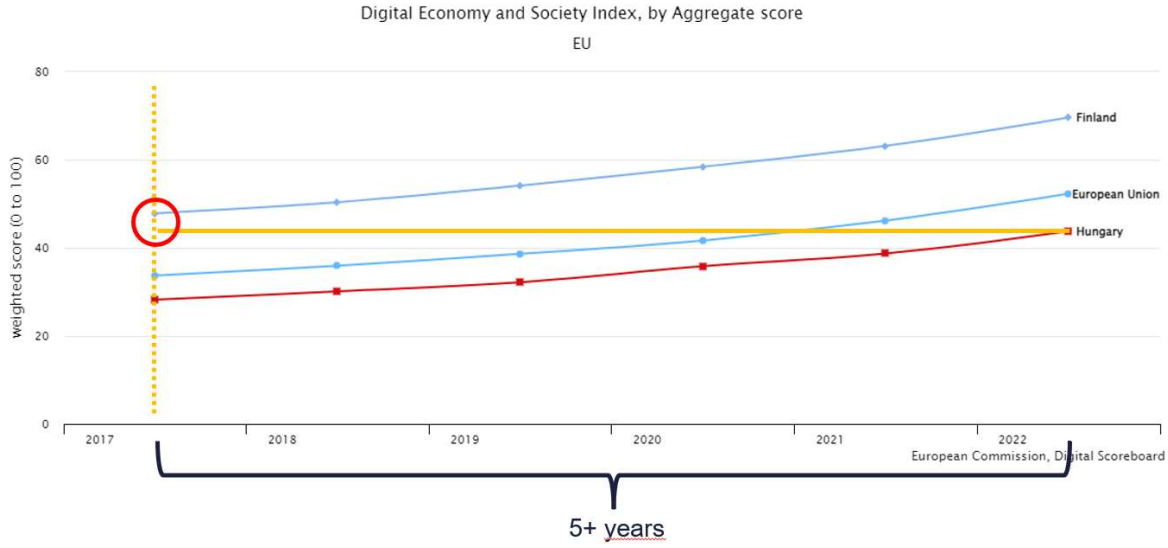
The frequent, deep-reaching structural changes, that were followed by several education policy changes as well, not only weakened the autonomy of the individual schools but created an unpredictable policy context as well. As a consequence, firstly, the reality of organizational-level strategic planning in state schools became highly limited, secondly, non-state schools gained a potential advantage in this matter.

Along with the centralization measures, extensive privatization and growth in the number of non-state schools have been characteristic of the field of general education (Ercse & Radó, 2019). This privatisation meant an increase in religious schools primarily that was highly supported and incentivised by the government, but private schools also grew in number. Ercse and Radó argue that this phenomenon can be characterized as a segregation process in public education. Religious schools and private schools not only have higher pedagogical freedom but the education budget per student in church schools is reported to be approximately four times

more than that of public schools (Domschitz, 2019). This, naturally, frames the opportunities of schools when it comes to digital innovations.

I regard education as the best means to increase society's capacity for growth, consequently, I believe that schools need to be able to foster digital competence in the information society as well. The Digital Economy and Society Index (DESI) shows that its human capital dimension in Hungary, incorporating Internet User Skills and Advanced Skills and Development, has been stagnating, experiencing only a slight increase since 2015, and in absolute value, Hungary places below the EU average, among the last third. Hungary is ca. 6 years behind the leading economy, Finland, and 1,5 years behind the EU average in the digital evolution (European Commission, n.d.) (Figure 3).

Figure 3 DESI evolution trends and gaps between the EU, Finland, and Hungary



Source: Own editing, based on European Commission, n.d.

In Hungary, although I evaluate current education policy actions on digital transformation as insufficient, there have been significant innovations in the past more than 10 years, that impact schools' context for digital learning. These developments will be elaborated in detail in section 1.7.2.

Domestic publications also grew significantly in the period of my doctoral studies, which provided context and input for my work. Hungarian colleagues have emphasized the emergence and growing importance of several topics. Zakota (2020) mentions economic perspectives of

digitalization, new challenges of the educational infrastructure, the digital divide and access to technology, the take-up of mobile technology, the role and managing of platforms and virtual spaces, teaching and learning competencies in the information age, differentiation, measurement and assessment of learning outcomes, or even trust and control. Buda (2023) also discusses operative challenges, however, with the structure of his paper, builds around the questions of *what, how, where* we should teach and *who* should teach, he shows us quite sharply: that we must rethink fundamental questions of education as an effect of digitalization in the wider society. Szűts (2020) views digitalization not only as a methodological tool and innovation; it is a driver of paradigm change in education that needs to be investigated.

As for the educational practice in digitalization, I found Jakab's evaluation and problem definition (2020a, 2020b) especially accurate. I could support many of his observations with published or unpublished empirical data from my doctoral research. He states that the pandemic made the cracks in the educational system visible that were already present but ignored, but these could not and were not solved in a "digital switchover", as the media communicated it, as digital transformation can only be viewed as a process. He also questions the "digital pedagogy" that was used in the period, suggesting that it was not based on digital cultural change, only the intermediary tool was replaced. He explained this phenomenon with the fact, that the role of the *institution* (school) was not revisited, and no paradigmatic or structural changes followed. The training of teachers is not enough to build a well-functioning (digital) education system; specialization and team-work-based operation within the profession, learning-organizational capacity, professional and consistent educational policy, and more democratic and synergic utilization of the main stakeholders' (students, teachers, and parents) competencies is needed.

Similarly, Péter Radó's book, titled "The school of the future" (Az iskola jövője) (2017), points out huge gaps between the current conventional practice and a new way of schooling, marked by the term "learning ecosystems". In such an ecosystem the school would function as an enabler of learning, a "learning centre". As he describes the main characteristics of the future learning environment, we can see many aspects of digitalisation, such as rich offline and online learning content, online learning support systems, a rich assortment of tools (digital too), and flexible and unlimited internet access, furthermore, multifunctional learning spaces, while not exclusively digitalisation-related, can be counted here as well. He visions the empowerment and emancipation of teachers and students through digitally enabled knowledge construction and personalised learning opportunities, that grow from interest and motivation and are fun. In this future, the school still holds its unique position as the environment for social learning, even

though the monopoly status of schools for learning is long gone. However, he warns that he believes Hungarian schools in general are heading in the opposite direction on this path, back to a very conventional and outdated model. My research, based on teachers' reports paints a similar image both about anticipations and a realistic future as well.

The present doctoral research primarily wants to contribute to the previous discourse about the role and future of schools in digital education (Article 1-2.), in the territory of organization theory. Another stream is connected more to the management theory of crisis learning in organizations (Article 3.). Relevant literature, as the approach is more connected to the conceptual framework than the context, I will discuss in section I.6.

Digitalization is a complex social process, however, the turbulent changes that impact education systems and schools now, such as the pandemic and the easily available AI solutions disrupt this social process in a crisis-like way, pushing academics and society actors to rethink basic values and purposes of general education. To investigate the institutional dilemmas and organizational learning dynamics of digitalization in schools represents an exciting research field, not only because of its complex environment, diversity of stakeholders, relevance, and unprecedented crisis-learning process but also because of the critical need in our local and globalizing society for schools to succeed.

I.4. Research setting: The school and its learning context

Forms of education existed before literacy and took the institutional form of the school in ancient, developed cultures. Although education took place primarily within the family, there were also community centres where children were prepared for their civic, military, and professional duties. Many words used to refer to school and school life in different languages also come from this period. In medieval Europe, the Church played a major role in education, with many monastic and town schools, and the first universities were founded at this age. The theory and content of education were greatly enriched by the Renaissance, Humanism, the Reformation and the Enlightenment which impacted the role of the school too (Mészáros et al., 1999).

Modern education, general education organised at the state level, emerged in the 18th and 19th centuries and received its now-known form in the 20th century. The reasons behind the modernisation of education included the end of pre-educational privileges, the rise of Protestantism, industrialisation and technological developments, which made learning

accessible to more and more people. The state also recognised the economic, social and political role of education and subsequently became actively involved in its regulation and development. The state took over the main role of education from the church and established the concept of national education that was delivered through schools. (Dietrich & Tenorth, 2003; Halász, 2001)

Halász (2001) distinguishes what might otherwise be called mass education or public education, from earlier forms of education by the following criteria:

- for a shorter or longer period of time, the whole or a significant majority of the population enters the system
- the task of education is performed by specialists, separate from other occupational groups professionals from other occupational groups
- the different forms of education are combined into a single system organised into a single system
- the state has a decisive role to play in ensuring cooperation between the various elements has a key role to play
    - it is governed by laws with a national scope
    - financed mainly from public funds
    - overseen at some level by a political authority in the country

This research focuses on the field of education institutions providing primary, lower and upper secondary education (ISCED 1-3). Even though I define the school cases participating in the research further based on their legal maintaining authority (state, religious, private, etc.), in general, I view schools as part of public education, as all schools in the Hungarian education system fulfil the above criteria. In Hungary public education, both general and vocational, is primarily governed by the state (65%), 19% is managed by different churches and 16% of schools are private (European Education and Culture Executive Agency [EACEA], 2021).

As this research project looks at public education and organizational learning of institutions of public education, it is essential to look at the general characteristics of public sector learning. These are summarized below as in one previous publication (Fazekas, 2023).

The purpose of learning in the public sector tends to follow efficiency and effectiveness aspects in the implementation of mandatory public services (Dunleavy et al., 2006). According to Jarvie

and Stuart (2018) some public services, mainly in public administration, do not encounter substantial competition, they can only shape their activities to a limited extent, and their effectiveness is evaluated by a very complex group of stakeholders. That is why the goal of learning in the public sector can be to survive, to fulfil ministerial expectations, or even to just perform the obligatory service, or to perform the task more efficiently and effectively. Some of its organizations are almost eternal, they survive regardless of their learning competence (C. Gilson et al., 2007), which also affects the organizational culture and the learning patterns in public sector organizations.

According to the assessment of several researchers in the field, the learning potential of the public sector is very limited and in most cases is only capable of single-loop learning. This is because knowledge transfer activities and learning from change are decentralized and might be a low priority for public service decision-makers, creating short-term learning practices. Double-loop and triple-loop (deutero) learning requires political decision-making, since without it the industrial or institutional policy is ignored (C. Gilson et al., 2007). Real learning is also hindered by resistance to change, limited changeability of organizational behavioural structures, continuity broken by election cycles and changes of government, strong social responsibility for mistakes, although learning often takes place in a "trial-and-error" model, and the distortion of actual performance information in order to maintain a good image towards public opinion (as Olsen & Peters, 1996 in Gilson et al., 2007).

While legal regulations often limit the learning potential of public sector organizations (Kinder, 2012), organizations that are located further away from ideological battles, have a stable mandate, and employ colleagues with a professional background (Stewart & Jarvie, 2015) have higher learning potential. Responsibles for HR-related tasks or HR professionals working here have a relatively narrow scope for defining training plans, as they are often created at the political or managerial level, and the possibility of personalizing the plans is also negligible according to Poell and his colleagues (2007).

Clarke (2006) also found in his research in the field of healthcare that despite having rather advanced HR and training development strategies in the public sector, measurement is mostly lacking, and formal learning situations continue to dominate to a significant extent. The weight of formal learning situations may also seem more significant since in many areas the state makes professional further education compulsory and regulated. The form of this continuing education is increasingly being transferred to eLearning and mLearning platforms (Csedő et al., 2014). Other typical sector-specific learning types include 1) project planning, implementation

and evaluation (e.g. formal and informal learning situations of projects to be implemented), 2) program-based learning situations (e.g. national workshops), 3) operational learning (e.g. HR information, databases, informal channels, financial operations), 4) strategic learning (e.g. external surveillance surveys, independent evaluations) (Jarvie and Stewart, 2018).

In the public sphere, it is typical to facilitate the sharing of knowledge by organizing workshops, forums, discussions, defining learning processes, and mapping training needs (McAdam & Reid, 2000). Fewer hierarchical structures, the reduction of excessive bureaucratic systems, and the power resulting from knowledge withholding are reported to have a positive effect on the sharing of knowledge and information (Henttonen et al., 2016). However, the dissemination of knowledge is typically not automatic, and administrative measures and "reforms" aimed at the dissemination of new knowledge and practice do not achieve as much impact as the mechanisms of the competitive market (Foray & Hargreaves, 2003).

McAdam and Reid (2000) state that the knowledge used and accumulated during the work of employees working at the bottom of the hierarchy is greater than on the same level in companies, i.e., a higher level of knowledge management competencies is required. On the other hand, the public sector that its knowledge systems are more closed and isolated. Networking initiatives (with actors from the market and civil sector) can be a solution to this, but along the lines of some specific programs, co-production (Verschuere et al., 2012) and other solutions directly channelling citizen knowledge can also help the acquisition of external and local knowledge.

In particular, the third article in this dissertation demonstrates the presence of these characteristics in the learning context of the participating organizations. These characteristics lead us to hypothesize that schools face limited pressure to innovate since many can continue operating without significant changes. The complex measure of quality encourages schools to conform to educational authority requirements, especially in centralized systems. The government steering the whole education system has little incentive to reveal underperforming schools or a deficient educational system, particularly during times of ideological and legislative battles, as seen recently in Hungary. This situation weakens the learning capacities of schools. Although there is a centrally provided professional development selection for educators, it may not cater to all their needs. Schools with limited autonomy in establishing partnerships may isolate themselves from transformative influences, while these institutions, as social entities designed to uphold societal structures, tend to resist change naturally too.

I.5. Research gaps and research questions

The academic research field of digitalisation in education has been changing immensely since the planning of my doctoral research. While in 2019 digital competence frameworks (DigComp 2012, DigCompOrg 2015, DigCompEdu 2017) and their impact on the sector were still relatively new and just starting to push digital development actions forward, suggesting a very timely and relevant field of research, the COVID-19 pandemic accelerated the academic interest extraordinarily. If we issue a search in Scopus (TITLE-ABS-KEY ("education*" AND "school*" AND "digitali?ation" OR "digital transformation")), we can see that there were almost 5,5 times more articles published since 2020 than before that altogether, and this growth still continues. Many empirical research papers referenced in this dissertation have been published since the design and the start of the empirical research, in May 2021, turning the purposeful aiming at research gaps into shooting at moving targets.

My approach to addressing research gaps is rooted in cultivating my professional research motivation and joining it with the local and international discourse, emphasising an organizational theoretical viewpoint, trying to uncover school futures, possible scenarios, change dynamics, possible implications, and connected organizational learning. Based on both my academic readings, referenced in the included papers and my research experiences in the field, I believe these pursuits to be most pertinent.

In this section, I will outline the research gaps and the subsequent research questions addressed in each article within the dissertation. In section I.7. I will provide a summary of the key concepts and introduce the research methodologies employed in my doctoral research and in the research papers. Section I.9 will elaborate on the overall structure of the dissertation. The research findings will be summarized once more in each individual paper and ultimately in Chapter V.

The school in a digitalizing world

The transformation of schools as institutions is a subject of enduring scholarly interest, particularly in the context of evolving educational paradigms. However, an extensive academic discourse and theorising of the effect of the integration of digital technologies is still missing. Such discourse could contribute to equitable access, teacher preparedness, improved student outcomes, consideration of socioeconomic ramifications, and the development of effective policy and regulatory frameworks. This academic dialogue is essential for ensuring that

educational institutions are well-equipped to leverage the potential of digitalization to enhance the quality of education and address the demands of the modern era.

As a consequence, I posed the following questions in my article:

> ***Q1:*** *How is digitalisation changing our image of schools?*
>
> ***Q2:*** *How do changes in the school as an organization and the school as an institution interact?*

I have chosen two theoretical approaches to frame my theorising of the phenomenon: the neo-institutional approach and the organizational learning theory approach. These frameworks offer distinct lenses through which to examine the changing nature of schools and provide valuable insights into the complex interplay between external forces and internal adaptation within educational institutions.

The neo-institutional approach draws upon sociological and organizational theories to scrutinize how schools, as traditional institutions, respond to external pressures for change and conformity. This framework underscores the role of institutional isomorphism, whereby schools adopt structural and cultural features that mirror prevailing norms and values in the larger educational landscape. It elucidates the ways in which schools are influenced by external stakeholders, such as policymakers, parents, and accrediting bodies, and how these pressures shape institutional responses and innovations.

Conversely, the organizational learning theory approach delves into how schools, as organizations, adapt and evolve internally in response to changing circumstances. This framework emphasizes the significance of knowledge creation, diffusion, and retention within schools as a means to enhance their organizational capacity and effectiveness. It explores how learning processes at various levels within educational institutions, from individual classrooms to administrative offices, contribute to the continuous improvement and adaptation of schools.

Both the neo-institutional approach and the organizational learning theory approach shed light on the dynamic and multifaceted nature of educational institutions. They offer complementary perspectives on the evolving roles of schools in the face of contemporary challenges, including digitalization, changes in pedagogy, and shifts in educational policy. This article embarks on a journey to explore these theoretical paradigms and their applicability in elucidating the changing landscape of schools as institutions in the 21st century. Through an interdisciplinary lens, it seeks to unravel the complex interplay between institutional pressures, organizational

learning processes, and the resulting transformations in educational institutions, fostering a deeper understanding of the evolving nature of schools in the digital age.

Digital Utopia and Dystopia of Schools after the COVID-19 Pandemic

The integration of digital technologies into schools has transformed the way we teach and learn, opening up avenues for innovation and enhanced educational experiences. Digital school futures represent a paradigm shift in education, emphasizing the utilization of technology to expand access, personalize learning, and equip students with the skills needed to thrive in an increasingly digital world. From virtual classrooms to interactive learning platforms and data-driven instruction, the possibilities are endless. However, in our enthusiasm to embrace these transformative changes, we must also recognize that this digital shift brings with it a myriad of complexities and uncertainties.

School leaders and teachers navigate uncharted territory, it becomes evident that expectations about the future vary. Understanding the precise impact of digital technologies on teaching and learning, the effectiveness of different digital tools and platforms, and the implications for educational equity are just a few examples of areas that can be debated.

From the perspective of educational managers and policymakers, comprehending schoolteachers' attitudes and expectations towards digitalization is of paramount significance for informed decision-making and effective policy implementation. Teachers serve as the frontline implementers of digital initiatives within schools, and their acceptance and enthusiasm are essential for the successful integration of technology in the classroom. By understanding their attitudes, educational managers and policymakers can identify potential obstacles and design targeted interventions to address resistance, ensuring the smooth implementation of digitalization strategies. Moreover, teachers' expectations inform the allocation of resources and support needed for their professional development, helping to tailor training programs and resource distribution to meet their specific requirements. This understanding also enables educational managers and policymakers to align their policies and strategies with the needs and aspirations of teachers, fostering a collaborative and supportive environment that maximizes the benefits of digitalization while mitigating potential challenges, ultimately leading to improved educational outcomes. However, domestic assessment is needed, as all national educational systems have their own characteristics that have to be taken into consideration.

In my second article, I set out to identify these narratives for scholars, policymakers, and educational leaders to better comprehend the complexities of digital imaginaries of the school. This study sets out to answer the research question:

> ***Q3:*** *What are the dreams and fears of school leaders and employees regarding digitalisation in schools influencing their attitudes toward increasing involvement of technology?*

The applied utopian-dystopian theoretic approach provides an effective methodology for analysing the impact of digitalization in education. It allows for a balanced assessment of both the potential benefits and challenges. Utopian scenarios envision an idealized future where technology enhances education, while dystopian perspectives highlight potential drawbacks. As such, the utopian-dystopian dichotomy proves to be a valuable methodology for capturing the complexities of digitalization in education and guiding well-rounded discussions and decisions in this evolving landscape.

Understanding crisis perception and organizational learning: A case study of school organizations in the COVID-19 pandemic

The COVID-19 pandemic has significantly accelerated the urgency of understanding how organizations learn in times of crisis, with a particular focus on digital competence building. As the pandemic forced organizations to rapidly pivot to remote work, online services, and digital operations, the importance of digital competence and adaptability became starkly evident. Organizations needed to learn and adapt to this digital shift swiftly, often under duress. This necessitates an exploration of the dynamics of organizational learning in the context of crisis and its application to building digital competence. While the pandemic presented a unique case study, it also uncovered significant research gaps, particularly in the realm of how organizations effectively build and sustain digital competence in crisis situations. This article delves into the critical importance of studying organizational learning during crises, specifically within the context of digital competence building.

I aim to answer the following research question:

> ***Q4:*** *What factors influence the learning paths of the observed organizations within the crisis, and how?*

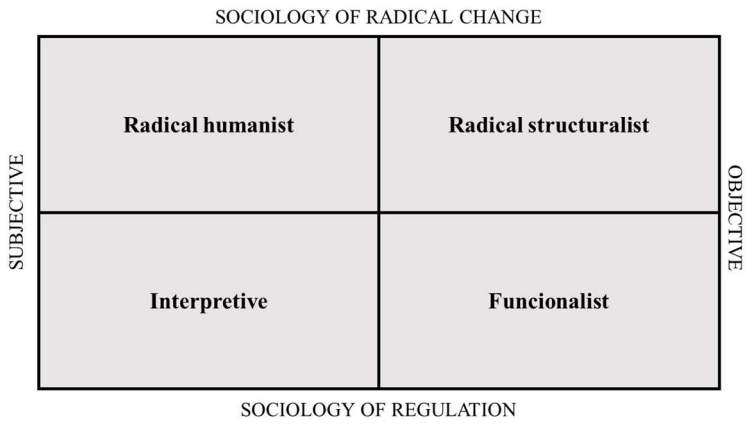
Understanding crisis as a natural process in an organization's life and acknowledging that learning occurs within the crisis, particularly shaped by organizational perception, forms the unique perspective of this article. Crisis perception directly influences an organization's ability to learn and adapt effectively, impacting decision-making and resource allocation. This recognition of crisis as an inherent element of organizational life not only enhances our understanding of how organizations navigate challenges but also illuminates the cognitive processes underlying crisis management. By examining the interplay between crisis perception, learning, and the inherent nature of crises, this study offers valuable insights into crisis learning, and organizational adaptability, contributing significantly to the field of management studies.

I.6. Paradigmatic stance

In this section, I give an overview of the paradigmatic and methodological tradition of research in education and educational institutions and I define my research stance within the theoretical framework of the Burrell-Morgan matrix (1979). Philosophical and theoretic paradigmatic presumptions lay behind the concept and every decision of our research, therefore, it is the researcher's responsibility to set clear guidelines for consistent research and aspects of evaluation for the research outcomes.

Burrell and Morgan's conceptual model (Figure 4) is built up along two dimensions. The horizontal axis of the Burrell-Morgan matrix deals with the assumptions about the nature of social science, the vertical axis demonstrates the assumptions about the nature of society.

Figure 4 Burrell-Morgan matrix



Source: Burrell & Morgan (1979, p. 22)

Along the horizontal axis, the authors differentiate between subjectivist and objectivist approaches based on four sets of assumptions regarding the social world. First, the ontological view determines whether reality is to be investigated external to the individual, consequently, there is an observable objective reality (realist approach), or reality is the very product of individual consciousness, suggesting that there is no single reality to be made sense of (nominalist approach). Second, the epistemological view provides a stand about the nature of knowledge. Assuming knowledge to be observable, tangible, transmittable, and accumulable, the focus of the Investigation Is the verification or falsification of hypotheses and the search for regularities and general laws (positivism). On the other hand, assuming knowledge to be subjective, one must be an active participant in developing understanding, excluding the idea of generating objective knowledge of any kind (anti-positivism). Thirdly, the debate about human nature differentiates between views, regarding people as responders to their environment (determinism) or defining them as creators of it (voluntarism). Finally, the methodological view matches the previous assumptions, suggesting systematic methods alike to natural sciences (nomothetic) or detailed analysis of various insights of first-hand knowledge (idiographic).

The vertical axis demonstrates the assumptions about the nature of society, Introducing the distinction between the sociology of regulation and the sociology of radical change. While the first characterizes society as united and cohesive, the latter explains it through structural conflicts and modes of domination. The sociology of regulation can be labelled as the conventional approach of management and organization studies. Contrastingly, the sociology of radical change, also termed the critical approach, aims to question the mainstream, adding a socio-political viewpoint and criticizing the general order of economy and work.

The interpretive paradigm, I identify my overall research approach to belong to, is in the bottom left cell of the matrix. I do not question the status quo of society or, the political structures of the Hungarian education system; I aim to provide a deep understanding of local realities supporting and impeding digital competence building. The research itself represents theoretical streams of subjectivist backgrounds, that are nominalist, anti-positivist, voluntarist, and ideographic. As Hatch and Yanow (2003) describe, theories of this paradigm aim to understand the world in its genuine nature. This world is inherently social, constructed continuously by individuals and their communities through interpretation and sense-making. Interpretive approaches concentrate on context-specific meaning-making. Their goal is to understand the local lifeworld of the actor. In my doctoral research, I wish to understand, how participating

schools think about and deal with digitalization, what digital competence means to them and how that has been influencing their approach and practices in learning.

Approaches of this tradition favour methodologies inherently based on interpretative and dialogical practices such as interviews, observation, narrative inquiry, art and artefact-based sense-making, and reflection. The conducted research will be deliberately subjective, as the researcher is viewed as part of the interpretation process, unable to separate his/her own contextual embeddedness from the subject of research.

In educational research, positivistic and quantitative-methodology-oriented research, the scientific method was the reigning tradition for more than a century (Poni, 2014). In this scientific field, however, the omnipresence of the tradition was questioned quite early in the domain of social and behavioural phenomena. As Moses (2002) summarizes, rooted in the 20th-century philosophy of science, philosophers like James W. Garrison, Kenneth Howe, and Denis C. Phillips challenge the viability of positivism and introduce alternatives like postpositivism and pragmatism. A pivotal theme is the call to avoid positioning positivism as the sole epistemological reference point, and to dispel the stark distinction between quantitative and qualitative methods. Instead, the aim is to foster a more philosophically robust engagement with these controversies.

According to Poni (2014), quantitative research plays a pivotal role in investigating education as a social institution, delving into its structure and functions by examining the interactions between institutions and individuals, thus addressing macro-social-level concerns. This approach focuses on understanding the education system's functions and dysfunctions to drive improvement. The central objective of education research, however, lies in sensitizing stakeholders to the imperative of fostering inclusive access and quality education. Hanan Alexander (2006) underscores also the necessity of conducting meaningful educational research within the framework of well-defined, non-dogmatic visions of educational excellence, encompassing policies, practices, and pedagogies. He thinks, that both quantitative and qualitative research are tasked with interpreting and elaborating the philosophical foundations underpinning these visions, facilitating their transmission and evolution across generations. He argues for an increased role of philosophy, particularly in substantive ethics and the analysis of educational aims, to enrich the educational research discourse. To live up to its purpose educational research was seen to have more and more responsibility in fostering debate about the movement of educational standards, its marriage to high-stakes testing, accountability, or inequality (Moses, 2002), which are all relevant topics in relation to digitalization as well.

As a result of the dialogue about adequate research in education, interpretative methods were widely accepted. As Poni (2014) explains, translating personal expressions into abstract concepts challenges researchers due to differing meanings. Qualitative research, in contrast to objectivity, values personal voices, employing methodologies like ethnography, case studies, and participant observation, particularly applicable to educational contexts. Its attributes—empathy, contextualization, flexibility—are pivotal in educational studies. Validity relies on criteria like trustworthiness and authenticity, yielding useful interpretations, while honesty ensures reliability. Given the challenge of proving truth in social research, relatability is favoured over generalizability. Constructivism emphasizes unique individual interaction in shared environments. Meaning-making is central to educational research, wherein qualitative methods can promote a change-oriented mindset.

What we can see in the research practice based on a systematic literature review of Matos and colleagues (2023) is that almost 2/3 of empirical research applies qualitative methodologies, ca. 1/5 mixed methodologies, and little more than 10% uses purely quantitative tools for data collection and analysis in educational research. Moses (2002) warns that it is not appropriate nor feasible to differentiate and juxtapose quantitative and qualitative research methods based on the premise that quantitative methods are inherently and solely aligned with positivism and suited exclusively for confirmation, while qualitative methods are inherently and exclusively interpretive, serving solely for understanding. Poni (2014) concludes too, that the overarching aim of intentional research that contributes to theory underscores the need to break down polemics and establish mutual understanding around research strategy pluralism, although, no preference is given to multi-strategy research over mono-method. The overarching mission is the influencing of education policy and practice through theoretically informed research.

Organizational knowledge and learning, as the focal aspect of my doctoral research, has different interpretations across the different theoretical paradigms as well. The positivist, functionalist tradition views organizational learning as something to "fix" the organization with, it is a systemic, mechanistic approach that views organizational phenomena as universally understandable and a belief that learning inherently leads to business success, which marginalizes activities not yielding commercial measurable results (Garrick & Rhodes, 1998). This view can be connected to the earlier traditions of learning research where learning was understood as a root of change in behaviour, and a cognitive activity of the learner (Cullen, 1999). These are represented well in definitions, as *"organizational learning is a process of detecting and correcting error"* (Argyris, 1977, p.116), or *"an entity learns if, through its*

processing of information, the range of its potential behaviors is changed" (Huber, 1991, p.89), emphasizing the objectively observable and influenceable rules of organizational learning and outcomes, representing the organization as a system or machine, understandable through the tools of natural sciences.

Constructivist, and interpretivist traditions, however, emphasize that learning is embedded in a specific, local, social, cultural, time and physical context. Here the terms such as *sensemaking process* (Weick, 1995), *distributed sensemaking* (Weick, 2012), *dynamic process of organizational knowledge creation* (Nonaka, 1994), *generative dance between knowledge and knowing* (Cook & Brown, 1999), *situated learning* (Lave & Wenger, 1991) are characteristic, pointing out the human processes of the organization, recognising local meanings, understandings and truths; that can be interpreted and got to know. Most learning organization concepts can be also subscribed to this tradition (e.g. Senge), however, positivist approaches are also present (e.g. Garvin).

In the critical traditions approach, organizational learning is a process of exercising power, and the followers of this approach critique the previous paradigms for their neglect of this matter. Power relations, inherent in social practices and relationships, can either enable or hinder learning processes (Contu & Willmott, 2003). Critical theory highlights how all knowledge reflects power relations, which can lead to new forms of domination (Alvesson & Willmott, 1992). In the organizational context, sensemaking becomes sensegiving through all stages of innovative actions and projects: at the initiation phase, by managers engaging organizational members for and defining the project, ongoingly through evaluation and feedback on the progress, and in the closure stage when leaders drive the translation of learning outcomes to the permanent organization, aiming to change routines, structures, and organizational memory. Contrary to the engaging narrative, employees become sensetakers (Huzzard, 2004). Fenwick (2005) points out that learning should be a process that transforms personal and group awareness to reveal oppression through critical reflection and practical action, where learners become committed to reforming these oppressive conditions.

The postmodern critique is that the previous modernist paradigms create rigid, overarching narratives of organizational priorities that may suppress diverse or non-commercially focused activities, and diverse and fragmented voices, as a result of the urge of organization specialists and consultants to explain and handle the uncertainties of contemporary organizations, to keep control and competitive advantage (Garrick & Rhodes, 1998). Postmodernism is the paradigm of becoming, celebrates the primacy of lived experience, and gives voice to tacit forms of

knowing (Chia, 2003). It encourages a more decentralized, fragmented view of organizations, and a view of dispersed, pragmatic knowledge (Peltonen, 2016). This is an approach that seems to be fit to explain processes of individual and organizational learning within the ubiquitousness of digitalization. Premises of modernism describe a constant and permanent state of the world, where change must be enforced externally, while postmodernism focuses on *becoming* (Chia, 2003), a constant change, diversity and ambiguity in knowledge.

In this dissertation and the included articles, I believe that a shade of all the introduced theoretical paradigms can be detected. The knowledge of this palette of lenses has shaped my questions, what I see, and what I conclude over the four-year period, with their significance changing through different stages of the research. However, by design, I subscribe to the interpretative tradition in my doctoral research project's approach and methodology, which is especially tangible in my second article (Chapter III). While the third article (Chapter IV) is also based on interpretative grounds and is inspired by the postmodernist approach in defining the nature of knowledge and learning, it used rather functionalist tools to capture and depict interpretations and constructive processes as well. Critical aspects of learning and digitalization can be sporadically detected, especially in Chapters II and III, in connection with oppression through technology.

I.7. Conceptual framework, main concepts

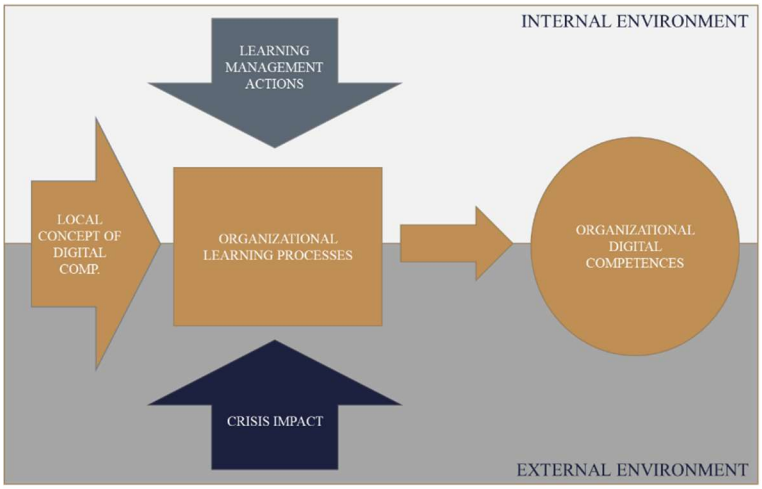
In the forthcoming section, the primary objective is to provide a comprehensive introduction to the main theoretical background at the outset. Key theoretical elements will be introduced in the included articles as well; however, this summary will establish a foundational framework, facilitating a thorough understanding of the overarching theoretical underpinnings that guide and connect the subsequent articles. By presenting the core conceptual framework at the beginning, the subsequent articles can delve into specific applications and nuances, building upon this established theoretical foundation for a cohesive exploration of the research topics.

1.7.1. Conceptual framework

Planning the research, I created a framework of the concept of organization digital competence building (Figure 5), that would guide my thinking. In the centre of the framework is organizational learning, specifically the learning processes connected to digital competence building on the organizational level within the school. The external and internal context together

can be viewed as a space for the institutional context as well. My research wished to investigate three aspects of these processes: 1) how the local concept of digital competence shapes organizational learning, 2) in the specific learning context, what kind of learning management practices are the most beneficial for organizational digital learning processes and who are the ones behind them, and 3) how crisis learning, through the case of online education, has impacted organizational learning in Hungarian schools.

Figure 5 The frame of the research: digital competence and organizational learning in schools



Source: own editing

As a qualitative research project, the concept is highly iterative, and I have adapted the focus based on the emerging patterns of the phenomenon. However, theoretical fields framing the research of the school institution and the discourse on digital competence and organizational learning have remained in front. On the other front, learning-in-crisis, change, and crisis management literature expands our view regarding how the coronavirus impacts the learning process. Lastly, as for the context of the research, I had to take into consideration the specialities of the schools' internal and external environment: educational management and public management aspects can bear a huge influence on the organizational culture and behaviour because of sector-specific legislation, policies, and historic traditions.

In the upcoming sections, I touch on topics, theories, and models lying behind the researched phenomenon. First, the concept of digital competence is explained, followed by the presentation of recent European and Hungarian policy-led progress in the field. Secondly, I define

organizational learning as it is understood in this research and demonstrate research and management dilemmas in connection with digitalization and organizational learning. Thirdly, I point to the currently most prominent factor affecting digital transformation: the crisis learning environment of the coronavirus pandemic.

1.7.2. Digital competence

The concept of "digital competence" in connection with digital technologies is also referred to as "ICT (information and communication technologies) literacy" or "digital literacy" in professional materials. There are no widely accepted definitions for these and other terms like digital "skills", "competence", "aptitudes", "knowledge", "understandings", "dispositions", and "thinking" are also frequently used (Atchoarena et al., 2017) The term digital competence is preferred in this study, as the concept of competence goes beyond the skills of interpretation and use implicated by literacy, comprehension, or thinking, as it includes elements of skill, knowledge, and attitude (Vuorikari et al., 2022).

Digital competence can be broadly defined as the confident, critical, and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion, and/or participation in society. "Digitally competent educational organization" refers to a school in which digital technology is used effectively by the staff to provide a compelling student experience and to realize a good return on investment in digital technology (Kampylis et al., 2015). While an attractive approach, hardships to moving forward in improving schools' digital competence indicate, that the understanding of digital competence in Hungarian schools might not entirely match this. They seem to struggle to create their own understanding and positive relationship with digital technologies in operation and education.

The DigCompOrg framework defines 7+1 key elements of organizational digital competence that are inter-related and inter-dependent: 1) Leadership and governance practices, 2) Teaching and learning practices, 3) Professional development, 4) Assessment practices, 5) Content and curricula, 6) Collaboration and networking, 7) Infrastructure and +1 Sector specific element.

In the EU

The European Commission's Joint Research Centre (EC JRC) has been researching learning in the digital age and related skills since 2005 (Carretero et al., 2017). The European Digital

Competence Framework, also known as DigComp, first appeared in 2013 as a reference for the development and strategic planning of digital competence initiatives. This standard was updated and expanded in 2016 (2.0), in 2017 (2.1), and then recently in 2022 (2.2). Building on this material, in 2015 the framework for educational organizations (DigCompOrg) and in 2017 the digital competence framework for educators (DigCompEdu) were created.

The developments in the area construct a system of strategic goals with the Digital Education Action Plans (European Commission DG EAC, n.d.-a) in the centre, encompassing both the first iteration (2018-2020) and the renewed version (2021-2027). The plans are strategic frameworks designed to foster high-quality, inclusive, and accessible digital education in Europe. The first plan laid the foundation, while the second, adopted on September 30, 2020, builds upon and extends these efforts. Aligned with EU priorities such as 'A Europe fit for the Digital Age', the plans emphasize collaboration, addressing challenges and opportunities posed by the COVID-19 pandemic. They outline two main priorities: developing a high-performing digital education ecosystem and enhancing digital skills and competence. The goals include fostering dialogue with Member States, recommending key enabling factors, and establishing a European Digital Education Hub.

A tool was developed too, to offer tangible and autonomous ways for schools to improve themselves in embedding digital technologies into teaching learning and assessment. SELFIE (Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies) is a free online tool, launched in 2018. The online surveys of SELFIE anonymously gather information from students, teachers, and school leaders on how technology is used in their schools. This is done using short statements and questions and a simple 1-5 answer scale in eight dimensions: 1) infrastructure, 2) content and curricula, 3) assessment practices, 4) professional development, 5) leadership and governance practices, 6) sector-specific, 7) collaboration and networking and 8) teaching and learning practices. The questions and statements take around 20 minutes to complete. Based on this input, the tool generates a report – a snapshot of a school's strengths and weaknesses in its use of technology. SELFIE is available for any primary, secondary, and vocational schools in and out of Europe in over 30 languages. It can be used by any school – not just those with advanced levels of infrastructure, equipment, and technology use (European Commission DG EAC, n.d.-b).

SELFIEforTEACHERS was also released in October 2021 as part of the initiatives of the Commission's Digital Education Action Plan. It is based on DigCompEdu and was piloted with 4,000 teachers and validated before its launch (Economou, 2023). SELFIEforTEACHERS aims

to assist teachers in advancing their digital competence for professional development, ultimately improving teaching and learning through digital technologies. The initiative outlines digital competence and levels achievable by teachers, offers personalized feedback based on detailed reports, and fosters the exchange of good practices and resource sharing. The tool is designed to meet teachers' learning needs and enhance the overall learning process, contributing to the broader goal of optimizing students' learning potential while supporting their digital competence development (Economou, 2023).

The above frameworks try to capture knowledge elements, skills, and attitudes towards technology but also the technological readiness, and infrastructure of a school at the same time. The interaction of these is embedded within the local, wider, and global context. However, they are not fit to capture deeper dispositions or the causes of resistance and motivation towards learning. To understand how digital organizational competence is built we should turn to organizational learning theories that provide the process approach to complement the competence frameworks' content approach.

In Hungary

Complying with EU measures, the Hungarian education system has been taking strategic steps to improve digital competence. Based on The Hungarian Digital Educational Strategy (DOS, Magyarország Digitális Oktatási Stratégiája, 2016) drown up in 2016, several digitization-related programs were implemented in public education in cooperation with the Educational Authority (Oktatási Hivatal), the Digital Welfare Nonprofit Ltd (Digitális Jólét Program). and Károly Eszterházy University within the development project EFOP-3.2.15 – VEKOP-17-2017-00001 (Measurement-evaluation and digital developments related to the public education framework, development, and renewal of innovative educational organization procedures) between 2017 and 2020.

Hungary based its educational transformation programmes mostly on the European Commission's (EC) digital competence frameworks, such as DigComp, DigCompOrg and DigCompEdu mentioned above. In 2016 led by DOS the Hungarian Government jumpstarted several investments in education. Since then, however, there has been no legitim digital education strategy in place; the strategy proposal, DigiNOIR (Halász et al., 2019) is not legitimized, but it is available and was taken as a basis for policy developments in a number of cases. The Hungarian Education Strategy 2021-2030 produced for the European Union names

several relevant directions for development (student and teacher skills, education services and infrastructure, digital education content and learning management system (LMS) development, etc.) in the field of digital development (goal No.4 of the strategy), however, on the indicator level it completely fails to capture the outcomes needed for a digitally developed education system. If we take a look at the two indicators No.4/8 (Number of task performance locations affected by infrastructural development) and No.4/9 (Proportion of classrooms equipped with interactive whiteboards, displays, and workstations) (*Az Európai Unió Számára Készített Köznevelési Stratégia 2021-2030*, 2021), we can see that the indicators do not measure outcomes or even quality of the interventions, moreover, there is no direct causal relationship between indicators and the level of digital development. Therefore, in this dissertation, the above strategy is not regarded as a relevant document for analysis.

The start of Hungary's educational digital competence development path was signalled with the creation of the first online measurement system in 2011, eLEMÉR (DPMK, 2020), dating even before the DigComp frameworks. Later as an action of the Digital Educational Strategy (DOS), DNR (Digitális Névjegy Rendszer – Digital Profile System) was developed in 2020, in a pilot project with 63 schools (ca. 1,5 %) completing the self-evaluation questionnaire and receiving the system reports. DNR is a complex institutional feedback and development tool that is suitable for determining the level of digital maturity of schools. The use of the system helps the school to make the most out of digitization. The purpose of the system is multifaceted. It provides information on the digital maturity of the given public education institution and suggests possible steps for development in a structured way. DNR also shows the stage of digital transition the school is at, while the use of the system itself supports and reinforces the complex thinking of school actors about all areas of a digitally competent school. It supports the implementation of evidence-based decision-making by school leaders, maintainers, and policy institutions. DNR serves, however, neither qualification nor ranking purposes, nor does it replace a deep-reaching development process (DPMK, 2020).

Although it is a very valuable tool, based on the benchmarks of developed educational systems, such as Estonia, the project has no continuation since and is not sufficient for the purposes of the research as a qualitative data source.

At the time of the doctoral research project, teachers' or students' individual digital competence is not measured or evaluated; the Hungarian school inspection system lists only one indicator related to digital competence (Oktatási Hivatal, 2021). Later, in the frame of the mandatory National Assessment of Basic Competencies (Országos Kompetenciamérés) programme,

however, that has been executed in a digital format since 2022. In the 2023-2024 school year students starting from 5th grade were assessed in the Digital culture subject too, providing an opportunity for future monitoring. Some schools engage in self-assessment, using the SELFIE tool, which allows a 360° assessment involving school leaders, teachers and students as well (Főző & Racsko, 2020).

The development of digital textbooks and learning tools has been supported by DOS between 2016-2020, establishing the National Public Education Portal (nkp.hu). There are digital education management systems in place, such as the Public Education Information System (KIR) and the Secondary School Enrolment Information System (KIFIR) as well as the University Enrolment System (felvi.hu), or the eKRÉTA system since the 2018/2019 school year.

Digital transformation was supported on the professional cultural level too, as the Digital Project Week (Digitális Témahét) and the Digital Education Conference and Fair (DOKK – Digitális Oktatási Konferencia és Kiállítás) were established and became events engaging both teachers and students.

The educational infrastructure experienced some significant developments too. Teacher laptops were distributed for professional use, accompanied by mandatory training within the EFOP-3.2.4-16-2016-00001 project. The government further plans to invest around 200 billion forints over four years, providing 565,000 student and 55,000 teacher notebooks. The distribution will prioritize 5th and 9th-grade students, with the first phase involving 34 billion forints for 55,000 notebooks for students and teachers, and 10,000 for schools (Klebelsberg Központ, 2022).

Infrastructural investments have been characteristics as well. The installation of internet access and faster internet has also been in focus within the StudentNet Programme (Diákháló Program). According to the Governmental Information-Technology Development Agency (KIFÜ) in 2014, less than one-third of Hungarian schools had Wi-Fi access; however, by 2023, this ratio has increased to 99%. The average bandwidth now meets the expectations of DOS, ranging between 100 Mbit/s and 1 Gbit/s, depending on the school's student population (Kormányzati Informatikai Fejlesztési Ügynökség [KIFÜ], 2023).

As extensions for schools, Digital Knowledge Centres (digitalis-tudaskozpont.hu) in six Hungarian towns were opened in 2022 in the frame of the Digital Welfare Programme that offers programmes mostly for primary and high school students but for wider audiences as well in order to introduce modern and future technologies to visitors, based on the practice of

international benchmarks. The idea of these centres was not new in Hungary, as AlbaInnovár (albainnovar.hu), a similar local initiative, a mainly municipal-funded space was already created back in 2017 in Székesfehérvár, and later in partnership with edtech companies with KIFÜ another centre, Edu&Fun (edufunbudapest.hu) was opened in 2020 in Budapest. As for within-the-school developments, AlbaInnovár and the High-Tech Suli programme (High-Tech School) (hightechsuli.hu) were probably the most prominent institutions financing the construction of smart classrooms within the applying schools.

It is also worth noting that thanks to the many private stakeholders in this edtech ecosystem, after the end of the DOS-generated conferences and programmes the Education: NEXT - Edtech Association (Education: NEXT – Oktatástechnológiai Szövetség) (educationnext.hu) was created with the purpose of adequate industry representation, the building of an edtech community and supporting the export of related services and products. Edison Platform (edisonplatform.hu) by Bridge Budapest can also be mentioned as an important network organization for edtech and digital skill nurturing organizations, although this is not its only profile.

Recently, an OECD report (OECD, 2023, pp.152-161) also documented the main characteristics of Hungarian digital education that can provide an additional viewpoint of the current state. It is important to note, however, that its text is rather descriptive, containing few critiques and areas for improvement (e.g., education market and R&D), hence, it portrays the ecosystem in a rather neutral or advantageous light.

Consequently, while we can document various advancements in this domain at the national level, both in the public and the privet sector, during the research conducted at the local school organization level, the overall context of digitalization appeared to be suboptimal. Evidently, either the investments were delayed, only reaching a critical mass subsequently, or significant challenges arose in the implementation of central projects.

1.7.3. Organizational learning

The process of how digital competence is developed in an organization is learning. Wenger-Trayner and colleagues' theory of Communities of Practice (CoP) states that learning is a social process (2014). It is not enough to have one or two pioneering teachers in our school to bring digitalization forward in a school: their knowledge needs to be absorbed, reformed, and owned by the organization. This kind of organizational learning is based on the continuous exchange

and rearrangement of competence defined by the community, and the personal experiences of the individual; the knowledge is based on subjective and aesthetic values, embedded in a process, and created during practice (Wenger-Trayner et al. 2014). Tsoukas (1996) describes organizations themselves as *distributed knowledge systems* in constant flux, where individuals gather and share tacit, unarticulated, background knowledge of *common understandings.* Knowledge in organizations is dispersed, collective and continuously reconstituted, part of a bigger, *outside-firm knowledge,* a result of actor networks, a co-evolutionary interplay of society and technology (Spender, 1996).

Defining organizational learning as above displays the complexity of the researched phenomenon. This overview focuses on the following aspects of digital competence learning in organizations that will be central to the proposed research: 1) tacit, unarticulated knowledge, 2) non-formal and informal learning situations, 3) meaning defined by community, 4) dispersed nature of knowledge, 5) boundedness to the interplay of society and technology.

Based on organizational learning studies, an image of the organization, that has mastered learning effectively on the organizational level, emerged, which is called the *learning organization* (LO). While this is a theoretical concept, there have been many scholars who managed to define it, observe and describe characteristics and typical practices of a learning organization, providing focus areas for organizational development for the management. I am giving an overview in this section based on a previously published conference paper (Fazekas, 2021).

Most of the pioneering literature on the LO emerged in the 1990s, responding to the knowledge society and economy concepts discussed in the 1980s. Key traits of the conceptualisations include being conscious, and goal-oriented, supporting collective and open-system learning, empowering employees, and organising structures and processes for continuous improvement (Örtenblad, 2019).

Pedler and colleagues emphasized joint learning, facilitated by the organization, with the aim of achieving strategic goals (Pedler et al., 1991). Senge's (1990) approach, probably the most influential thinker of the LO concept, is more holistic in the sense that it includes the organizational members not just workers, but as people, individuals with individual and collective goals. He puts systems thinking in the centre as an organizational ability to foster expansive patterns of thinking and learning. Garvin (1993) criticises this approach deeming it too abstract and points to easily detectable and produceable practices like systematic problem-

solving, experimentation, learning from past experience, learning from others and transferring knowledge. As a result learning organizations are *"skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights"* (Garvin, 1993, p. 80). He also emphasizes the necessity of measuring learning, reflecting a functionalist approach. Watkins and Marsick (1996) understand the learning organization as an organization that can continuously learn and transform strategically, and where learning is part of work, happening parallelly. The scholars developed a measurement tool as well, the Dimensions of the Learning Organizations Questionnaire (DLOQ) (Marsick & Watkins, 2003; Watkins & O'Neil, 2013) that is widely adapted and used across various sectors and countries.

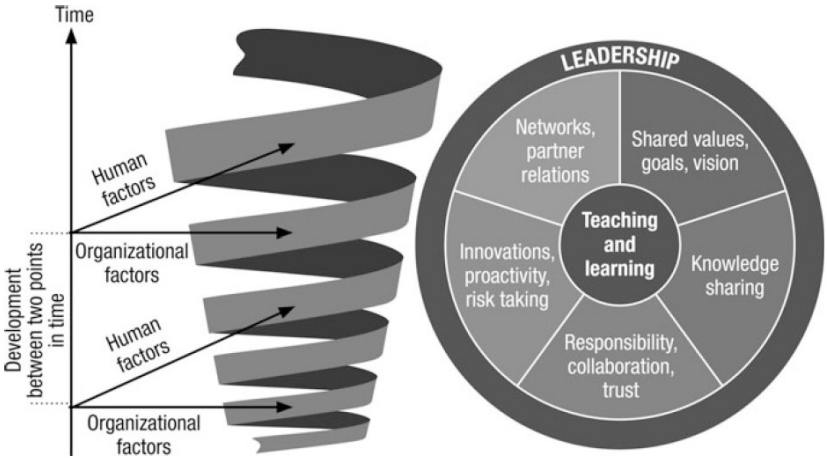
The above concepts while describing various aspects of what it means to be a learning organization, do not include technology in their central frameworks. Marquardt (2011), besides putting continuous development and the empowerment of people both in and outside of the organization to learn, also points to technology as an enabler of these activities.

Not surprisingly, the concept of LO has been very popular in the education sector, and education management scholars and policy institutions have widely engaged with the model. OECD in its report defines the *school as a learning organization* (SLO) as an institution that "has the capacity to change and adapt routinely to new environments and circumstances as its members, individually and together, learn their way to realizing their vision" (Kools & Stoll, 2016, p. 6). Action-oriented dimensions, supporting student learning as the central element of the model, convey a dynamic view of the LO that is receptive to the local and broader environment: 1) developing and sharing a vision centred on the learning of all students; 2) creating and supporting continuous learning opportunities for all staff; 3) promoting team learning and collaboration among staff; 4) establishing a culture of inquiry, innovation and exploration; 5) establishing embedded systems for collecting and exchanging knowledge and learning; 6) learning with and from the external environment and larger learning system; and 7) modelling and growing learning leadership (Kools & Stoll, 2016, p. 10). The report emphasizes four transversal themes (4 T) that influence all LO dimensions: trust, time, technology, and thinking together.

As a result of the growing acceptance of the concept "to become a LO" became part of the expectations towards educational institutions in Hungary as well (Kovács et al., 2015). This expectation led to the need for locally relevant tools that can reflect school organizations' progress towards this goal. As an answer, in a regional research project of the Hungarian-Netherlands School of Educational Management (Hungarian abbreviation: KÖVI) (Baráth,

2017) the synchronous-diachronic (SD) LO model (see Figure 6) was developed to provide a snapshot of institutions at a specific stage and time synchronously, and to identify the school's developmental path, focusing on evolutionary changes diachronically. At the centre of the synchronous model are learning and teaching, surrounded by interrelated supporting activity systems. Leadership forms the outer circle, coordinating efforts towards the core purpose. The maturation progress of the LO is determined by human and organizational factors that enhance the organization's learning capacity.

Figure 6 The synchronous-diachronic model of the school as a learning organization



Source: Baráth, 2017 (p. 1189)

Radó (2017) identifies three main goals for schools as learning organizations: 1) aligning organizational goals with individual learning, 2) accumulating collective knowledge, and 3) linking external expectations with learning outcomes. The organizational prerequisites for this type of learning include non-hierarchical relationships, information systems and open internal communication, delegation, teamwork and cooperation, capacity building, as well as incentives and rewards. He argues that becoming a learning organization is one of the key enablers for progressing towards the future model of schools. This statement is reinforced in Horváth's recent research (Horváth, 2023) as well, which showed that successful digital transformation in education relies heavily on the ability of schools to cultivate a learning organization culture, characterized by continuous learning, adaptability, and collaboration, which are critical for integrating new digital tools effectively.

How can we however connect the concepts the learning organization and digitalisation in schools, if we accept Marquard's notion of technology as an enabler of the learning organization? How can becoming a LO contribute to the school's digital competence? I argued that improving school practices around shared values, goals, and vision helps create a unified understanding of digital competence, setting goals that align with external expectations and teachers' needs and readiness. This fosters a positive attitude towards digitalisation and cultivates a welcoming culture in both pedagogical and organizational areas. Strategically, leadership, evaluation systems, knowledge sharing, professional development, communication, and infrastructure management are all essential elements for achieving digitalization goals. Effective knowledge-sharing processes enhance the dissemination of digital innovations and accelerate learning. Strengthening a culture of innovation, proactivity, and risk-taking empowers school managers and teachers to explore and implement the best digital solutions, contributing to pedagogical and organizational renewal and increasing competitiveness. Building a responsible, collaborative, and trustworthy school community supports collective digital initiatives, encourages the sharing of digital materials, fosters new cooperation within and outside the school, and ensures responsible ICT use and the successful realization of the school's vision through appropriate digital tools.

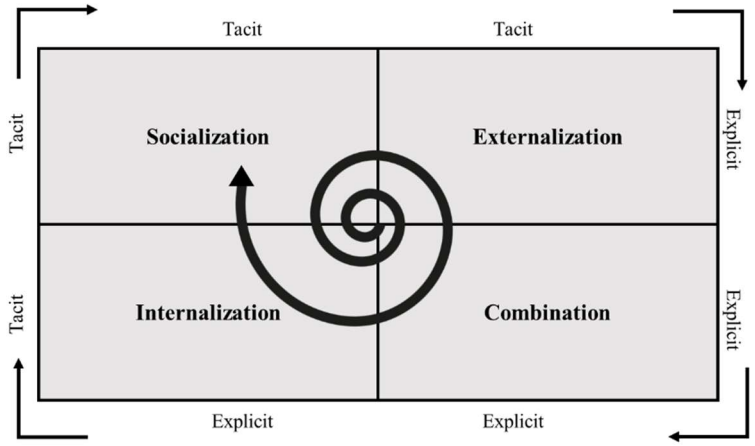
How can a higher level of digital organizational competence contribute to becoming a LO? Digitalisation supports informed decision-making, goal setting, and action planning, creating additional platforms for knowledge sharing. Improved digital pedagogical culture allows for diverse materials and cross-subject collaborations. Well-integrated pedagogical administration supports personalized education. Digital professional development enhances teachers' engagement and participation. A high level of digital school culture improves communication, collaboration, and secure digital environments. The thoughtfully planned infrastructure supports internal and external collaboration and global learning opportunities for staff and students.

Tacit knowledge

To understand knowledge and learning in an organization, we must first get to know the members of the organization and the social processes that take place between them in which knowledge is created (Nonaka et al., 2008). To track the flow of knowledge and detect the process of learning we can follow situations in the organization in which knowledge is shared and distributed through socialization (from tacit to tacit knowledge), externalization (from tacit

to explicit knowledge), combination (from explicit to explicit knowledge), and finally internalization (from explicit to tacit knowledge) (Nonaka et al., 2008, p. 19) (Figure 7). During these transformations, the shared knowledge itself grows through the process. This is the SECI model for organizational knowledge creation, which is based on the theory of tacit and explicit knowledge by Polányi (Polanyi, 1962). Tacit knowledge is hidden knowledge: it cannot be expressed or codified accurately, rather, it is detectable in skills, abilities, and intuition. On the contrary, explicit knowledge is easy to codify, document, store, retrieve, or transfer.

Figure 7 The SECI model of organizational knowledge creation



Source: Nonaka et al. (2008), own editing

Looking at any digital competence framework introduced above, we can conclude, that in most of the learning situations of building organizational digital competence, tacit knowledge is involved. For example: how to design an online class, how to best collaborate with colleagues online, how to set up the digital infrastructure of the school to best utilize it? Answers to these questions are present in a school community, however, these answers are not evident, or unanimous and are often a product of a common definition. They are discussed in coffee breaks, at meetings, shown by mentors, and learned by shadowing colleagues. As a result of these social interactions, knowledge in organizations is not only reflected in documents or repositories, but is incorporated into organizational routines, processes, practices, and norms (Davenport & Prusak, 1998), as other explicit and tacit ways of organizational knowing.

To foster knowledge-sharing practices four dimensions need to be taken care of: 1) Do we know what we know? (knowledge dimension), 2) Can we access what we know in a sufficiently

timely fashion? (access dimension), 3) Do we effectively engage with each other in problem-solving (engagement dimension), 4) How do we promote safety in relationships? (safety dimension). These questions can be answered with management actions; however, strong professional communities are natural forms to build knowledge sharing across these dimensions. Communities of practice (CoP), which are groups of people informally bound together by shared expertise and passion for a joint enterprise (Wenger & Snyder, 2000, p. 139), are great networks to develop competence, to build and exchange knowledge. Although these are autonomous groups with voluntary participation, they will benefit if the management enables the cultivation of such communities. This would mean, 1) identifying active, innovative colleagues of the school (who are maybe specifically interested in digitalization) and who seem to form a spontaneous learning community, 2) providing infrastructure (time, space, and money) to make up for legitimate organizational status and to ensure them of the school's support, and 3) using non-traditional methods to measure value, by, for example, listening to praising words from colleagues, or looking at media coverages or awards, members of the community earned as a result of participating.

Another widely known way of fostering tacit knowledge-sharing activities that are close to the culture of an educational institution is mentoring. In Hungary, there are even dedicated post-gradual courses for teachers (mentor-teacher specialized training), that can be a prerequisite qualification to a higher rank in the teacher career model. The English-language academic literature on teacher mentoring has grown mainly since the 80-es (Feiman-Nemser, 1996). Egan (as cited in DeBolt, 1992, p. 40) describes the mentoring process with the availability and approachability of the senior educator, where the nature of the support is manifold: technical support, career advice, and psychological support. This happens in an informal way, through observation and feedback, discussions, and planning together. Even though the nature of knowledge sharing is informal, the relationship, the existence of a school's teacher-mentoring program is usually, to some extent, organized.

When we look at organizational learning, we can not only analyse the type of knowledge (tacit or explicit) but the type of learning situation. Based on Marsick and Watkins (2015, pp. 12-13.) we can define three types of learning. *Formal learning* is typically institutional, classroom-based, and highly structured. *Informal learning*, although it might be institutionally organized, is usually not classroom-based nor structured and it is autonomous. The third category, as a subcategory to informal learning, is *incidental learning* which is a byproduct of different activities, such as interactions with other people, with the organizational culture, trial-and-error

activities, learning from mistakes, or even formal learning situations. While informal learning can be fostered directly by management practices, in the case of incidental learning it is quite hard to do so. Incidental learning is often not even realized by the learner. Thus, although informal and incidental learning are similar, in the sense that they happen casually without significant structures or design, and they both need focused attention to identify learning, incidental learning requires a more profound reflection to utilize.

Marsick and Watkins (2015) point our attention to the importance of such learning situations, however, consciously fostering socialization, CoPs, mentoring, or incidental learning, raises the dilemma, of how to do so without overdesigning and tarnishing the naturalness, motivation, and joy of learning. It is hard and maybe even foolish to learn the ethics of videoconferencing with the school faculty or the social mechanisms of different online platforms, where teachers are present with students, in a formal learning environment. An empirical study by Barton and Dexter (2020) concluded similarly the roles of formal and informal learning. Research showed that formal learning serves as a baseline, however informal and independent learning is essential to master self-efficacy regarding digital tools. The authors suggest, therefore, hybrid formulas of competence building, training, and programmes that are leader-initiated but teacher-led.

The above literature highlights the role of informal learning situations that are challenging to make visible, operationalize, measure, and assess by the school management (Watkins et al., 2018). Different types of informal learning ties support different types of organizational learning (Schreurs et al., 2019), therefore, it is essential to understand these processes better to utilize this kind of knowing as well.

If we accept, that most digital organizational competence seems to be built on tacit knowledge gained in informal and incidental learning situations, we must logically assume, that this kind of organizational competence and knowing is unbounded by the school walls.

Dispersed nature of knowledge

The work of Trust and colleagues (Trust et al., 2016) examines professional learning networks (PLN) that can be defined as a "system of interpersonal connections and resources that support informal learning" (p. 16). These PLNs are often mentioned in connection with online platforms as the housing "system". According to the authors, online spaces have a positive impact on participants' learning and draw attention to the high level of compliance of these platforms with teacher needs. Research also points out that a significant proportion of learning does not take

place within the school, or with direct colleagues. Moreover, some teachers use these online networks as an "escape" from routine work. In many cases, teachers are not even in contact with other teachers, but with professionals of different backgrounds, enriching their schools' knowledge with heterogeneous elements. Another important aspect of PLN learning is that its platforms are mostly social sites (e.g., Twitter, Facebook) (Trust et al., 2016), mixing personal and professional 'living spaces'. Also, during the COVID-19-pandemic-triggered distance education, teachers got the most help from online platforms besides the help from their colleagues (N. Kollár, 2021). As virtual interpersonal networks can not only complement but to some extent replace direct colleague relationships in the learning processes as well (Baksa & Drótos, 2018), it is necessary to examine where the knowledge comes from, how can these streams be better channelled into the school organization.

Meaning defined by the community

Digitalization of operational and pedagogical practices is likely to be interpreted differently for different schools and their teacher communities. When individual knowledge becomes a building block of organizational competence, the meaning of this knowledge becomes redefined by the community of teachers, staff, students, and parents, who are all interacting with digital platforms and tools used in the school. It might be understood as good or evil, necessary or unnecessary, connected to equipment and tools or skills and knowledge, to pedagogy or operation as well. A community's understanding of attitude to the concept will determine what kind and depth of learning the community is ready to immerse itself in.

The management of the school is a key actor in this meaning-making process; as management literature points out "management of meaning" is one of the main tasks of a leader (Gelei, 2006; Riehl, 2000). This role is significant, as not all members of an organization can form and influence organizational meanings: members with organizational power are the ones in the position to influence meanings; and those who are able to form interpretations of the community's reality, are the ones who are likely to become leaders (Gelei, 2006). On the other hand, there are more bottom-up explanations of meaning-making. Orton (2002) emphasizes that only the meaning, emerging from the lower hierarchy levels, can be picked up and accepted collectively. The question of this bidirectional concept of organizational meaning-making is also relevant to explore within the research.

In Hungary during the first wave of the pandemic in 2020, there were reports about schools that were unable to build distance education on digital foundations because of the families' lack of readiness and sufficient digital infrastructure at home. Thus, mostly traditional non-digital means of education were used to deliver education and to communicate. In these cases, the digital competence of the school was defined by the needs and capacities of students and their families; it was not a matter of the school's learning capability and positive understanding of technology. The sufficient level of digital competence in the field of pedagogy was set by the circumstances and schools, rightly, adapted to that.

However, the demand for improving digital operational processes in schools seems less dependent on the external expectations of families. It comes from the internal stakeholders' expectations: from teachers. Expectations from the maintainer and education policy also form organizational operation practices, but genuine readiness for applying technology or for innovation is in the hands of the school community itself.

The interplay of society and technology

Engagement with digitalization, new technologies, and tools does not only depend on the level of the learning capacity of an organization but on the openness of the school faculty to get to know and use these in their day-to-day work. Technology acceptance models try to point to the connections and causalities, in what makes individuals want to learn and apply specific technologies. The Technology Acceptance Model (Davis, 1989) emphasizes perceived usefulness and perceived ease of use of certain technologies as the most important factors leading to usage. Technology Readiness Index (Kreijns et al., 2013) uses the dimensions of optimism, insecurity, innovativeness, and discomfort to predict the level of digital openness. The Integrative Model of Behaviour Prediction (Parasuraman & Colby, 2015) describes a complex model of connections, where the usage of a specific technology is determined by the actual knowledge and skills of the technology, the current environmental affordances, and constraints and the personal intention, the latter influenced by attitude, subjective norm, and level of self-efficacy.

However, when we use an interpretative approach to the interplay of users and technology, instead of causal relationships, users' understandings and perceptions of these relations are in focus. These help to understand the background of these causal relationships suggested by the above models. As technologies and connected tools change, our frameworks to talk and think

about technology change with them. An example of this is the shift from using the term ICT to the more complex concept of digital competence in education. The very definition of digital competence is also subject to this constant change. On the one hand, as technology improves and more features and possibilities arise, the needed competence to use these will change too. For example, we have experienced quite a change regarding data security or the ethics of online privacy, as well as regarding forms of online communication. On the other hand, as generations grow older and longer we live in a digital age, and certain competence elements become more self-evident, therefore meaningless and invisible.

In the near past, the world has experienced some external forcing factors, however, that urged schools to adapt faster. In the next part of this overview, the concept of crisis-induced learning is introduced to extend the initial general approach to schools' organizational digital learning to our currently relevant external context.

1.7.4. Crisis learning

Public education is one of the most affected fields by the coronavirus all over the world, thus, when I discuss digital organizational learning, I cannot dismiss this rare event (Lampel et al., 2009) from my research. Most of the schools and the teachers had only days to start distance education, which, seemingly, most of them were not ready for. Teachers started using tools they had never heard of before, and set up a knowledge-sharing community of more than 70,000 members on Facebook over one weekend. Many taught each other on online platforms and in the local school communities to cope with the new situation for their students.

Several complications arise, which will make the effects of the crisis felt for some time to come. What happened exactly during this period? What learnings will stay and what will go? Will schools be able to incorporate into their day-to-day operations the new practices, knowledge, and competence they have created, explored, and shared in the past year? The intersection of the literature on organizational learning and crisis management can provide invaluable insight to comprehend the current happenings and direct us to meaningful research.

A great amount of academic literature about the connections of organizational learning and crisis management were written around the great financial crisis of 2008, inspired also by other recent previous business scandals (e.g., the Enron scandal), environmental disasters, epidemic or social and technological crises (Beck & Plowman, 2009; Deverell, 2009; Elliott, 2009; Lampel et al., 2009; Moynihan, 2008, 2009; Smith & Elliott, 2007; Starbuck, 2009; Wang,

2008). There are related topics and themes that by expanding the definition of the phenomenon allow wider understanding, like *dynamic capabilities, ambidexterity* and *absorptive capacity* (Antonacopoulou & Sheaffer, 2014), or *organizational resilience* (Smith & Elliott, 2007).

A crisis is a state of an organization when the current situation challenges the organization's basic assumptions and goals and threatens its operation, and even survival. Crisis brings time pressure without any tried and tested coping mechanisms available, in a very ambiguous environment (Antonacopoulou & Sheaffer, 2014). I accept this definition for the purposes of my research. While crisis is defined similarly across the literature, the concept of learning and its connection to crisis has different conceptual interpretations.

A modernist approach to learning can be viewed as the *identification and the embedding of practices and behaviors* (Moynihan, 2008, p. 352). In connection to crises, we can talk about learning as crisis-induced learning ("lesson-drawing processes" triggered by crisis) (Deverell, 2009, p. 180), or can be categorized as intercrisis ("learning from one crisis to prepare for another") or intracrisis ("learning that seeks to improve response during a single crisis episode") learning (Moynihan, 2009, p. 189). This approach sees crisis as change, as an external impact affecting the organizational equilibrium. In a postmodernist view, learning can be understood as the movement from the known to the unknown (Antonacopoulou & Sheaffer, 2014). This view describes *learning within the crisis*. Antonacopoulou and Sheaffer defy the separating approach and promote a dynamic view of learning. This approach embraces crisis and sees it as a natural event of continuous change. Thus, learning *from* a crisis or a failure is not as clear-cut, as assumed. Authors even suggest, that "understanding the dynamics of learning and crisis may reveal, *why* critical incidents may be perceived as crises in the first place" (p. 6).

When we look at the current case of distance digital education, the latter concept can offer special insights into the phenomenon. It helps to understand the processes that lead to interpreting the situation as a crisis. What is the subject of crisis exactly? Why is it perceived as a crisis? What happened inside and outside of the organization that made this condition critical? Why was this crisis a natural event in the course of change?

In this approach, a deficiency of digital competence was already building within the Hungarian education system. The instant need for distance education only erupted a digital crisis within schools because they were not ready for it. At least most of them. Naturally, if we holistically look at the issue, we can see that shortcomings in digital competence were only a part of the crisis impacting schools, students, and their families, however, in my research, I will focus only on this partial aspect.

Both learning blocking and fostering aspects of crisis have been observed in empirical studies (Deverell, 2009). Both sides of this academic discourse highlight the value of learning in and from a crisis. According to Christianson and colleagues (2009) rare events trigger learning in three ways: 1) rare events act as audits of existing response repertoires, 2) disrupt and foster the reorganization of organizing routines, and 3) redirect organizational identity. Similarly, it is suggested that crisis experience is helpful in new crisis encounters (Moynihan, 2008), by improving understanding of latent, previously hidden flaws (Robin et al., 2019), consequently, it "broadens the scope of action and builds confidence in experimenting with new ways of thinking, acting, and learning" (Antonacopoulou & Sheaffer, 2014, p. 16). Crisis also creates a *learning space* that cultivates networks and trans-sectorial partnerships (Robin et al., 2019) and the involvement of external experts (Broekema et al., 2018), enabling the procurement of significant outside-organization knowledge and the creation of knowledge synergies.

Several factors hinder or block learning. Moynihan (2008, p. 351) lists the following:

- The high consequentiality of crises makes trial-and-error learning prohibitive.
- Crises require inter-organizational rather than organizational learning.
- There is a lack of relevant experience, heuristics, SOPs, or technologies to draw on.
- The scope of learning required is greater than for routine situations.
- The ambiguity of previous experience gives rise to faulty lesson drawings.
- Crises narrow focus and limit information processing.
- Rigidity of response: actors recycle old solutions to new problems.
- Political dynamics give rise to bargaining and suboptimal decisions.
- Crises provoke defensive postures and denial of the problem, responsibility, or error.
- Crises provoke opportunism as actors focus on their positive role.

Besides learning and *not* learning in crisis, we can also talk about *unlearning* in crisis. First, prior routines must be unlearned to give way for practices adequate in the crisis. Then, however, a great part of these new practices, knowledge, network relationships, etc. get unlearned as well (Robin et al., 2019).

In case new practices and mindsets get established concerning digitalization in the school as an outcome of the crisis, these new learnings might not be the right learnings or need further adaptation. However, the initial adaptation of new technologies and practices determines how they will be present in the organization in the long term. This initial period is the *window of opportunity:* organization members view the new technology, tools, and practices as distinct

artefacts that are still flexible. Later, these get obscured by becoming parts of a complex system, and the habitual behaviours will sustain them, as they are (Tyre et al., 2016). Thus, there is a great responsibility for school leaders and the school community, to review these (mostly) rapidly implemented new educational and operational practices and behaviours.

Generally, public organizations and institutions, such as schools and the education system, experience long periods of stability or incremental change. When these get interrupted by crises, they create opportunities for major change (Broekema et al., 2017). The nature of change itself, however, must be explored.

According to the model of Lampel and colleagues (2009) in Table 1, learning that takes place in a school as a result of the crisis is fundamentally influenced by two factors: the extent of the impact and the perceived potential relevance of the event. *Transformative* learning, which we can view as double-loop learning, can occur when both levels are high. A current example of this is that the day-to-day operation of a school is completely transformed by the need to provide education online (degree of impact), but it also recognizes a lack of digital competence and knowledge about digital tools supporting school operation as a development point independently from the crisis itself (perceived relevance).

Table 1 Types of learning in crisis

	POTENTIAL IMPACT	
POTENTIAL RELEVANCE	High	Low
High	Transformative	Reinterpretative
Low	Focusing	Transitory

Source: Lampel et al. (2009, p. 839), own editing

We could assume a high level of both factors, considering the present circumstances. However, if we take a closer look at the situation, we may find that in some schools the degree of perceived relevance of the case is not evident. Here I give some examples that I hypothesized in the planning phase of the research.

On the one hand, as the level of digital competence in several schools is variable or low, and its development is not a strategic goal, the situation is assessed as a temporary emergency in which

ICT tools *have to be* used. The other reason seems to stem from the situation of students and parents. As for many, due to the socio-economic background of many families, the use of digital tools and online platforms is scarce and superficial, and the depth of digital knowledge is significantly lower, there is no real need to improve digitalization more widely in education or cooperation.

Thus, if learning is stimulated by the large-scale impact of the crisis, then it happens in a *focused* way: to solve a particular problem that arises at a specific time and place. The emergence of intra-crisis learning is thus limited, and intercrisis learning is unlikely.

The perceived impact of the crisis may be lower in schools where significant knowledge and experience of digital education is at hand. This can help to learn, but due to the presence of the needed competence, only the re-examination of educational and organizational practice occurs (*reinterpretation*) or only point-like, *transitory* learning takes place, without systematic transformation.

I.8. Research methods

In my doctoral research, I investigate schools, with different maintainers (Ministry of Human Capacities, Ministry for Innovation and Technology and church) from ISCED1 to ISCED3 to cover a variety of educational contexts. The research was carried out in collaboration with the Hungarian-Netherlands School of Educational Management (Hungarian abbreviation: KÖVI). KÖVI was operating as an organizational unit of the University of Szeged, and its main goal for more than 20 years was to contribute to the enrichment of school leadership and organizational development in Hungary. Accordingly, the institution offered several courses for aspiring and current school leaders, as well as conducted research on its field of expertise, and carried out organizational development projects.

With my doctoral project, I joined the Learning organization research in the South Great Plain region of Hungary. The research was first carried out in 2015 and was repeated in 2020. In this second data collection period, I involved questions pointing to the digital competence of the school, with the notion of gaining some insights into digital competence and their connection to learning organizational operation. Even though I decided not to include the preliminary results of the quantitative research directly in my doctoral project, they reinforced that the relationship between organizational learning and digital competence is worth investigating further (see Kersánszki et al., 2021).

KÖVI was closed at the end of the academic year in 2021, as a result of a reorganization measure at the university. As the aforementioned research project got cancelled too, I had to redesign the frame of the research methodology, according to now more limited resources.

In the ensuing chapter, I aim to introduce the basis of my empirical research. While the research methodology of this dissertation is detailed in all the included articles, I consider it important to present the methodological system and principles of doctoral research in a comprehensive way. In this way, the interrelationship of the studies is recognizable and easier to follow for the readers.

1.8.1. Conceptual paper

Yadav (2010) promotes conceptual papers as a widely acknowledged genre in social sciences and warns about their decreasing numbers despite their essential function in academic progress. In my doctoral dissertation, in Section II., I apply this scientific approach to utilise one of its multifaceted roles that allows the author to foster knowledge development and strategies for theory development (Yadav, 2010).

According to Gilson's and Goldberg's guidelines (2015), *"beyond summarizing recent research, manuscripts should provide an integration of literatures, offer an integrated framework, provide value added, and highlight directions for future inquiry"* (p. 127). A strong conceptual piece should start with a brief overview of the field's current state, including what is known, its historical context, and unexplored areas. The review section should be concise, with the paper quickly transitioning to an in-depth exploration of a specific theoretical aspect.

Papers of this tradition do not aim to provide comprehensive literature reviews or create entirely new theories. Instead, they seek to offer fresh insights into relationships and associations among key concepts, enhancing our understanding of the central constructs. Visual aids, such as figures, are highly recommended, as they help readers grasp typologies and relationships in these papers, bridging theory and review (L. L. Gilson & Goldberg, 2015).

Conceptual paper as a methodology has its equivalent tools to empirical research (Jaakkola, 2020). Instead of theoretical framing the theories and concepts used to generate novel insights need to be chosen. The choice of theories and concepts analysed will act as our data. The unit of analysis will be exchanged by the chosen perspective, or the level(s) of analysis or aggregation. Key concepts to be analysed or used to analyse a phenomenon will act as our

variables. The way we translate our target phenomenon in conceptual language, and define key concepts is similar to the operationalization of our research, such as using scales and measures. The integration of concepts and argumentative quality of the paper can be compared to the approach of data analysis.

Jaakkola (2020) names four main types of conceptual papers: theory synthesis, theory adaptation, typology, and model. The approach applied in the first article, in Section II., builds mostly on the template of theory adaptation. Typically, this approach seeks to change the scope or perspective of an established theory by enriching it with insights from other theories or perspectives with the goal of 1) revising current understanding, 2) problematising an existing theory or concept and resolving identified dilemmas by introducing a new theoretical lens, 3) expanding the application domain of an existing theory or concept by introducing a new theoretical lens, or 4) identifying new dimensions of an established construct by introducing a new theoretical lens (p. 22). The below article comprises mostly the last two goals, by applying and combining institutional and organizational theories with the perspectives of education and digitalisation.

1.8.2. Qualitative research

Qualitative research is diverse both in terms of its philosophical background and methodological practices. Accordingly, it has numerous definitions across research traditions. Denzin and Lincoln (Denzin & Lincoln, 2011) describe qualitative research as "a set of interpretive, material practices, that make the world visible", and where "researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them" (p. 3). I chose this interpretation, as it corresponds with my paradigmatic stance as well as with my research goals. The outcomes of the qualitative research undertaken in my doctoral project are displayed in Sections III. and IV.

Premises of interpretive qualitative research do not only impact practices and settings but question the very role of the researcher. They deny the illusion of positivist traditions, that the researcher can be independent of the subject of study. As Holloway and Biley (2011) write, "we are also part of what is being studied. How much we should be part of it is a question both interesting and problematic" (p. 971). In qualitative research, my duty as a researcher is to keep 'empathic neutrality': to avoid obvious, conscious or systematic bias, that can appear during the collection, interpretation, and presentation of data (Ormston et al., 2013), while

acknowledging that it is never fully possible. This makes the reflexive practices of the researchers inevitable, which, if carried out consciously and systematically, are the pledge of validity.

As a summary of the above, we can conclude that each qualitative research is as unique as the case or as the researcher himself or herself. As Maxwell (1996) notes, qualitative research is more a "do-it-yourself" than an "off-the-shelf" solution, which requires not only the careful design of the specific elements of the research design but a continuous interaction and adaptation among those elements. Consequently, the research design is an interconnected, flexible systemic structure.

1.8.3. Case study methodology

To provide a rich description of the researched phenomena I have chosen to apply the case study approach of qualitative inquiry. Based on Stake (1995) we use the framework of case study methodology if we wish to uncover unique attributes of a specific, complex unit or system. It allows one to build a theory or gain a better understanding of the local context (Marshall & Rossman, 1989; Yin, 2009). As Maaløe (2004)suggests, the case study research method gives the chance to trace links between discrete happenings and to understand how and why a certain chain of events may be released. Although learnings of one case study are not fit for generalization, the higher the more detailed description of the case's uniqueness is, the more it can add to and be fitted to previous experiences. Thus, generalization happens through emerging new understandings by combining previous personal and vicarious knowledge and new learnings (Stake, 1994).

Stake (1995) differentiates three groups of case studies. (1) Intrinsic case studies focus on deep understanding; this is the sole purpose of the research. The (2) instrumental case studies differ from the previous one in that the aim of gaining understanding is to utilize that knowledge, for instance, to understand a wider problem. The last type is represented by the (3) collective case study, which is in fact instrumental research that has not only one but also several subjects, where the relationship between the knowledge gained from each subject is important.

I have chosen to apply the case study approach as the empirical data collection strategy of my research. The instrumental case study methodology can help me tell a story, and present a rich descriptive report about the development of the organizational phenomenon of organizational learning and digital competence development in the rare event of the COVID-19 pandemic. It

offers the frames to dive deep and with the aim of understanding, while at the same time, it allows the formulations of generalized suggestions by noting and acknowledging the uniqueness of the cases.

1.8.4. Research process and schedule

The research was conducted in two main phases (Table 2). After the necessary preparations, such as an extensive literature review on the field, initial research to inform sampling, and contacting possible research participants. The research opportunity was offered to a handful of schools fitting the sampling criteria described in detail in Section 1.8.5.

The first phase was carried out in the spring of the school year 2020/21. As the pandemic situation did not allow on-site research, the initial research measures will include techniques that are appropriate for online research. Accordingly, I started with document analysis; I collected relevant school documents, asked schools to complete a SELFIE tool fill-out, and reviewed previous SELFIE, DNR and Learning Organization reports as well. See the summary of the reviewed documents in Appendix I. These documents were included in the reports provided to the schools, however, did not directly provide data for the studies resulting from my doctoral research, as these served as input for the preparation of the research tools, such as the interviews and the on-site observations.

The second phase built on the results of the previous phase and started at the end of the summer vacation. Timely cooperation with the schools enabled the next round of data collection to start at the beginning of the 2021/22 school year, however, due to the COVID-19 pandemic two schools decided to push the observation periods to the spring semester. As a result, observations happened in two different periods, delaying the research and the possible beginning of comprehensive data analysis by almost a whole school year.

A third phase (about lasting outcomes of crisis learning) was cut from the original research plan due to the extensive delay caused by school shutdowns and precaution measures issued in the participating schools. After reviewing the collected data and the original research goals, and considering school engagement, I have decided to conclude the data collection at the end of phase two. This was possible, as in the first two phases, thanks to the openness and cooperative attitude of the participating schools, I managed to collect a large amount of rich qualitative data. To see the summary of data collection and collaboration with the research participants, please see Appendix I.

Table 2 Research schedule

Phase	**Activity**	**Schedule**
Preparation	Literature review, publication planning (Article 1)	2021 April-May
	Sampling	2021 April-May
	Project planning arrangements with the participating schools	2021 May w1-2
Phase 1	Document and platform analysis	2021 May w3-4
	SELFIE (measurement tool) fill-out	2021 May w3-4
	Research methodology planning	2021 May w3-4
	Interviews	2021 June - August
	Data analysis, preparing school reports	2021 August - October
Phase 2	Observation	2021 September – October; 2022 April - May
	Data analysis, publication planning	2021 October-November
Publishing	Digital future (Article 1)	2022 March - 2023 June (submitted 2022 October)
	Perception of digitalization (Article 2)	2022 September - 2023 December (submitted 2023 April)
	Crisis learning (Article 3)	2023 February - 2024 (submitted 2023 September)

Source: own editing

In the following subsections, I will delineate the main steps and methodological decisions listed in the research schedule.

1.8.5. Sampling

While designing a case study, sampling strategy is one of the most important decision points. Qualitative research uses small samples characteristically. Sampling is purposive, iterative (by

setting boundaries but keeping a frame for adjustments), and theory-driven (Huberman & Miles, 1994). Miles and Huberman (1994, p. 28) provide a typology of sampling based on the purpose of the study.

Consequently, the chosen schools had to conform to certain criteria regarding organizational digital competence and operative aspects. Accepting the above typology, sampling should be *intensity* based and, as I wish to investigate 3-5 schools, *stratified purposeful* sampling, along different ISCED levels and maintainers, can enable drawing learnings from comparison.

Operative criteria: The chosen schools come from the network of KÖVI. Apart from the convenience of approachability, this choice is reasonable, as the connection with KÖVI is accounted as an attribute of continuous and conscious organizational or managerial learning. Furthermore, the school management engaged in carrying out a development project in the field of organizational digital competence was open to offer the data of the development project, to provide additional information and access to its online platforms, as well as the opportunity for on-site observation.

Intensity criteria: In the research sample, I wished to include schools that are homes of good practices when it comes to organizational digital improvement. Thus, there needed to be some examples of digital project involvement, and organizational digitalization initiatives in the previous two years that have been perceived by the school community as beneficial or innovative. The school did not have to show the highest level of digital competence, but improvement processes had to be already in place.

Stratifying criteria: To be able to express overarching learnings of the investigated cases, the sample had to be both similar and different along certain characteristics. The stage of organizational digitalization and the connected competence to utilize it can be influenced by many factors, such as socioeconomic background, the nature of the CoP of the school community, the financial background to provide the infrastructure, network connectedness, and so forth. One of the chosen varying attributes of the sample is the maintaining institution (Ministry of Human Resources, Ministry of Innovation and Technology, church). Because of Hungarian education policies, schools with different maintainers have different grades of professional, ideological, and financial freedom, which might impact schools' digital innovativeness and their means of it. Although the type of institution maintaining is not in the focus of the research, it provides a currently relevant additional lens to the research. As another varying attribute, I involved schools from different ISCED levels, primary and secondary schools as well. Impacts of further

attributes of the schools, such as the type of the settlement (village, small town, big town, capital), socio-economical context, and network-connectedness did not serve as sampling criteria but are reported in the papers.

1.8.6. Entry strategy and collaboration

Being involved with KÖVI, I had the opportunity to offer an organization development project focusing on the development of organizational digital competence for schools within KÖVI's network. The offer included 1) the production of a diagnosis, analysing the current state and underlying patterns, and 2) the facilitation of digital competence strategy-building workshops. The research and development projects were handled separately. As a developer, I agreed to provide them with tangible, and actionable knowledge about their digital competence, and as a researcher, I asked for extended means and time to access the school's colleagues, systems, and platforms. As a result of the development project, I produced one report for each of the schools at the end of the first phase (excluded from this document due to ethical and methodological considerations), however further steps (feedback presentation, workshop) were only pursued by two schools, presumably due to the disturbances caused by the pandemic. Within the research project, schools were cooperative and proactive in providing me with the necessary access.

1.8.7. Data collection and analysis

Types of data collection techniques in qualitative research should be multiple and diverse (Yin, 2009). The length and depth of the research events need to be ensured to reach data saturation (Lincoln & Guba, 1985), and to be able to capture both formal and informal, explicit and tacit learning processes within the school organization. Data collection has to support the answering of the research questions and sub-questions, for which purpose I have selected the following tools and data types:

- *Digital competence measurement tools:* The SELFIE tool, as introduced previously, is an online measurement tool, designed by the EC to support the self-evaluation and self-improvement of schools in their digital competence. This tool was not considered as a central means of data collection, but rather one that 1) informs qualitative investigation

uncovering the research questions, and 2) serves as an organizational development tool for the participating schools.

I have chosen a pre-existing tool instead of designing a unique questionnaire for the purposes of the research, because the tool is professionally designed, academically proven (Costa et al., 2021), and is already widely used by Hungarian schools. Moreover, in the case of dissemination, the results of the tool are easily interpretable in other schools and countries too, due to its renown. Accordingly, schools could be easily persuaded to complete the surveys, moreover, some schools had previous results, expanding the data at hand. The function of the survey results was helpful in identifying the current level of organizational digital competence based on the evaluation of school leaders, teachers, and students, to design the interviews the most effectively. The results of the surveys signalled possible promising fields of deeper inquiry and provided context for understanding organizational learning processes.

Two of the participating schools provided their DNR results as well, which was not originally part of the data collection design, but they gave a significantly deeper look into specific dimensions of digital competence. However, as the secondary data collection was not consistent throughout all the participating schools, I have only used the report to inform my research, not to provide data.

It is also important to note, that none of these reports are viable for case comparisons on factual digital competence levels, as these tools, although carrying quantitative data, are self-evaluations. However, they helped me to increase my understanding greatly about the self-image of schools, how the COVID-19 pandemic influenced this image, and how this image is consistent with the organizational culture.

- *Individual and focus group interviews:* The altogether 24 interviews, which make up more than 34 hours of audio material (Appendix II.), followed the subtopics (1) organizational learning, 2) digital competence, 3) crisis learning and its outcomes) of the research; thus, they represent one of the methodological pillars of the research. The sampling of interview participants happened purposively, covering colleagues in diverse positions, experiences, ages, and subject backgrounds. Participating teachers were recruited with different levels of digital competence to avoid painting biased or wishful pictures of the organizations. Because of the time and resource constraints of the doctoral research, I decided not to include students, parents, or external stakeholders

and partners of the schools, however, their inclusion is a vital direction for further research.

Individual interviews in the research served the understanding of managerial perceptions and those, that cannot be captured in unison with teachers' perspectives. Thus, these involved school principals and vice-principals extended by administrative staff representatives. Interviews were designed to be semi-structured. As the doctoral research investigates organizational learning, I decided to carry out focus group interviews, enabling the uncovering of the nature of interactions and the clash of opinions, perceptions, and individual stories that individual interviews could not. This also permitted the involvement of a wider population of the chosen schools, promising a more comprehensive overview of organizational learning dynamics. The summary of the interviews can be found in Appendix II.

- *Observation:* Observation, as the second main pillar of data collection, is to provide genuine experiences for the researcher to see the schools' learning processes in their everyday flow. It is an essential methodological tool, enabling to discovery of blind spots and hidden areas of the Johari window (Luft & Ingham, 1961) that cannot be uncovered by mere inquiry. This dedicated time spent in the life of the organization included class visits, meeting observations, inspection of the school building, as well as informal discussions with the school staff. Observation is an ethnographic technique that helps us to study and understand people in their natural settings, providing an insider's view of our findings (Baker, 2006). The researcher's role can vary very widely in an observing position. I chose to apply an approach that allows a moderately close connection to the school organizations. In the literature, this would match with the *observer-as-participant* (Baker, 2006), or the *research as an explicit role* (Easterby-Smith et al., 2002) approaches. While this role is still highly research-oriented, it allows interaction and becoming known to school members. The research itself was arranged with the knowledge and support of the management, and transparent to other members of the organization. The advantages of this approach are, that by entering an interactive relationship, school colleagues might become more trustful and open to sharing informal information, while no permanent attachments are forming (Baker, 2006), and ethical issues stemming from hiding information from research participants, or closer relationships with co-workers can be avoided (Vinten, 1994).

- *Field notes:* Field notes are essential elements of accurate qualitative (Phillippi & Lauderdale, 2018). It aims to bolster the construction of thick, rich descriptions of the study context and the research event (interview, focus group, and other encounters). Notes mostly include a description of the setting, participants, interviews, and critical reflection. In the research, field notes were attached to interviews, and observation events and were collecting my thoughts and feelings after a school visit.

For data analysis, I used the NVivo software. NVivo offers users the capability to execute a range of qualitative analysis functions on the platform. These functions encompass organizing and refining raw data, uncovering and constructing associations between data elements, defining themes and categories for data, visualizing the outcomes of data analysis, and generating reports (Phillips & Lu, 2018). As I have been handling an extensive amount of interview data, the software helped me to follow a proper coding process and an easy overlook of the process and the results. The coding process is described and integrated in the methodological sections of the included articles below.

1.8.8. Validity, reliability, and generalizability

Due to special characteristics of qualitative research validity, reliability and generalizability cannot be understood and granted in a positivist sense, thus requiring a distinct definitional framework and practices.

Miles and Huberman (1994, pp. 278-280) list five aspects of ensuring the quality of qualitative research. In the following lines, I will list and explain these and present implications for my research.

1) *Objectivity/confirmability* means relative neutrality, elimination of hidden researcher bias, and explicitness about biases that cannot be set aside by the researcher. To address this concern, the research notes were an invaluable tool in making my dilemmas and biases available for reflection during the data analysis. The identified prejudices and preferences are not only an important part of presenting the research results in an objective way but to considering and checking them during the data collection process to prevent reoccurring misinterpretations over the different research phases and research events.

2) *Reliability/dependability/auditability* is investigated to ensure the process of the research is consistent, and reasonably stable over time and across researchers and methods. As different schools had different focuses in their learning history and goals, as well as different operational characteristics, etc., some parts and focuses of the different methodological tools varied among the cases (e.g., order of interview questions and segments, weighting of interview topics; types and processes of observation situations), while the main framework remained unchanged. It is not a violation of scientific investigation, on the contrary: the underlying qualitative, interpretative philosophy of the research demands Iterative and tailored measures.

3) *Internal validity/credibility/authenticity* means the truth-value, reasonability, and authenticity of the findings. I aimed to grant these criteria by validating my findings with the research participants. All five schools received a report after the first phase. The feedback I received was supportive of the written observations. As I am involved with a wider team of organization developers and researchers within KÖVI, who have previous experiences with each school, I had the opportunity to exercise peer-check episodes in the data analysis stages as well.

4) *External validity/transferability/fittingness* implies the transferability of conclusions and assesses their impact on and connection to previous knowledge in the field. The premise of external validity and fittingness is supported by the extensive literature review prepared in the first phase of the research that was further extended with each paper. The case study methodology itself does not provide explicit generalizability, however, it is the goal of the present research. Findings are descriptive, without a normative agenda, exhibiting genuine workings of the designated phenomena; they offer the prospect of forming transferable learnings.

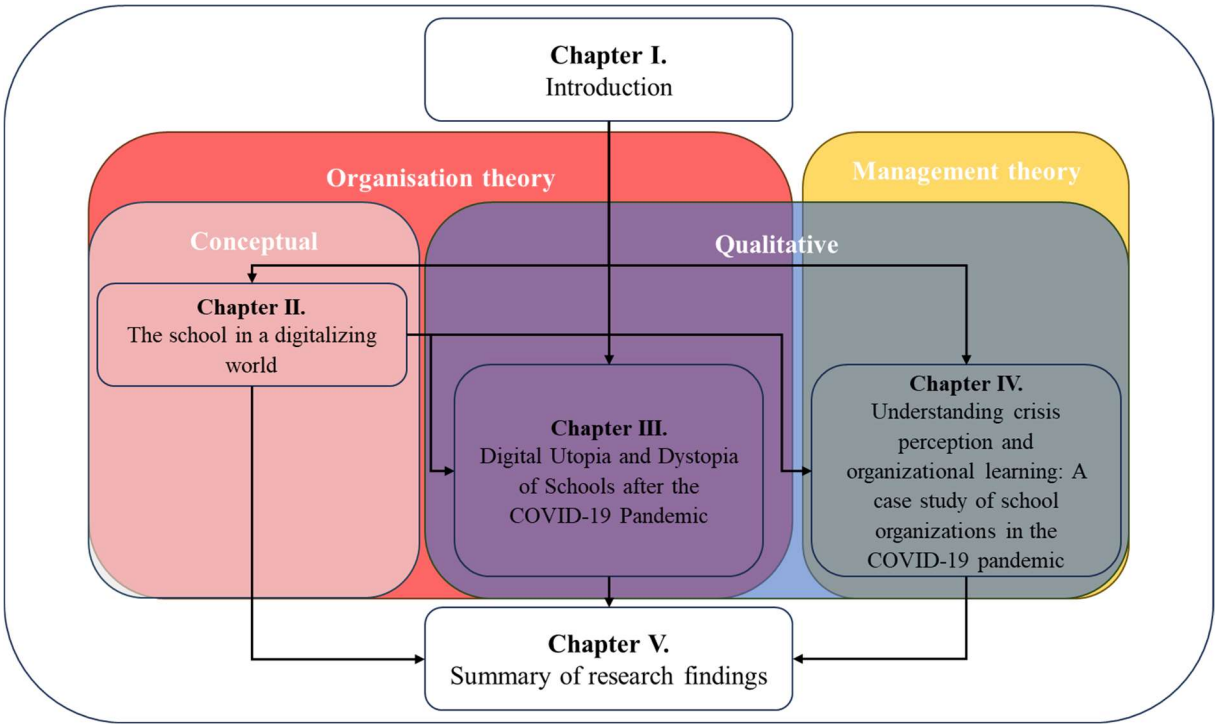
5) *Utilization/application/action* orientation represents the pragmatic value of the research and its applicability. As stated in my research goals and detectable in the research design, my objective was to create value throughout the research process for the participating schools and aim to generate knowledge not only for the utilization of educational management but for the wider traditions of organizational learning, change, and crisis management as well.

Additionally, the research project followed the British Educational Research Association [BERA] Ethical Guidelines (2018) and was approved by the doctoral school.

I.9. Structure of the dissertation

In the introduction of my dissertation, I defined my field of research and presented the research questions and research goals. The paradigmatic stance and methods used in my doctoral research were also discussed. The subsequent chapters of my dissertation demonstrate my findings in three interconnected sub-topics of school digitalisation and are thus based on already published research papers or papers under the publication process. Chapter II discusses the complex interplay between institutional pressures, organizational learning processes in a digitalising world, and the resulting transformations in educational institutions through an interdisciplinary lens. Chapter III applied a utopian-dystopian theoretic approach to explore sociotechnical imaginaries of schools. Chapter IV presents factors influencing the learning paths of schools in a crisis focusing on digital competence building. Finally, Chapter V contains a brief outline of new scientific results. The structure of my doctoral dissertation is summarized in Figure 8.

Figure 8 Structure of the doctoral dissertation



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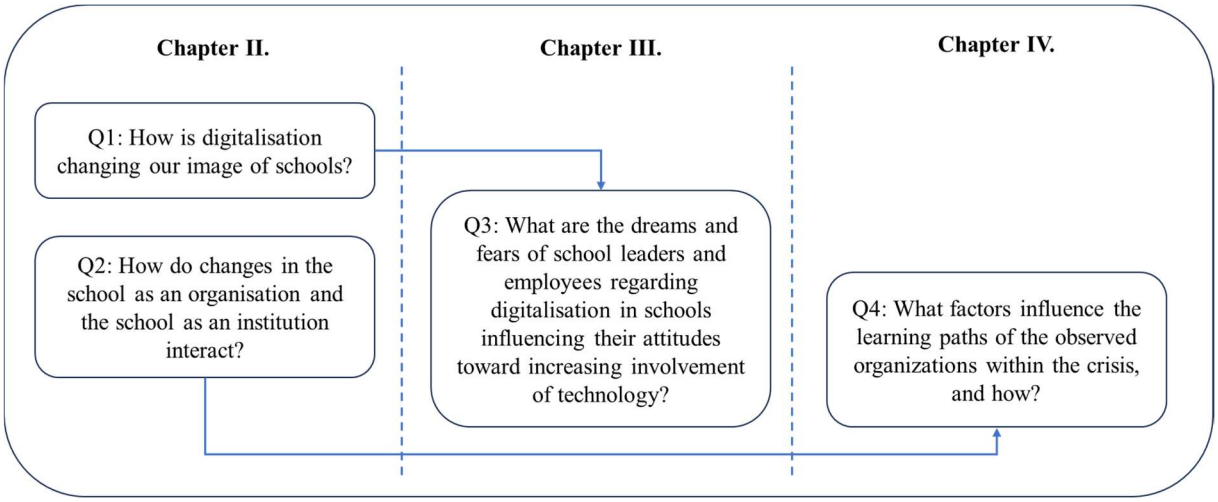
In Figure 8 we can see that articles draw their basis from the theoretical and methodological background laid out in the introduction. It is important to highlight that within my doctoral programme specialisation of Organization and leadership theory I put the emphasis more on organization theory than on leadership and management theory. Chapter II. applies a conceptual paper approach and Chapter III. a qualitative empirical paper approach. Chapter IV. builds on the same empirical data as the previous chapter, however it contributes to management theory.

Chapters III. and IV. build on Chapter II. in the sense that they both provide a deep dive into dilemmas introduced in Chapter II. along its main research questions: Q1: How is digitalisation changing our image of schools? (Chapter III.); Q2: How do changes in the school as an organization and the school as an institution interact? (Chapter IV). See the structure of the research questions in Figure 9.

Figure 9 Relations between research questions



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Q3 aims to discover the future images of schools from the perspective of school leaders and staff, elaborating Q1 further on what kind of imaginaries there are for schools in a digitalising world. Q4 digs deeper into how an external shock affects the school institution (relation 1 in the model of Chapter II.) and how the external environment of the school organization drives organizational learning (relation 3 in the model of Chapter II.).

II. The school in a digitalizing world[1]

Abstract

The study analyses the interaction of the school as an institution and schools as organizations in the light of digitalization. It presents the external context, the relations between the institution and the schools, the factors of the school's institutional change, the isomorphic change of school organizations and organizational learning aspects. The aim of the study is primarily to review this complex phenomenon, thereby starting a discourse on the unstoppable change taking place in the institution, and in the needs of school management.

II.1. Introduction

The emergence of the knowledge society, the advancement of societies in that direction, and the explosion of digital technologies are ushering in a paradigm shift in the world of schools. This is being driven by various actors, often with different objectives and different approaches. School organizations are operating and learning differently than they did even a decade or two ago as a result of the development of digital technologies and their presence in the educational domain. In particular, this process has been accelerated by digital education during the COVID-19 pandemic, during which schools have undergone varying degrees of digitalisation. Changes at the organizational level of schools implicitly imply a shift in the very essence of the institution, which is able to provide appropriate responses to new expectations and challenges.

How is digitalisation changing our image of schools? How do changes in the school as an organization and the school as an institution interact? This paper seeks to answer these questions through theories of institutional economics, knowledge-based organization theory and organizational learning.

II.2. Changes to the school institution

In March and Olsen's (2011) interpretation, institutions are enduring collections of rules and organised practices embedded in structures of meaning and resources that remain relatively unchanged in the face of fluctuations in individuals, individual preferences and expectations,

[1] Original publication in Hungarian: Fazekas, N. (2023). Iskola a digitalizálódó világban. Educatio, 32(2), 339-347.) https://doi.org/10.1556/2063.32.2023.2.12

and changing external circumstances. Rules and practices prescribe appropriate behaviour, set common goals and responsibilities that give direction and meaning to behaviour, and explain and justify codes of conduct. Resource structures represent capacities for action, and empower and constrain actors, making them more or less capable of acting according to the rules. Institutions are also reinforced by third parties through the sanctioning of non-compliance with rules (2011, p.1). In this paper, the focus in discussing school as an institution is primarily on the meaning structure constituted by rules and practices, that is, the socially constructed, abstract institutional image that a social milieu generally calls school.

The school as an institution can be seen as an anchor of modern society – since mass public education was born out of the needs of a modern, industrialising society – responsible for the reproduction of society, the establishment of social norms, cultural traditions and the transmission of knowledge (Berg, 2007, p.581), among other social functions. Different contexts and ideologies have conceived different missions for the existence of the school: as a 'filling station' it transmits classical, canonised literacy, as a 'greenhouse' it nurtures and unearths knowledge and develops the individual, as a 'tool' it creates new citizens for society and as a 'market' it provides space for interaction (Zrinszky, 2000). As a consequence of the transformation of industrial society into a knowledge society, new goals are being set for schools and a new image of schools is emerging. This image can best be described in the Hungarian domestic literature by the terms 'school of the knowledge society' (Z. Karvalics, 2010), 'open school' (Ollé, 2012) or 'school of encounters' (Perjés, 2005).

The factors of Institutional change are understood In the following framework: 1) design, 2) competitive selection, and 3) change due to external shocks (Goodin, 1996). Change in institutions by design is limited because the nature of institutional change is path-dependent, i.e. it always has a history, tradition, and historical context based on the social transmission of meaning. Selection by competition is a matter of social diversity and power: the greater the diversity in society, the less generally understood a particular institution is, and the lower the degree of acceptance of it is. The direction of change is in the hands of those in power within society, who are best placed to influence the value competition. External shocks alone can bring about far-reaching change, but long-standing gaps between institutional ideas and applied practices can also open the way to incremental transformation (March & Olsen, 2011).

The school is both an institution and an organization, since one presupposes the other and vice versa (North, 1990), and the school organizations that make up the institution learn and change individually. A number of definitions of organizational learning can be found in academic

research over the past half century or more. The essence of these can be summarised as organizational learning is a change in the knowledge, beliefs/thinking and actions/behaviour of organizations (Argote, 2011). Learning in school organizations is considered convergent when it supports and recreates the dominant institutional image, and divergent when it deviates from it, weakens it and reinforces alternative institutional arrangements instead.

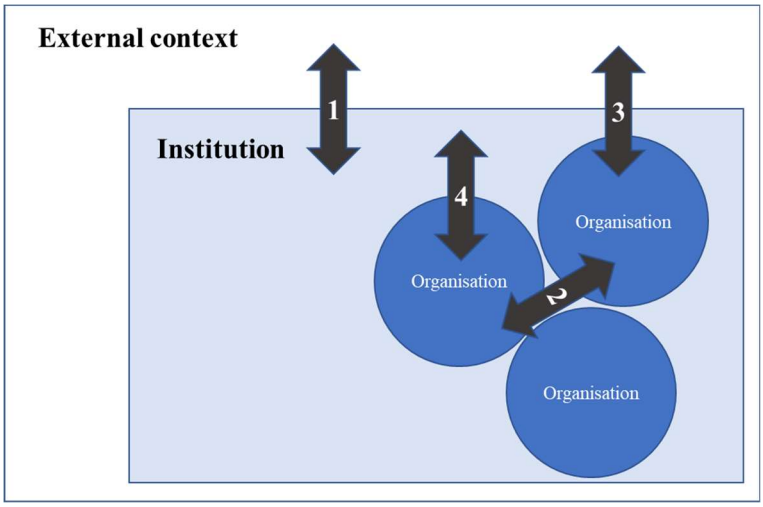
All schools, especially in a "sufficiently" homogeneous socio-economic environment, are quite similar. This phenomenon, which results from convergent organizational learning, is called isomorphism in the institutional view. DiMaggio and Powell (1983) identify three mechanisms of institutional isomorphic change: (1) coercive (2) mimetic and (3) normative isomorphism. Coercive isomorphism arises from formal and informal pressures from other organizations or institutions that create a common social, legal and technical environment for all organizations. Mimetic isomorphism calls for the modelling of other organizations, particularly in situations where there is a high degree of uncertainty, where the goals are not clear and where the technologies required are not adequately known. Normative isomorphism is the product of specialisation, where members of a profession build a common cognitive base and legitimation for their vocation that transcends organizational boundaries (1983, pp.150-152).

A counter-institutional mechanism of isomorphic change is decoupling. This occurs when adaptation to institutional pressures is at odds with internal efficiency needs. Organizations create the appearance of adaptation while in fact decoupling their own actions from the institutional structure (Boxenbaum & Jonsson, 2018). There is also a countervailing effect of the activities of institutional entrepreneurs, who are individuals or organizations that participate in the creation of new types of organizations or new industries, adapting new technologies, help to develop new organizational forms and routines, create new supply chains and markets, and help to gain cognitive, normative and regulatory legitimacy (DiMaggio & Powell, 1983).

We can also look for explanations of divergent learning paths of school organizations in organizational theory. Regarding knowledge as a resource, school-specific intangible knowledge (Spender, 1996) is the most important strategic asset of organizations (Grant, 1996) and the basis of their existence. In this conception, schools exist because the professional knowledge needed for education can be integrated most effectively in these organizations; their purpose is to act as facilitators of knowledge dispersed in society, enabling the development and innovation of learning processes (Fazekas, 2020). Divergent change is thus a result of the uniqueness of knowledge in organizations and of differences in knowledge facilitation practices in response to competition in the market.

Building on the theoretical framework presented, the following dynamics can be observed: (1) the impact of the external context on the institution, (2) institutional isomorphism through the interaction of organizations, (3) the impact of the external environment directly on organizations, and (4) the interaction of the institution and organizations (Figure 10).

Figure 10 The interaction of the elements of institutional change



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In what follows, we analyse these dynamics in the light of digitalisation: (1) first, we interpret institutional change processes induced by design, competitive selection and external shocks, then (2) we explore the phenomenon as a process of organizational isomorphic change within the institution, (3) we then examine learning with the omission of isomorphic effects, and finally (4) we interpret individual, divergent learning in school organizations in the same institutional space.

2.2.1. The changing school as an institution (1)

Design

The main design element shaping the digital competence of schools and thus the institution itself is based on EU and national frameworks (e.g., DigComp 2.2, DigCompOrg, DigCompEdu), strategies (e.g., DOS, DigiNOIR), regulations (legislative and regulatory), proposals (e.g., Digital Pedagogy and Methodology Centre publications), applications (e.g.,

eLEMÉR, SELFIE, DNR) and grants (e.g., EFOP-3.2.4-16-2016-00001, EFOP-3.2.3-17, RRF-1.2.1-2021), that are top-down incentives. As the state is very strong in the centralised Hungarian public education system (Radó, 2022), the design mechanisms for digital transformation are centrally driven, and organizational-level strategies and efforts are mostly the only function of these. Overall, a centralised, more authoritarian system can dictate a faster pace of change if digitisation is central to the strategy than in a decentralised system with autonomous institutions, but it can also slow development down with a lack of support if this focus is missing (e.g., lack of a digitisation strategy in the sector before 2016 and since 2020). However, the depth and embeddedness of change can be more effective when complemented by decentralised, organizational-level digitisation planning, where policies are adapted to the local context.

Competitive selection

For more deprived regions and socially marginalised groups, digitisation may not only fail to respond to existing needs but may even go against, if these groups are unable to participate in digitalised pedagogical (e.g., distance online education) and operational (e.g., use of eLearning) processes due to lack of tools or individual competence. The new digitalised processes also require the development of digital competence of the students' families. Instead of having schoolbooks and textbooks, schools will sooner or later move into the homes and lives of families with IT networks, according to their level of digitalisation, which families will need to be able to use and maintain. This means, first and foremost, an appropriate infrastructure (e.g., internet access and the need for PCs during the COVID-19 pandemic), which is often a problem even within school walls in our country (e.g., lack of regular replacement of school computers/tablets). The seriousness of this phenomenon is also indicated by the fact that in the Family Background Index (családiháttér-index) used in the National Competency Measurement, which is highly correlated with the results of the measurement in our country, the weight of the variable "computer available at home" is the second highest of all (17.5%) (Oktatási Hivatal, 2021).

However, for the state and the market, as well as for the middle and upper classes – where more power is concentrated – school organizations that can meet the digital challenges of the 21st century will be the ones that are acceptable. As society becomes more polarised, the digital divide is growing, with the result that the images of the right school institution are becoming increasingly divergent (e.g., Is it seen as teaching and learning by parents, teachers or the system

if a student produces his or her own learning material through online research?) Schools must therefore adapt to increasingly diverse local needs. Overall, polarization is reducing the pace of change, but there seems to be a slow shift towards upper- and middle-class needs, where competition remains fiercer, either between school organizations of public education or with substituting organizations (e.g., supplementary education or various forms of shadow education, Gordon Győri, 2020).

External shock

In parallel with the digitalisation of the economy and society, the development of digital literacy in schools has been an increasingly important objective since the 2000s. However, this was a far cry from the digitalisation trends observed in the market sector or even in our private lives, which deepened the cracks in the school institution. Digital methods were the most effective and efficient response to the need to organise distance learning in the wake of the COVID-19 pandemic. This has accelerated the digitalisation of public education in our country to an unprecedented degree. Although there does not appear to have been a paradigm shift, there are issues (e.g., assessment, communication, organization) which, if schools and the education system respond, can make this shift happen. A further shock is the inflation, energy crisis and price rise in 2022, which will make ICT investments more expensive (thus cancelled or postponed) and will affect the maintenance of existing educational ICT assets (e.g., electricity prices, maintenance costs); both at the level of the education system and at the household level.

2.2.2. Isomorphic change as a result of learning in organizations (2)

Coercive isomorphism

The economy and society at large expect digital literacy to be developed, and EU and national education policies are translating these expectations into guidelines. Proactive, innovative school organizations are institutional entrepreneurs of change, usually following the example of other sectors. This sector is typically characterised by the operation of Professional Learning Networks (PLNs), which connect professionals interested in a given subject through online platforms, which also cross-disciplinary, professional, sectoral and national boundaries in knowledge sharing (Trust et al., 2016). Adaptive organizations follow these proactive organizations. Constraint isomorphism thus depends on the openness of the school

organization, the direction and quality of its relationships: Where do perceived expectations come from that affect schools, and what is their nature? What role models and visions are displayed? To what extent is the school embedded in professional communities, programmes, networks, and the related ecosystem that deals with digitalisation?

Mimetic isomorphism

Digital education brought huge uncertainty, which triggered copying, as school organizations hoped to survive in a new situation. Learning is more intense if the perceived relevance and the perceived impact of the crisis is high (Lampel et al., 2009), and the subject of the crisis feels urgent. This way of learning can also stimulate the development of organizations that were previously blind or resistant to external pressures, although not to the same extent. The perceived relevance may be low if the existing digital competence level is higher so that the transition to online learning does not create a knowledge vacuum; or if the development of digital competence is not a strategic goal in the organization so that the situation that has arisen is seen as a passing emergency, creating temporary solutions without real lasting change. A further reason for different adaptation is the situation of students and parents, which results from the significant differences in social background discussed in the competitive selection section. The perceived magnitude of the impact may be low in schools where the organization's operation does not change significantly, merely encouraging them to review and improve existing practices, or where the organization is unable to assess or understand the impact of the situation.

The main questions here might be: how strong Is the network effect? Is the quality of relationships (e.g., trust) sufficiently conducive to network learning? What level of digital knowledge is available in existing networks? How diverse is the knowledge within the network?

Normative isomorphism

Specialisation, the Community of Practice (CoP) of the teaching profession, its different organizations, and the informal learning relationships in schools seem to both inhibit and encourage the digital transformation of school organizations. A significant number of teachers, especially before or even after the pandemic, resisted new technologies and the school transformation building on them, as their professional communities did not support the vision of a digitalisation-driven learning and working environment (Fazekas, 2022). Here, the aim was

to preserve the former institutional image of the school. However, institutional developments are pointing towards the digitalisation of school organizations. The community driving the change is also growing, typically through innovative groups of teachers participating in PLNs, such as the Digital Project Week (Digitális Témahét), the maker movement or even STEM/STEAM projects of large companies (e.g., LEGO robot programmes). Discourses and new practices emerging in these communities are also shaping the image and values of the new school institution.

The extent of the normative Isomorphic change can therefore be estimated by asking the following questions: what is the general attitude of the profession towards digitalisation, and what is their understanding of digitalisation? How widespread and institutionalized are professional communities of practice for teachers and school leaders supporting digitalisation in public education? What is the proportion of these communities at the organizational level? To what extent is ICT part of the introduction to the profession, and to what extent are the leading role models of the profession ICT promoters?

2.2.3. Divergent change as a result of learning in organizations (3-4)

The manifestation of organizational learning in isomorphic processes of change does not necessarily imply digital development in a positive direction; i.e. the occurrence (yes/no) and the outcome (result) of learning in the field are not the same. Throughout the process across different sectors and the education sector, schools are adapting good practices to local realities and local meanings of digitalisation, school, teaching and learning. Incorrect implementation and incorrect or inadequate operation can be just as prevalent as appropriate improvements. There may be solutions borrowed from the market sector whose inappropriate adaptation is a problem (e.g., overly idealized use of tools). Or, on the contrary, organizational adaptations of some digital education or management practices may only appear to be happening, so that the original tools and methods lose their essential features and benefits (e.g., tablets stored in a cupboard, out of use), which may be the result of deliberate decoupling.

When we talk about education, we don't just think of schools anymore. As demand grows, more and more new players are entering the education market, in other words, the learning market, so schools are losing their monopoly (Halász, 2009) and competition is increasing. As the privatisation of part of the education market becomes an inevitable trend, different new forms

of teaching and learning, as well as new market actors and models, emerge (ESPC, 2017), to which schools respond through their organizations.

We need to re-examine the relevance of the school and build on this to find the right organizational forms to meet its objectives. Why do we need schools? What and how do schools need to learn in order to remain sustainably relevant as learning-centred organizations, both alongside other forms of learning in the market and in relation to other schools, in line with the expectations of stakeholders?

At the organizational level, it is rational, even in an egalitarian education system, that schools try to differentiate themselves, to strive for excellence in some area, to learn, and the organizational learning process cannot be the same in even two organizations, because learning is a social process. Thus, in the context of external and internal learning environments, different organizational learning processes result in school organizations that differ in competence and outcomes, but which are based on a common profession, the teacher CoP. Thus, school organizations will evolve in different ways and at different rates, and the learning process will result in the development of local interpretations and meanings of digitalisation in interaction with their environment, which will become part of the organizational culture. These can be utopian or dystopian images along with the attitudes of the members of the organization, which in turn, as a component of competence, influences the organization's willingness to learn (Fazekas, 2022).

II.3. Conclusions and implications

The impact of digitalisation on changing the institution and organization of schools is a complex, multifaceted social process in which many possible futures are implicitly created, painting digital utopias and dystopias not only of schools but also of our society through schools. The change of the institution is an abstract phenomenon, in reality, it is the individual schools that embody it in our everyday lives. Their functioning, and thus their impact on our society, is vital; this paper aims primarily to stimulate discourse on this.

The study was not intended to provide a detailed assessment of the current state of the digitalisation process in education, although it may be noted from international statistics (e.g., DESI) that domestic school organizations seem to be slow to follow the increasingly visible global change of the institution, which is not supported by the change mechanisms available at the design level of the institution in our country.

Future research should therefore set related objectives. For example, through an institutional lens, it is important to examine the organizational effects of digital education policy interventions at national and international levels and the role of attitudes of school citizens and other stakeholders in the transformation process. An organizational lens also raises a number of managerial issues, such as how to manage digital schools differently in terms of HR, financing, logistics and many other management tasks, if ICT is to be put at the service of more effective delivery of school goals.

3. Digital Utopia and Dystopia of Schools after the COVID-19 Pandemic

Abstract

This paper aims to capture the digital imaginaries of Hungarian schools through the lens of digital utopianism as a theoretical framework. Employing a qualitative research approach and semi-structured interviews, this study contributes to the body of literature concerning organizational and policy-level educational management. It investigates utopian and dystopian visions of digitalized schools within the Hungarian education system, featuring participants comprising school leaders, teachers, and administrative staff drawn from five institutions, offering either general or vocational education, representing diverse ownership structures, including state and religious ownership. The study highlights prominent themes of the imaginaries, such as funding and infrastructure, equity, misuse, and social and pedagogical relations and suggests further research directions and methodologies applicable in this field.

III.1. Introduction

Are schools going to be better as a result of digitalisation in the education sector? Whatever our answer to this question as school leaders or educational professionals might be, what counts is the response of our school communities. We need to gain a profound understanding of how digitalisation is perceived to find fitting development and implementation strategies and to lead digital transformation in a way that reacts to these perceptions and creates better schools for future generations.

Digitalisation in the education context has been widely researched (e.g. (Hammond, 2014; Livingstone, 2012; Pettersson, 2018, 2021; Williamson, 2016a, 2016b), and has grown exponentially since 2019, but the research of future possibilities is less mature. The reviewed publications on the cross-section of education and digital futures appear from the 1980s, however, consequent growth of the literature started in the second half of the 2010s, doubling in 2022, probably as a result of the forced digitalisation wave of the COVID-19 pandemic. The articles have a strong Anglo-Saxon social, economic, and theoretical background. The majority of articles come from the USA, the UK, and Australia and are followed by Ireland and Canada, there are emerging discussions in the Nordic states, Finland, Sweden, and Norway, however, academic literature from continental Europe is scarce.

While European recommendations, frameworks, and strategies have been urging and supporting the development of digital competencies, in Hungary, a Central-and-Eastern-European country, schools seem to struggle to create their own understanding, positive relationship, and strategic approach to digital technologies in their operation and their pedagogical practices. This can be explained partly by the lack of focus on education policy and governance in this field, which is mirrored in the wider society too. Based on the Digital Economy and Society Index (DESI) (European Commission, n.d.), that is a comprehensive assessment tool used to gauge and compare the digital performance of European Union (EU) member states, measuring their progress in areas such as digital connectivity, digital skills, and the use of digital technologies, In 2022 Hungary was more than 5 years behind the No. 1 Finland, and three years behind the EU average's digital evolution trend, while barely before Bulgaria, closing the line.

This study sets out to answer the research question: What are the dreams and fears of school leaders and employees regarding digitalisation in schools influencing their attitudes toward increasing involvement of technology? The researcher used a qualitative approach to explore these anticipations within the Hungarian education system. This investigation focused on five schools, which offered either general or vocational education and were owned either by the state or by religious institutions. This research builds on the theoretical framework of digital utopianism (Dickel & Schrape, 2017), which is a novel approach in the field of education, and a specific contribution of this article. The paper aims to capture digital visions of Hungarian schools in the form of a utopia and dystopia, as a print of their attitudes towards digitalisation, contributing to organizational and policy-level educational management literature.

III.2. Theoretical background

3.3.1. Digital utopianism

Analysing images of wishes and fears of the future of modern, digitalised education provides an intriguing theoretical framework. The genre of utopian thinking and writing originates from Thomas More, who named his idealized and fictional island society using the Greek ou and topos expressions. While More's utopia was singular and non-existent and was rather a critique of the status quo, later social utopian thinkers created utopias to serve as positive examples, models to be imitated and implemented into our societies (Picon, 2003).

Digital utopianism is a branch of technological or techno-utopianism, focusing on computer technologies or online technologies in a wide sense. According to Dickel and Schrape (2017), digital utopias are visions of futures that present a rhetoric of 'a potentiality already present in current technological designs, possibly to be released in a yet-to-be-arranged future' and they treat new digital technologies as enablers for improving human lives (p. 1). The authors also argue that emerging technological and digital innovations, such as Web 2.0 and 3D printing, encourage a narrative of a prosumer society, where people not only consume goods in the online space and via digitally enhanced methods but produce them as well. Consequently, this evolution of digital technology leads to (1) democratization, (2) decentralization, and (3) emancipation and creates a new era of post-capitalistic maker-economy (Schrape, 2019).

Techno-dystopianism emerged as a response to the perceived damage technology creates in society, representing a pessimistic view. Starting with Huxley's book, The Brave New World, in the twentieth century, dystopian thinkers pointed to how 'technological advance can deprive people of freedom and dignity and ultimately bring destruction to humanity' (Dai & Hao, 2018, p.9). Dystopian thinking idealizes the past, stating that humans' primaeval harmony with nature and the natural way of life is disrupted and sabotaged by technological progression (Dai & Hao, 2018).

However, even the most engaging digital utopias simplify our reality and are imperfect. Utopias disappoint by decoupling solidified social problems from their socio-economic contexts (factual dimension), generalizing the skills and motivations of early and tech-savvy users (social dimension), and dissociating a future visionary alternative from the past experiences, developments, and technologies (temporal dimension) (Dickel & Schrape, 2017; Schrape, 2019). Digital utopias, as highlighted by Ossewaarde and Gülenç (2020), often serve political agendas and align with Morozov's (2013) notion of technological solutionism, suggesting the inherent benignity of technological solutions and their positive social impact.

Dai and Hao (2018) suggest transcending the binary opposition of utopias and dystopias, marked as an idealistic symmetric structure, as their relationship is not static. They state that both narratives are present at a given time, and as an outcome of historical junctions, the two ideologies build up new arguments. Consequently, the dominance of the two narratives shifts. This is called the realistic antisymmetric structure (p.11).

Jasanoff (2015) avoids a dichotomous approach altogether and applies the term sociotechnical imaginaries. The term arches over the intertwined complexity of "descriptive and normative, structure and agency, material and mental, local and translocal" (p.323) allowing multiple

synchronous, parallel visions. The present data analysis design kept the dual structure of utopia and dystopia, as a tool to portray hopes and fears for digital educational futures in a loud, clear, unanimous manner. This simplification and extremization of complexity were made to serve the understandability and applicability of the findings, while using the term imaginaries as well, to indicate the parallel natures and the inner diversity of the discussed visions.

3.3.2. Digital school imaginaries & educational futures

In educational futures research, the impact of computing and digitalisation has been a growingly prominent theme starting from the 1980s (e.g. Hedley & Ellsworth, 1992; Sullivan, 1983). Facer (2011) points out that current digital developments make such schools possible that are fundamentally detached from place and connected only by shared educational values, creating millions of fragmented personalized learning environments. However, she argues that we need the school as a physical space and a local organization, as "where community members are encouraged to encounter each other and learn from each other is one of the last public spaces in which we can begin to build the intergenerational solidarity, respect for diversity and democratic capability needed to ensure fairness in the context of sociotechnical change" (p.28).

As a result of OECD's educational futures research, we can discuss different future scenarios. The four scenarios published in 2020 are the following: (1) Schooling extended, (2) Education outsourced, (3) Schools as learning hubs, and (4) Learn-as-you-go. Although, the main dimensions of the scenarios don't explicitly highlight digitalisation, distinctive characteristics of the different scenarios often stem from digitalisation trends, for example, massive digital learning platforms of an outsourced education system, national or international information systems of strong educational government systems, or independent, informal and de-institutionalized learning enabled by artificial intelligence, virtual and augmented reality and the Internet of Things, etc.

If we look at the literature on the cross-section of digital utopianism and schools, the main topics discussed in the reviewed literature are policy-level causes or implications (Gulson & Webb, 2017; Høydal & Haldar, 2022; Johnston & McGarr, 2022; Rahm, 2021; Rensfeldt & Player-Koro, 2020; Zufiaurre, 1999) future school scenarios (Gruszczynska et al., 2013; Kearney et al., 2022; Mateu et al., 2018), leadership and management (Keane & Keane, 2020; Webster, 2016, 2017), students' digital visions (Rasa & Laherto, 2022; Schuck & Aubusson,

2010; Williamson, 2018), public sector and ed-tech company involvement (McGarr and Engen, 2021; Williamson, 2018), equity (Nilsberth et al., 2021).

The main challenges in the use of digital technology in education are not technological, but social and cultural factors, which is why the main task is to re-imagine teachers' roles and teaching in general, as well as learners and learning, and address both the 'why' and the 'how' of digital literacy (Gruszczynska et al., 2013; Mateu et al., 2018). The results of re-thinking education are digital educational scenarios, that are not all tech-positive; we encounter the issue of over-digitization and of the efficacy of high-tech usage as well (Kearney et al., 2022; Mateu et al., 2018).

Policy and macro-level management implications of this field of research are considered essential. Researchers recommend that national education and technology policy have a clear vision and purpose (Johnston and McGarr, 2022; Mateu et al., 2018). Policies of current practice typically address ideal citizenship of future societies but struggle to strike a balance between curriculum content and governance transformations, resulting in a constant pendulum movement between central, state-led, or new monopolized technology governance and infrastructures, and partly through decentralized forms of governance (Rahm, 2021; Rensfeldt and Player-Koro, 2020). The availability of data also gives way to "computational rationality" on the level of education policymaking, by utilising machine learning to provide faster, 'real-time' ways of analysing and identifying patterns in educational performance and administrative data (Gulson and Webb, 2017).

Digitalisation is most often depicted as necessary, inevitable, and good. Educational policies have been observed to portray the digital future of the school as rather utopian, digitalisation being a solution for complex societal issues while depicting the present as inefficient, passive, and teacher-centred, using the narrative as a tool to urge change and innovation in the field (Saari & Säntti, 2018). Furthermore, in academics, digitalisation tends to be shown in a positive light too. As an example, Rahm (2021) paraphrased Jasanoff's definition of imaginaries of education as '[…] collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms, of social life, and social order attainable through, and supportive of, advances in education about science and technology' (Rahm, 2021 as in Jasanoff, 2015, p.19).

However, authors Høydal and Haldar (2022) critique previous sociotechnical imaginaries in the Nordic model, claiming that the goal of providing digitally competent future citizen-workers neglects humanism and solidarity, mirroring neoliberal economic thinking even in traditional

welfare states, furthermore, they handle the governance of the education system and the economic competitiveness of the nation as an axiomatic causal relationship (Saari & Säntti, 2018). Internationally, the educational sector shows a strong belief in digitalisation as a democratic project promoting equity (Nilsberth et al., 2021). The experiences of the COVID-19 pandemic, however, show that a high level of digitalisation in the learning processes can lead to growing effects of social and economic inequalities, for example through differences in parents' familiarity with ICT, or overcrowded housing (Dimopoulos et al., 2021). This supports the previous critique, and hence, the role of the school as a social space should be heavily emphasized when thinking about digitalisation (Frohn, 2021).

Moving on to the micro level, research shows that digitalisation affects all aspects of organizational leadership and management. On an organizational level, technology leaders' thinking can be characterized by an instrumental view of technology, technological optimism, and technological determinism, which typically leads to two main outcomes in decision-making, such as (1) educational goals and curriculum should drive technology, or (2) the school(s) should keep up with technology, with the latter being more prevalent (Webster, 2016, 2017). The question of financing and funding options has also been shown to have a significant impact on managerial strategy and decision-making in the field, affecting classroom practice, teaching and learning programs, and professional staff learning (Keane and Keane, 2020).

Public education is undergoing an extensive process of marketization, privatization, and commercialization, through venture funding, collaborations, and entrepreneurship strategies that originate in Silicon Valley (Williamson, 2017). Many aspects of private sector involvement in public education infrastructures were accelerated by the pandemic, but this emergency inclusion of diverse actors raises complex and long-term questions about legalization, commercialization, and responsibilization (Cone et al., 2022).

3.3.3. The Hungarian context of educational digitalisation

Hungary can be viewed as a highly centralized, conservative education system with relatively low local autonomy of schools (Radó, 2022). The public school system is maintained by the 60 school districts supported by a central organization, the Klebelsberg Centre (KC) and by the Educational Authority, responsible for professional assistance and governance.

We can look at digital competence from a student, teacher, organizational or system perspective. For student skills, the previous 2012 version of the Hungarian national core

curriculum (see the list of applied governmental decrees in Appendix III) lists digital competence as one of the nine core competencies which means the '[…] confident, critical and ethical use of information and communication technologies (ICT) […]' that also gets specified in the document. The new 2020 version of the national curriculum doesn't define digital competence, but instead of the Informatics subject, it introduces the Digital culture subject signalling a change in the approach to digital skills. The Digital culture subject aims to 'provide and develop up-to-date knowledge and skills that will help learners to become successful and useful members of the information society' (p.428).

What we can observe is a slow movement from specified digital skills to the general principles of adaptability and learning skills to continuous change in technology and society in a wider sense, introducing a practice-based and uncertainty-accepting approach to digital skill building, however, also a step back from promoting digital competence as a key element in education.

On the teachers' level, there is a framework in place for assessing teachers' skills in the frame of their evaluation process, however, it does not contain detailed expectations towards digital skills. The first 2013 version of the framework did, however, these were erased in the second version and have not been included again since.

Schools are prescribed to use certain online systems and software operated by the Education Authority or the KC, however, even currently applicable 2021 ministry regulations for a minimal level of infrastructure and school equipment (Ministry of Human Resources, 2021) mirror the early millennium compared to entry-level suggestions of the European Commission's highly equipped classroom model from 2019 (European Commission, 2019).

The first Digital Education Strategy of Hungary 2016–2020 (Magyarország Digitális Oktatási Stratégiája, 2016) was created 'to build adaptability by promoting the acquisition of lifelong learning skills to prepare future citizens for, among other things, the changes brought about by the continuous technological development and the proliferation of information and communication technologies in the 21st century', and its main goals define both pedagogical and organizational needs. The strategy was never publicly evaluated and has no legitim continuation, only a proposal document, DigiNOIR (Halász et al., 2019), that suggests digital advancement losing priority in educational strategizing.

We can see some governmental ICT projects in the lifespan of the strategy. The development of digital textbooks and learning tools has been supported by a project between 2016 and 2022, establishing the National Public Education Portal (nkp.hu). A large number of teachers got

laptops for professional use, accompanied by training, in the frame of the EU-funded project EFOP-3.2.4-16-2016-00001, and the installation of faster internet within schools was also a focal project (see further infrastructural investments in EFOP-3.2.3 and EFOP-7.3.3.). There are digital education management systems in place, such as the eChalk (eKRÉTA) system since the 2018/2019 school year, the Public Education Information System (KIR) and the Secondary School Enrolment Information System (KIFIR) as well as the University Enrolment System (Felvi.hu), that provide public education with the necessary administrative and workflow management support. The Digital Profile System (Digitális Névjegy Rendszer) (DPMK, 2020), a new organizational digital competence self-evaluation tool, was designed based on international best practices, but the pilot sample was small and the initiative died off after the pilot phase. Major investments stopped after 2020.

III.3. Research methodology

The results presented in this paper are outcomes of wider a doctoral research project that investigates what digital competence means to school communities, and how this concept has been affecting organizational learning, just in the aftermath of the COVID-19 pandemic. By answering the research question, what are the dreams and fears of school leaders and employees regarding digitalisation in public schools, the author aims to provide a deeper understanding of the attitudes influencing organizational digital competence building.

The choice of the qualitative approach was made due to its capacity "to make sense of or interpret phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 2011, p.3). The research explores meaning-making through the cases of five schools as a part of the learning organization research and development project (2015, 2020) of KÖVI (Hungarian-Netherlands School of Educational Management) in the South Great Plain region of Hungary. The schools were selected intensity-based with stratified purposeful sampling (Huberman & Miles, 1994). The intensity criteria demanded schools be able to show some examples of involvement in organizational digitalisation initiatives in the past 2 years. For the stratifying criteria, the varying attribute of the school owner was chosen. As a result, state schools providing general and vocational education, as well as church-owned schools are also part of the sample, as domestic debate suggests that these schools have different opportunities regarding funding and autonomy (Jordán, 2019; Péteri & Szilágyi, 2022). Solely private schools were excluded from the sample. The participation was invitation-based. As the project

demanded serious engagement from the schools, the most significant criterion for selection and invitation was their readiness to cooperate in the different stages of the research project. In the first round 5 schools got invited; as all of them agreed to participate, no second round of invitations was issued. A summary of the main characteristics of the schools can be found in Table 3.

Table 3 Summary of the participating schools

Name	**S1**	**S2**	**S3**	**S4**	**S5**
Owner	Ministry of Human Resources	Ministry of Human Resources	Ministry of Human Resources	Organization of a Christian church	Ministry of Innovation and Technology
Level*[1]	primary and lower secondary	primary and lower secondary	primary and lower secondary	(early childhood), primary, lower, and upper secondary	upper secondary, (adult)
Type	general	general	general	general	vocational
No. of students*[2]	643	271	402	852	n.d. ~1200-1300*[3]
Location	county capital	small town in the agglomeration of a county capital	midsize town	county capital	county capital

***[1] Educational levels in brackets were not involved in the research**

***[2] Student number includes only the educational levels that were involved in the research based on 2022 data from** https://dari.oktatas.hu/kirpub/index

***[3] Estimate based on 2019 data from** https://dari.oktatas.hu/kirpub/index

Source: Own editing

The data collection was carried out in individual and focus group interviews extended with on-site observation. The sampling of interview participants happened purposively, inviting three different groups: school leaders, administrative staff members, and teachers. Individual interviews in the research served the understanding of school management perspectives; these

involved school principals and vice-principals extended by administrative staff representatives. Teachers participated in the focus group interviews to provide space for discussion and debate. Teachers were selected by school principals along the following pre-determined attributes: (1) diverse levels of digital competence, different (2) hierarchic positions, (3) age, (4) duration of school affiliation, and (5) subject backgrounds to avoid biased or wishful images about the organizations. The prepared field notes include a description of the setting, participants, interviews, class and meeting observations, and critical reflection; these are used as supporting research material but are not part of the data analysis itself.

The main interview topics were (1) the characteristics of the school's organizational learning, (2) technology usage, and (3) experiences and learnings of the distance education period of the pandemic. Altogether 24 interviews were carried out between 11th June and 31st August 2021, 14 individual, two in-pair, and eight focus group interviews. In-pair interviews were designed as individual, but in two cases school leaders insisted on taking the interview together for efficiency purposes. The longest interview took 2 h and 5 min, and the shortest was 46 min. Twenty-three interviews have been recorded, transcribed, and coded in the NVivo software. One group interview, where the participants rejected the recording, was taken notes of and then similarly transcribed and coded in NVivo. In the text the interview codes can be understood as detailed in Appendix II: The first part of the code refers to the school (S1, S2,…), the second part to the interview subject (L = leadership, T = teacher group, A = administrative staff), and the third par provides further specifications (A = administrative staff, P = principal, VP = vice principal, GNo = number of the group within the school).

The first round of coding was theory-driven and applied the codes Utopia and Dystopia. Items coded under the two main codes were either (1) answers to the interview question 'How do you think the role of the school, in general, will change because of digital advancements and the distance education period caused by the pandemic?' or (2) statements that attached value or feeling (reflection) to a current digitalisation related practice or state at the school, thus projecting some future expectations. After a sample coding of all interviews of one research case, the theory-driven codes were accepted. Subcodes were assigned using the pattern coding method (Saldaña, 2013). Sub-codes emerged from the texts and were allocated to the main codes. These codes will be discussed in detail in the next section. All data collection and analysis tasks were completed by the author of the paper.

Validity of the research was provided by seeking out multiple viewpoints (leadership, teachers, administrative staff), the involvement of multiple cases (five in total) and the application of

different methodologies (individual and group interviews, observation), furthermore, peer-cross-validation was applied. Reliability is supported by the detailed explanation of the methodology and the research project's documentation. Due to the nature of qualitative research, generalizability and universality cannot be fully and objectively enforced, as it is not the aim of the methodological tradition (Gaudet & Robert, 2018). Ethical questions were taken into consideration in line with the principles of organizational research. The anonymity of the school organizations and the participants was ensured by allocating codes to them. Before the interview, respondents provided informed consent after being informed of the purpose of the study and the frames of data collection and analysis (Kvale, 2007). The research project followed the British Educational Research Association [BERA] Ethical Guidelines (2018) and was approved by the doctoral school of the author.

III.4. Results

This section introduces the main anticipations about a digital school future within the framework of digital utopianism based on the codes emerging from interviews with the five participating schools (Table 4). Sub-codes of Utopia and Dystopia can be understood as the main themes of these imaginaries, mirroring the hopes and fears of the research participants.

The two imaginaries, the utopia and dystopia of the digitalised school, are not homogeneous visions; the various themes come from all interview participants and are not proportionate to all cases. My goal in summarizing the hopes and fears of participants is to provide an overview of the anticipations that colour school staff' and school leaders' attitudes towards digitalisation. Sub-codes in Table 4 appear, however, in the order of frequency of mentions. This order suggests the intensity of the themes in the life of the interviewees, however, as the determination of the order of relevance was not a goal of the research, it was not validated retrospectively by the interview participants.

Table 4 Main codes and sub-codes of the research

Anticipations about school digitalisation	
Dystopia	**Utopia**
Erosion of pedagogical value	Digitally competent school community

Erosion of social connections	Infrastructure provided
Exploitation of teachers' resources	Effective communication and collaboration
Digital divide	Professional development
Cheating	Pedagogical enhancer
Mixing private and working life	Regulation and etiquette
Technological chaos	Time and support
Overdocumentation	Closer student-teacher relationship
Exploitation of families' resources	Space for real community
Health damage	Flexible time management
Misuse, power, and control	Professional Learning Networks (PLN)
Technology replacing teachers	Online communities
Erosion of autonomy	Teachers' status
	Data safety
	Efficient processes
	Sustainability
	Evidence-based pedagogy and management

Source: Own editing

3.5.1. Utopian imaginaries

In a utopian view of digitalised education, all school citizens have the necessary basic *digital competence.* The school management has a general knowledge of digital technologies and is engaged in fostering digitalisation in the organization. Teachers handle different digital devices and tools confidently and know how to apply them for their pedagogical purposes. All teachers are supporting students' digital competence building in some way and are familiar with netiquette. Parents have the necessary competence to cooperate in their children's education and are capable of teaching basic digital skills at home too. Students learn to learn and cooperate digitally, know their way around different tools, and navigate their digital presence. They acquire knowledge of coding and robotics beyond basic ICT knowledge. School administrative staff also receive the necessary training to increase their work efficiency and minimize unnecessary workload.

In an ideal future, all the *infrastructure is provided*. New, operational, and fast devices for teachers and students are available individually, classrooms are equipped with all the needed technology, and the Wi-Fi is steady and available to everyone in the school. Educational technology and connected educational materials are available, fitting different pedagogical methodologies. Maintenance budget and technology personnel are at hand, device compatibility is flawless. The school space is digitally enhanced, online workspace is provided as well. Office and supporting technologies are equally developed.

Digitalisation is seen as an enabler for *effective communication and collaboration* (see example in Table 5). It supports community building, and the inclusion of teachers and students when they are away from school. It makes meetings and information sharing instant and efficient, and collaboration easy.

Professional development with the development of technology, digital and online advancements spur continuous innovation within the school and provides a motivating professional challenge. Conquering these challenges reinforces teachers' self-confidence.

Digitalisation will *enhance pedagogy* by supporting autonomous learning, learning to learn, and autonomous creating (see example in Table 5). It makes differentiation and personalisation of learning paths possible and offers diverse methodological learning and joyful ways of acquiring knowledge. The available methodologies and tools will also help to provide equity in education and foster collaboration and teamwork skills.

Regulations and etiquette of digital educational tools and spaces will be discussed and clear to everyone. Schools will use school-wide learning and collaboration platforms, there will be school-level smartphone and school device usage policies that are determined based on student maturity. Formal and informal usage will be handled separately, and work-life balance will be considered when organizing teachers' or students' work. There will be guides available for students, parents, and teachers, students' digital onboarding will be a general part of kids getting ready for their school life. Proper online communication and netiquette will be an inherent part of educating students. Schools will have a digital competence education policy in place to consciously develop student skills.

Extra time and support will be generally provided for teachers. System administrators and educational technologists or digital pedagogical mentors will be there to help and advise teachers and coordinate project application writing for participating in digitalisation projects.

The management and administration will organize school life so that there will be time for teacher professional development (TPD), training, and digital material development.

Digitalisation also brings *student-teacher relationships closer*, where students are participating in suggesting and choosing digital technologies and tools that schools use, and where they support and teach their teachers to apply these too. Communication will be easier, quicker, and personally closer too, thanks to online ways of getting in contact.

The school lockdowns and the digital education period of the COVID-19 pandemic revealed the community-building role of the school. School life will focus more on creating a *space for community*, supplementing digital education. Schools will prioritize value-added interaction on-site and in class (see examples in Table 5).

School citizens also learned to appreciate the *flexible time management* that the digitalisation of work and learning provides. More distance work and flexible working time will be allowed for teachers and administrative staff, but also individual needs of students and parents can be built into learning and operational processes as well. The form of meeting, online or offline, will be considered more, contributing to more reasonable time management too.

Actively participating in online *Professional Learning Networks (PLNs)* will ensure access to high-quality knowledge and resources not just through Facebook groups, but also on different webinars or training, available on platforms, subjects, and other different topics for free. However, online encounters will not only provide space for informal learning but for building *online communities* too. On these online platforms, colleagues can connect even if they are not working directly together at school or if they come from completely different schools or backgrounds. They can emotionally support and motivate each other, share successes, have fun, and exercise their creativity too.

With technology growing more complex, the *status of teachers*, who can keep up with new trends, will grow, and their personal and pedagogical added value to plain education will be much more appreciated.

Data safety will be highly prioritised. Educational platform choice will be based on this need, personal data access will be well-regulated within the school as well. The personal spaces of students and teachers will be also respected even in cases of remote work and online distance education. Administrative data storage will be solved via digitizing documents and appropriate backup mechanisms.

Processes will be more efficient thanks to educational and operational administration platforms, software and cloud solutions, automated processes, and digital authentication. The used systems will be intercompatible, allowing seamless cooperation among public administration stakeholders. With digital solutions, everyday life in the education sector will be *more sustainable*, as more professional events can be organized online, travelling won't be necessary as frequently as before, and less paper will be used for administrative purposes as well.

With the evolution of data collection methods and analysis pedagogy and management can be more *evidence-based*, and pedagogical or HR strategies can build on data collected within the school.

Table 5 Exemplary quotes for 'Utopia' subcodes

Codes	**Exemplary quotes**
Effective communication and collaboration	*'T1: It is very good that we have introduced it [online meeting platform]. [laughter, collective approval]* *T2: It brought us closer…* *T3: Even though we're far apart […]. 'It's much more practical in terms of time management, which everybody struggles with, not just us but everybody else in this world, time, time, time, time. Lack of time.'* (S1-T-G)
Pedagogical enhancer	*'Motivating, innovative, and creative. Because I've always liked the part of digital technologies where the child can create, so we're not just using something. I also like the part where I can create content for the children and engage the children in activities where they can create using the tools.'* (S3-L-VP1)
Space for real community	*'Obviously, it also has the effect of making people realise that it's better to do it [education] this way, so the human side, the human relationships, the presence, the personal, immediate answers, immediate questions, and the physical proximity with living people, gained emphasis.'* (S4-A) *'VP: We won't allow them to be on the phone during the break, but they try their best. We want them to talk, we want them to be together, and we won't want them to be on their phones, they can do that at home. […] It was a huge lesson for me that at some point I just let the kids go without talking to them much about anything else [but the lesson], but it's good to have a couple of words. Let's say in that 10-minute break I stop them [in the school]. I think that kind of personal connection is going to be much more needed.'* (S4-L-P&VP)

Source: Own editing

3.5.2. Dystopian imaginaries

The dystopian visions predict the *erosion of pedagogical value* as a result of overdigitalisation. New tools and methodologies, and online communication hinder metacommunication and prevent teachers from reacting appropriately to their students. Teachers' unique personal added value, the conveying of social norms and values, the school image and its pedagogical values will get lost (see example in Table 6). Social soft skills and the focus on personal development will fade. The digital evaluation of students' learning results will be false, and teachers will struggle to provide sufficient pedagogical support online, as many won't be able or motivated to keep up with the needed skills in this field. Altogether, digital tools are distractions for both students and teachers from focused work and their personal connections.

Social contacts will suffer digitalisation too. Students will miss forming true friendships, school communities, or connections with their teachers. Family connections in general will also empty, as family members will merely exist alongside each other, lost in their own digital spaces (see examples in Table 6). Teachers will also lose the opportunity to work and live in a school community, be part of teams, or truly network with colleagues. The loss of these personal connections also cuts the ties to informal learning opportunities among colleagues.

With the improvement of technology but without proper infrastructural and operational (e.g. HR, education organization) development in education, *teachers' personal resources will be continuously exploited*, including time, money, and space. They will be expected to buy, maintain and resupply working devices, or even software and app licenses, for everyday use and experimentation. Without service phones or subscriptions, they are expected to pay phone bills directly connected to their work. Without the separation of personal and work accounts and devices, their data storage capacities, and an appropriate internet package, paid by them, will also serve the school they are working at. Without the proper equipment at school, teachers are forced to move their working space to their homes, taking up personal and physical space there, but also taking up their nonwork time. Partly this is true for *families' resources* as well: to enable an appropriate education for their kids, they have to invest a lot in technological devices as well as include these and other digital spaces in their personal living spaces, which many families won't be able to afford.

Online distance education proved to teachers, that at a high level of digitalisation, a *digital divide* is unavoidable. Students' progress will depend on the number of devices and the quality

of internet access at home, as well as the number of people in one household, or where that household is. If the student is young, has some special needs, or doesn't have a high level of learning skills or inner motivation, a digitalised way of education can hinder him/her even more. The parents' digital competence level will also influence the learning opportunities of the students. Students studying professions that need manual mastery and special tools or spaces to practice will suffer a more serious disadvantage compared to students in general education, creating an even bigger societal fraction.

Teachers are anxious about the effect of digitalisation on *cheating*. In the case of online education and with the development of different online tools students will fake the results of their individual work and examinations, as well as their general participation in learning processes. However, teachers will also choose the easier way sometimes, in their learning processes in TPD training, and even in their teaching efforts. These will be harder to detect too.

Private and professional life will be mixed and confused, making maintaining of work-life balance hard due to constant availability and connectedness to the internet. Work-related tasks and programs will be accepted to be pushed into people's free time and personal spaces, and the border between informal and formal communication and relationships will be blurred.

Technological complexity will only make learning processes more chaotic, taking away time, confusing students, and parents, and requiring extra financial resources. There will be too many different technologies, software, and apps, and the compatibility issues will be hard to handle, creating further barriers.

The growing opportunity to gather data will also cause *overdocumentation*; everything will be put in data and have to be administered. Teachers and administrative staff will be overwhelmed by double documentation (paper and digital) and the uncountable platforms that are to be used for these tasks, as they are not intercompatible or automated.

Our *health* will be damaged physically and mentally too. The immense screen time and sitting work will ruin our eyesight and our general level of fitness and posture. The lack of socialization and genuine, physical, personal connections will also disturb our general mental health and the way we connect with other people.

Technology is just another and better way to *exercise and even misuse power*. In public education, the government will exercise irrational control over the procurement and maintenance of different technological devices and use this control for surveillance too. The government will spread its propaganda and use education for political purposes through central

digital materials and central distance education measures (see examples in Table 6), as it will be possible to *replace teachers with technology*. *Autonomy* will be sacrificed in the name of efficiency, and available technological and digital tools will be restricted governmentally, but sometimes locally too.

Table 6 Exemplary quotes for 'Dystopia' subcodes

Code	**Exemplary quotes**
Erosion of pedagogical value	*'The pedagogical thread is being peeled away from education, the methodological thread. There will be knowledge transfer, and information transfer, for which appropriate technologies will be developed. Which is not the right direction, I think.'* (S4-T-G)
Erosion of social connections	*'Knowledge is important too, but what kind of example I, as an individual, as a human being, will set for him, will not be there. And he/she won't have any at home either, because his/her mother and father are not at home, as they are at work. So, I won't know what kind of role models they're going to pick up. Well, machines, fictional ones, from games...'* (S4-T-G) *'We are happy about digitalisation, but it takes away the personal touch at work, with parents, with students, among students.'* (S3-T-G1)
Misuse, power, and control	*'In 20 years, if things won't work out the way we want them to if we're not the ones teaching, for example, but there's a maths teacher up in Budapest, and if you need to brainwash, they can do that. I have this idea that in 20 years... [Someone: in 10 years...] [...] So we won't need a hundred thousand people [teachers] here... Now they [government] realise that they can use this to their advantage and then teachers will say what the current government wants. And then there is no thinking, there is nothing. And then it will be machine voices.'* (S5-T-G1) *'Who knows how they listen in [laughs].'* (S3-T-G2)

Source: Own editing

III.5. Discussion

Looking at the results analysing the benefits of the theoretical framework, we could make it visible, how hopes and fears, thus utopian and dystopian visions, are present at the same time in the observed school communities (Dai and Hao, 2018), mixed even on single cases level. The characteristic mental associations, such as democratization, decentralization, and emancipation for example in education system structures and processes, and student-teacher

relationships (Schrape, 2019) just as the romanticisation of the past or politicization of the new pedagogical methodologies (Dai and Hao, 2018; Morozov, 2013) could be also better understood embedded in educational examples.

However, we can also observe that the described images of the digital school are not radically different from the current school image; the interviewees expressed rather careful and reserved expectations towards digital development and change. Many mentioned solutions and practices are already in use in leading educational systems, while certain emerging topics like AI, robotic process automation in administration, or online bullying are not on the radar for most participating schools. This can be partly attributed to the temporal dimension of utopian errors (Dickel and Schrape, 2017), where participants base their expectations on past experiences and existing technological developments. Given the prevailing "follower" approach among school leaders and teachers (Webster, 2017), this limited experience and knowledge contribute to a short-sighted vision, negatively impacting local-level dialogue and strategizing, while only a few organizational members and change agents deviate from this pattern.

The conceptualization of utopian and dystopian visions and the dialogue about them allows for a more accurate problem definition for policy and management, highlighting themes and depicting opposing outcomes of the same developments (e.g., enhancement or loss of personal relationships in the same setting), hence, supports a more conscious and autonomous relationship towards digitalisation on all levels education. The predominant emerging themes of the two imaginaries are funding and infrastructure, equity, misuse, and social and pedagogical relations in future digitalised education, which we will address in this section.

The theme of *funding and infrastructure* emphasizes the role of policy and strategy building (Johnston and McGarr, 2022) as a possible macro-level tool for visioning innovation and fostering local digital leadership and implementation. Even though European-level directions are available, the lack of national-level strategy and budgeting influences local vision building in the centralized public education domain very severely. Emphasizing Keane and Keans's suggestion, that funding is very influential on managerial decision-making (2020), infrastructural funding opportunities seem to be the absolute basis for building future visions in the Hungarian context. These infrastructural opportunities are one of the most focal attributes of the painted images within this research, and the physical equipment available in the school shows to be still the main manifestation and meaning made of digitalisation in this sector in the given national context, thus needs to be central to policy and strategy building.

Policy and management actions however first need to bridge the learned scepticism of the local pedagogical communities about macro-level development goals, in the Hungarian context. Some participants believe that despite recognizing the need for change as educational professionals, the combination of high expectations for schools and teachers with a lack of necessary resources (e.g., tools, time, human resources, subject matter knowledge) makes it impossible to attain a utopian vision. This narrative is significant in discussing research results because it diverges from both utopian and dystopian scenarios by raising doubts about any forms of change. This attitude, born from frustration, although valid, is especially harmful, as it impedes dialogue, purposeful strategizing, and action on all levels.

In *equity*, local knowledge is invaluable in building good policy. In contrast to the policy-level insensibility about equity and sustainability (Høydal and Haldar, 2022), discussions about these issues at the local level are taking place. Although these discussions are still in their early stages, primarily focus on defining the problems. Based on the research results, concerns encompass information poverty based on socio-economic background, structural inequalities in the education system (e.g., general vs vocational education), or mass educational practices gaining ground at the expense of individual differentiation and even special need and vulnerable groups, while digitalisation was also seen to provide an effective countermeasure against the same issues. The collection and dissemination of good practices and even failed actions in this field is an essential field of future empirical research.

The theme of *misuse* in digitalisation signalled an emerging conflict between central authority and local autonomy, as well as the issue of individual and organizational data access and protection. Phenomena, such as the anticipated governmental misuse of power, surveillance, and oppression through technology, are examples that underscore the importance of further research grounded in critical theories.

Changing *social and pedagogical relationships* was also a main theme in the two narratives. The potential enrichment or erosion of relationships within the wider school community changes the adequate competence mix of teachers as well as urges more diverse professional expertise (e.g. professionals for mental health, community, soft social skill development, supporting roles) within the school, and the effects of these changes on the school's role, such as education, upbringing, socializing, etc., and teachers' role should be primary scenes of psychological, sociological and also managerial, HR-related empirical research.

Research results suggest that hopes and fears of school organizations are highly context-dependent (e.g., financial, regulatory, social-economic, and leadership-related factors), as

certain topics could be observed to be more significant in different school cases. Although the purpose of this analysis was not to compare the dominance of utopian or dystopian expectations based on organizational characteristics, future research should investigate causal relationships between contextual factors and the nature of organizational-level attitudes toward digitalisation, as this can guide school leaders in creating an accepting environment for beneficial digital developments.

One of the research's limitations is the generalizability of the findings, as the sampling of school institutions is quite focused and could be further diversified (e.g., along further different maintainers like foundations (private) or universities, regions, types of settlement, school profile/specialization, etc.). An analysis of imaginaries coming from students, parents, and other public or private sector actors is also highly advisable to understand the complete context of educational digitalisation, which was not possible within the scope of this research. This way research results represent the school staff's perspective only. In terms of data collection methodology, we discovered that, due to the reservedness of school communities' vision expression, visual qualitative research methods could be even more productive and provide rich and valuable data.

III.6. Conclusions

This article aimed to fill a research gap in our knowledge about the hopes and fears of school communities towards school digitalisation in the context of a Central and Eastern European country. The study summarized and introduced two future visions, a digital utopia and dystopia for schools, and discussed results in light of current academic literature. Results suggested further research on financial, policy, managerial, equity and social aspects of educational digitalisation, as well as the application of critical theory in research, and image-based methodological approaches. The present research contributes to the general educational digitalisation literature and can serve as input for an evidence-based macro-level policy and strategy-building practice, as well as for local-level level development and change-management programs.

Discussion about digital visions and future perspectives in educational institutions is still an emerging topic of both practice- and theory-oriented education research, especially considering organizational aspects, as these are typically outweighed by pedagogical approaches. Furthermore, primary, and secondary educational institutions are under-researched in this field

compared to higher education. Negative anticipations and critical voices should be put forward as well so that strategic remediating measures can be taken.

Based on the findings, the author of this paper believes that by utilizing the tools provided by digitalisation in an evidence-based, critical, and ethical manner, an optimistic future is just around the corner; and supporting that is the mission of academia.

IV. Understanding crisis perception and organizational learning: A case study of school organizations in the COVID-19 pandemic

Abstract

The research investigates the organizational dynamics of learning-in-crisis (LiC) in five Hungarian education institutions in the light of the COVID-19 pandemic with a focus on digital competence building, and the influence of organizational perception of contextual factors. The path of organisation-level learning that takes place as a result of the crisis event was analysed along two factors: the extent of perceived impact and the relevance of the rare event. Results of the qualitative, interview- and observation-based research show that learning willingness is different in the face of an identical external impact, influenced by organizational and financial capacity, as well as autonomy and stakeholder maturity for change. The depth of learning is related to strategical and cultural match with the sought-out competence, as well as field knowledge and the presence of parallel crises.

IV.1. Introduction

The education system worldwide was severely impacted by the coronavirus. With concerns about health and safety rising, schools and teachers had little time to implement remote-controlled home learning. They self-reported being unprepared for this challenge. Teachers quickly adapted to new digital tools, learning from each other online and within school communities. Meanwhile, school leaders coordinated staff preparation to meet the needs of students, families, and society. This external shock triggered an ongoing learning process in digital competence, leading to a complete reorganization of the education system and individual schools.

In this research, the author investigates how a specific competence, digital competence is developed within the crisis. The research follows five cases of Hungarian school organizations and observes the pandemic-crisis-induced organizational learning in the field of digital competence, caused by the necessity of remote-controlled home learning, which was mostly managed with online tools. The author aims to answer the following research question*: What factors influence the learning paths of the observed organizations within the crisis, and how?*

In this paper, to address the form of teaching and learning during the pandemic, the expression "*online education*" is used, knowing that it does not cover the realities of the phenomenon fully.

The forms of remote-controlled home learning have been diverse, often applying offline solutions to bridge digital gaps in society. However, it cannot be labelled as distance education either, as *distance education* is a different professional term (Gunawardena & McIsaac, 2013). As this paper investigates the development of digital competence in the pandemic crisis, to put the focus on the online and digitally supported nature of education, the above term has been chosen.

Digital competence can be broadly defined as the confident, critical, and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion, and/or participation in society, while a "digitally competent educational organization" refers to a school in which digital technology is used effectively by the staff to provide a compelling student experience and to realize a good return on investment in digital technology (Kampylis et al., 2015). Consequently, the paper understands organisation-level digital competence as the competence to leverage on individual and organisational digital features to support core and supportive processes within the organisation.

In the second section, the prominent crisis-learning literature is introduced, followed by recent empirical research results in education and the context of the research. In the third section, crisis understanding is displayed together with how the following learning can be interpreted along the identified factors. In section four results are summarised and finally the learnings are concluded in section five.

IV.2. Theoretical background

4.2.1. Crisis learning

Crisis-like events are labelled differently across academia, such as *crises* (Rerup, 2009), *rare events* (Starbuck, 2009), and *disasters* (Birkland, 2009; Birkmann et al., 2010). In this study, the term crisis is defined as the state of an organization when the current situation challenges the organization's basic assumptions and goals, threatens its operation, and even survival. Crisis brings time pressure without any tried and tested coping mechanisms available in a very ambiguous environment (Antonacopoulou & Sheaffer, 2014).

Learning in chaotic contexts changes the nature of organisational learning (Hámori, 2012). Analysing crisis literature through the lens of organizational learning, the most characteristic related terms are *learning from crisis* (Elliott, 2009; Elliott & Macpherson, 2010; Smith &

Elliott, 2007), *crisis learning* (Broekema et al., 2019; Lee et al., 2020), *learning in crisis* (Antonacopoulou & Sheaffer, 2014), *learning through or from rare or unusual events* (Beck & Plowman, 2009; Lampel et al., 2009), and *crisis-induced learning* (Deverell, 2009) and even *intercrisis and intracrisis learning* (Moynihan, 2009).

We can differentiate between a modernist and a postmodernist stream of thought. When we look at learning from crisis from a modernist view, we can talk about learning as crisis-induced learning ("lesson-drawing processes" triggered by the crisis) (Deverell, 2009, p. 180), or can be categorized as intercrisis ("learning from one crisis to prepare for another") or intracrisis ("learning that seeks to improve response during a single crisis episode") learning (Moynihan, 2009, p. 189). This approach perceives crisis as an external impact affecting the organizational equilibrium. From a postmodernist view, Antonacopoulou and Sheaffer (2014) defy the separating approach and promote a dynamic view of learning. This view describes *learning within the crisis*. This approach embraces crisis and sees it as a natural event of continuous change. Thus, learning *from* a crisis or a failure is not as clear-cut as assumed. Authors even suggest that "understanding the dynamics of learning and crisis may reveal *why* critical incidents may be perceived as crises in the first place" (p. 6).

Both learnings blocking and fostering aspects of crisis have been observed in empirical studies (Deverell, 2009). According to Christianson and colleagues (2009), rare events trigger learning in three ways: 1) rare events act as audits of existing response repertoires, 2) disrupt and foster the reorganization of routines, and 3) redirect organizational identity. Similarly, it is suggested that crisis experience is helpful in new crisis encounters (Moynihan, 2008) by improving understanding of latent, previously hidden flaws (Robin et al., 2019); consequently, it "broadens the scope of action and builds confidence in experimenting with new ways of thinking, acting, and learning" (Antonacopoulou & Sheaffer, 2014, p. 16). The crisis also creates a *learning space* that cultivates networks and trans-sectorial partnerships (Robin et al., 2019) and the involvement of external experts (Broekema et al., 2018), enabling the procurement of significant outside-organization knowledge and the creation of knowledge synergies.

According to Moynihan (2008), several factors hinder or block learning: the high consequentiality of crises makes trial and error learning prohibitive, there is a lack of relevant experience or existing tools, the organization misses to meet the needed scope of learning, faulty lessons are drawn, the narrowed focus limits information processing, actors recycle old solutions to new problems. There might be a lack of inter-organizational contribution to organizational learning, furthermore, political dynamics, defensive postures, denial of the

problem or responsibility and opportunism can also block organizational learning in crises (Moynihan, 2008).

Besides learning and not learning in crisis, we can also talk about *unlearning* in a crisis, as first, prior routines have to be unlearned to give way for practices adequate in the crisis (Starbuck, 2017). Then, however, a great part of these new practices, knowledge, network relationships, etc., get unlearned as well once the crisis is over (Robin et al., 2019), and the previously cultivated attributes of creativity, openness, and ability to change lose significance in the eyes of organisations (Pogácsás & Szepesi, 2023).

According to the model of Lampel and colleagues (2009) in Table 7, learning that takes in an organization as a result of the crisis is fundamentally influenced by two factors: the extent of the perceived impact and the perceived potential relevance of the phenomenon. Perception of the possible impact determines the willingness to learn, while the perceived relevance of the crisis decides the type or depth of the learning that happens. *Transformative* learning, which we can view as double-loop learning, can occur when both levels are high.

Table 7 Types of Learning in Crisis

	POTENTIAL IMPACT	
POTENTIAL RELEVANCE	High	Low
High	Transformative	Reinterpretative
Low	Focusing	Transitory

Source: Lampel et al. (2009, p. 839)

Based on the above literature, we can conclude that even though macro-level crises have common characteristics that can be generalized throughout the demography it affects, based on local characteristics, the effects themselves or the magnitude of the effects can be different, as well as the learning that entails. In this paper the author focuses on local, organizational learning mechanisms during the general humanitarian crisis of the COVID-19 pandemic, analysing specifically the digital technological learning of school organizations.

To frame our research accordingly the observed crisis impact is defined in the following way: *The crisis is an outcome of the COVID-19 pandemic, causing schools to operate an online-technology-based education system and additional social and sanitarian services, for which they did not have sufficient level of competence*. The definition reflects Antonacopoulou and Sheaffer's (2014) approach, considering the crisis as a natural event resulting from competence gaps in organizations. This understanding suggests that the competence gap existed before the crisis but was revealed by the urgent need for a higher level of digital competence; this statement was reinforced throughout the research interviews. Thus, Lampel and colleagues' model, which focuses on perception, is suitable. While acknowledging the severe health-related crisis effects on individuals, this article adopts an organizational perspective, viewing the pandemic as the context rather than the crisis itself.

4.2.2. Empirical results from schools in the COVID-19 pandemic

Several studies have been conducted recently in the education sector to assess the learnings of the online education period (Scopus search terms: (“digital*” OR “technolog*” AND “learning”) AND ("covid*" AND "school")). Main themes of these research projects focus on leadership capacity and practices (eg. Beckmann & Klein, 2022; Lien et al., 2022; Weiner et al., 2021), organizational learning practices (eg. Kopp & Pesti, 2022; Zaalouk et al., 2021), policy effects (eg. Zancajo et al., 2022), success factors and effects of transition (eg. Delcker & Ifenthaler, 2021) in connection with the crisis.

The meaning of crisis for schools was understood similarly in the empirical results of the above papers. The health danger our society was exposed to, left students isolated from education, connected social functions and services, and put immense pressure, often both physically and mentally, on schoolteachers and the school management. School organizations had to find solutions to mitigate the possible damages. According to the reviewed literature these solutions are mostly explained by leadership, organizational learning in the context of transitioning to online education, and technological factors in the reviewed literature.

It has been shown that success in handling the crisis depended on the ability of school leaders to apply a flexible leadership style, address issues directly, provide clear instructions and expectations, and leverage their autonomy to fittingly adapt governmental instructions for their local situations (Lien et al., 2022; McLeod & Dulsky, 2021) while leveraging on distributed forms of leadership (Beauchamp et al., 2021) at the same time. These leadership characteristics

not only afforded schools to switch quicker to online teaching (Delcker & Ifenthaler, 2021) but helped to conquer uncertainty and anxiety better as well (Lien et al., 2022). Schools with high leadership capacity could even maintain promoting academic learning during the pandemic (Beckmann & Klein, 2022).

Experts argue that pre-crisis learning and knowledge-sharing practices (Kopp & Pesti, 2022) next to sufficient technology (Navaridas-Nalda et al., 2020) have been key to showing resilience in the current crisis (Delcker & Ifenthaler, 2021). Weiner and colleagues (2021) highlight organizational features in the pandemic, such as culture, autonomy, infrastructure for collaboration, and organizational learning as significant influencers of psychological safety in the organization. Internal and external organizational trust as well as building on and working together with stakeholders was shown to have an important supporting effect on successful crisis management (Ahlström et al., 2020; Lien et al., 2022).

Delcker and Ifenthaler (2021) also emphasize that the involvement of external ICT professionals would be necessary for building the digital resilience of schools, as the inner stakeholders don't have the know-how and/or the capacity to develop and maintain ICT systems. Navaridas-Nalda and colleagues (2020) showed that school principals' digital competence, which increases their perceived usefulness of technology, significantly influences the integration of technological solutions.

The long-term organizational effects of learning due to the crisis are still in question. Kopp and Pesti (2022) note that even though initially there seemed to be a tendency or wish to formalise and institutionalise newly introduced processes, schools were keen on preserving their organisational traditions too. Therefore, even if there was an opportunity to reimagine organizational and pedagogical practices as a result of the crisis event, development steps and macro-level innovations are uncertain, furthermore, other preventive learning practices typically stopped during the pandemic period. Pató and colleagues report a reactive approach resulting in operational decisions in a wider economic context too (Pató Gáborné Szűcs et al., 2021).

4.2.3. The Hungarian context for schools' online learning in the pandemic

Hungary can be viewed as a highly centralized, conservative education system with relatively low local autonomy of schools (Radó, 2022). The public school system is maintained by the 60 school districts supported by a central organization, the Klebelsberg Centre (KC) and by the

Educational Authority (EA), responsible for professional assistance and governance. Although historically centralized, after 1990 Hungarian schools became highly decentralized, and maintained by local municipalities, until 2011, the foundation of KC (Radó, 2019).

Major ICT development projects in Hungarian schools have been carried out for the past ca. 20 years. Between 2016 and 2020 the country had a legitimate digital strategy, the Digital Education Strategy of Hungary (Magyarország Digitális Oktatási Stratégiája, 2016), later, another proposal document, DigiNOIR (Halász et al., 2019) got prepared and was taken as a basis for policies. In the lifespan of the above-mentioned strategy, several steps were taken: the National Public Education Portal (nkp.hu), a portal for digital textbooks and learning tools created between 2016-2022, laptops distributed for professional use, accompanied by training, installation of faster internet, the introduction of the digital education management systems eChalk (eKRÉTA) in the 2018/2019 school year, the Public Education Information System (KIR), the Secondary School Enrolment Information System (KIFIR), among others.

Regarding digital competence, in Hungary ca. 20% of the teachers assess themselves as beginners, 40% as independent users, and 40% as advanced users of technology in education (I. Fekete, 2022). In all these segments teachers are reported to be generally motivated in preparing for online lessons, however, they don't fully believe in their effectiveness, and they feel students are not motivated by them.

According to Monostori's research (2021) on the pandemic's impact, teachers gained more classroom freedom, leading to various school-level solutions. These solutions included unified digital systems, improved teacher digital literacy, and regulations for online lessons, fostering teacher collaboration and innovation. These changes also benefited students and parents, making educational frameworks more organized. However, differences between schools persisted and, in some cases, grew wider. Schools experienced with digital technologies and innovative pedagogy recognized the advantages of their previous efforts in skill development and creativity.

IV.3. Methodology

For the purposes of the research the qualitative approach has been chosen, as it allows one "to make sense of or interpret phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 2011, p. 3). The research explores meaning-making through the cases of five schools

as a part of the learning organization research and development project (2015, 2020) of KÖVI (Hungarian-Netherlands School of Educational Management) in the South Great Plain region of Hungary, and as the of the doctoral research of the author.

The schools were selected *intensity-based* with *stratified purposeful* sampling (Huberman & Miles, 1994). The *intensity* criteria demanded schools be able to show some examples of involvement in organizational digitalization initiatives in the past two years. For the *stratifying* criteria, the varying attribute "school owner" was chosen. As a result, state schools providing general and vocational education, as well as church-owned schools are also part of the sample, as domestic debate suggests that these schools have different opportunities regarding funding and autonomy (Jordán, 2019; Péteri & Szilágyi, 2022). The participation was invitation-based. As the project demanded serious engagement from the schools, the most significant criterion for selection and invitation was their readiness to cooperate in the different stages of the research project. In the first round 5 schools got invited; as all of them agreed to participate, a second round of invitations was not issued. A summary of the main characteristics of the schools can be found in Table 8.

Table 8 Summary of the participating schools

Name	**S1**	**S2**	**S3**	**S4**	**S5**
Owner*[4]	Ministry of Human Resources	Ministry of Human Resources	Ministry of Human Resources	Organization of a Christian church	Ministry of Innovation and Technology
Level*[1]	primary and lower secondary	primary and lower secondary	primary and lower secondary	(early childhood), primary, lower, and upper secondary	upper secondary, (adult)
Type	general	general	general	general	vocational
No. of students*[2]	643	271	402	852	n.d. ~1200-1300*[3]
Location	county capital	small town in the agglomeration of a county capital	midsize town	county capital	county capital

*[1] Educational levels in brackets were not involved in the research

*[2] Student number includes only the educational levels that were involved in the research based on 2022 data from https://dari.oktatas.hu/kirpub/index

*[3] Estimate based on 2019 data from https://dari.oktatas.hu/kirpub/index

*[4] Names of the responsible ministries as of the time of the research, 2021-2022

Source: Own editing

In the initial research phase document analysis was conducted, collecting school documents, and reviewing past digital-competence-related reports where it was available. These didn't directly contribute data to the research, instead, they informed data collection.

Data collection was carried out in individual and focus group interviews extended with on-site observation of classes, and if possible, meetings, and workshops. The sampling of interview participants happened purposively, inviting three different groups: school leaders, administrative staff members, and teachers. Individual interviews in the research served the understanding of school management perspectives; these involved school principals and vice-principals extended by administrative staff representatives. Teachers participated in the focus group interviews to provide space for discussion and debate. Teachers were selected by school principals along the following pre-determined attributes: (1) diverse levels of digital competence (based on the principals' professional judgement), different (2) hierarchic positions, (3) age, (4) duration of school affiliation, and (5) subject backgrounds to avoid biased or wishful images about the organizations. The prepared field notes include a description of the setting, participants, interviews, class and meeting observations, and critical reflection, and were used as supporting research material for triangulation.

The main interview topics were 1) the characteristics of the school's organizational learning, 2) technology usage, and 3) experiences and learnings of the online education period of the pandemic. Altogether 24 interviews were carried out between 11th June and 31st August 2021, 14 individual, 2 in-pair, and 8 focus group interviews. In-pair interviews were designed as individual, but in two cases school leaders insisted on taking the interview together for efficiency purposes. The longest interview took 2 hours and 5 minutes, and the shortest was 46 minutes. 23 interviews have been recorded, transcribed, and coded in the NVivo software. One group interview, where the participants rejected the recording, was taken notes of and then similarly transcribed and coded in NVivo. In the text the interview codes can be understood as

follows: the first part of the code refers to the school (S1, S2,…), the second part to the interview subject (L=leadership, T=teacher group, A=administrative staff), and the third part provides further specifications (A=administrative staff, P=principal, VP=vice principal, GNo=number of the group within the school). Summary of the interviews can be found in Appendix II.

The first round of coding was theory-driven, based on Lampel and colleagues' model, and applied the codes (1) potential impact and (2) potential relevance. Items coded under the two main codes were (1) perceptions about the possibility and the capacity for future change based on experiences of the online education period and (2) perceptions, of whether the experiences fall into the organizational "attention". After a sample coding of all interviews of one research case, the theory-driven codes were accepted. Sub-codes were assigned using the pattern coding method (Saldaña, 2013). All data collection and analysis tasks were completed by the author of the paper.

The research's validity was ensured through triangulation (Denzin, 2012), involving multiple viewpoints (leadership, teachers, administrative staff), multiple cases (five in total), and various methodologies (individual and group interviews, observation). Peer-cross-validation was applied too in different stages of the research project. Reliability is supported by the detailed methodology explanation and project documentation. However, due to the very nature of qualitative research, full and objective generalizability and universality cannot be fully enforced (Gaudet & Robert, 2018). Ethical considerations were addressed, ensuring anonymity through assigned codes for school organizations and participants. Informed consent was obtained from respondents before interviews, following the study's purpose and data collection and analysis procedures (Kvale, 2007). Digital data was stored on personal drive. The research project followed the British Educational Research Association [BERA] Ethical Guidelines (2018) and was approved by the doctoral school of the author.

IV.4. Results

Crisis learning paths

Our interpretation of the chosen model looks at schools and their learning paths during the COVID-19 pandemic. For instance, the day-to-day operation of a school can be seen completely transformed by the need to provide education online that might have a long-lasting impact (perceived impact), but the learning can be strengthened by recognizing the lack of digital competence and knowledge about digital tools supporting school operation as a development

point independently from the crisis as well (perceived relevance). We could assume a high level of both factors; however, we may find that it is not evident.

Table 9 The analytical framework for learning path analysis

	Factors	Definition
Potential impact (willingness to learn)	Organizational capacity for change	The school has the necessary capacity (including HR and learning practices) to implement change.
	Financial capability for change	The school has the resources to financially support the necessary changes, including infrastructure.
	Autonomy for change	The school has the autonomy to make strategic decisions about issues connected to digitalization.
	Stakeholder maturity for change	Stakeholders, mostly students and parents, are capable and willing to handle tools and services that are outputs of the digital innovations in the school.
Potential relevance (type/depth of learning)	Strategy match	The organizational strategy includes digital innovation as a key element.
	Cultural match	The school's organizational and pedagogical culture and values are supported by digitalization.
	Field knowledge	The school has the professional knowledge to understand and leverage the opportunities provided by digitalization.
	Parallel crisis	The school has no parallelly ongoing crisis affecting its foundational operations.

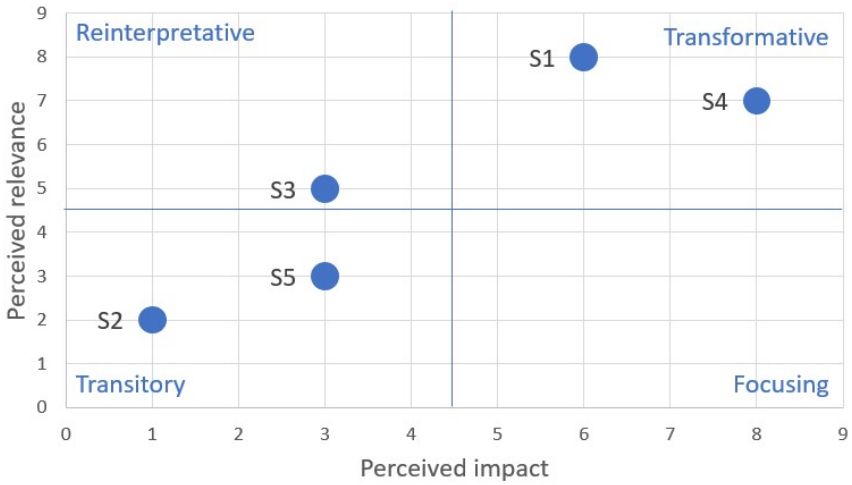
Source: own editing

Based on the interview data factors of the main axels of the model were identified that explain the willingness and the depth of learning in the crisis. Table 9 includes the influencing factors, that emerged from the coding process referred to in the method section. Definitions were worded by the author based on the whole methodological scope of the research.

These factors enabled the allocation of points to organizations, establishing scores along both axes and positioning schools within a matrix for comparative analysis (Figure 11). Points were

assigned based on the interview data by the author on a 0 to 2 scale, where 0 indicated the absence of a characteristic, 1 denoted partial presence, and 2 represented full presence, based on research participants' statements (in the case of "parallel crisis", 0 referred to a severe parallel crisis, and 2 indicated no parallel crisis) (for the scoring see Appendix IV.). While some statements were grounded in objective facts, they inherently represented the local understandings and perceptions of the participants. In the following discussion, it is explored, how these diverse factors influenced individual schools' learning and its implications for crisis management.

Figure 11 Different learning paths of the participating schools



Source: own edit based on Lampel et al. (2009, p. 839)

Perceived potential impact

Here we assessed factors that would influence the belief in schools, that the pandemic can truly bring a change, a lasting impact in the organization. We chose this perspective, as viewing short-term impacts would less likely allow us to differentiate beyond transitory learning.

Organizational capacity for change

Here we look at learning and HR capacity. We can observe that the learning capacity of the organization, and the learning practices, that the school had in place, not specifically from

previous crisis experiences, but in general, were very decisive in how effectively schools could adapt to challenges.

S1 and S4 had organizational-level learning practices in place and were conscious of the learnings of the online education period that can bring in the regular practices of education and organizational operation. These organizations realized the positive outcomes they could leverage, and they managed to locate areas of shortcomings in online education they will have to address later. Proof of this in S1 is a report of the pandemic period's experiences that a team of the school prepared and was presented in the school and shared among other schools in the school district. S4 created a new segment in the official house rules specified for online education. In other schools either there were no effective systems in place (S2), or for different reasons, the system was fragmented (S3, S5) which led to weaker visions of change.

> *The situation at our school is very fortunate, as the internal transfer of knowledge works in an extremely advanced way. […] If we take this [online education] as a new thing that got introduced, a new thing that had to be organized: This was actually not very unlike us, because we have already led and organized countless innovations.* (S1-L-VP)

The availability of the necessary human resources influences the perception of impact as well. In the case of S2, the perceived impact is minimal, as the school, especially on the lower secondary level, is quite overwhelmed because of HR shortages, as is the vice principal, responsible for this field. The cases also show that it is important to have a specialized person (e.g. S4) or team (e.g. S1, S5), who are empowered to support the changes in the long run; without this structural change, a lasting impact is not possible.

Financial and infrastructural capability for change

In all government-maintained institutions (all but S4), the impact is expected to be small, as the budget for digital investments and especially for maintenance is extremely low in comparison to the needs of the schools. A common example in state-run general education schools (S1, S2, S3) is the issue of changing the expired bulbs in the beamers, which are viewed as basic teaching equipment, but schools have to wait to get them fixed, sometimes up to 2 years. In S5 the main topic of lacking infrastructure was the missing Wi-Fi availability for all school citizens, that got resolved just before the interviews. In S2 especially, school infrastructure is heavily criticized by the staff who do not feel that they have the necessary system or local support to improve digital competence at the school. S1 and S5 were somewhat more optimistic, seemingly as a

result of higher-level district management support, but also as a result of higher organizational capacities that could compensate for some of the financial disadvantages.

> *But like this, it doesn't really make much sense... Even though we learn something in a course or training, it sounds very good, and it's not that people aren't open to it or something like that, but it's simply not feasible. When you really struggle with the fact that the projector doesn't work, the children can't see it, the computer doesn't even load, and the program doesn't run.* (S2-T-G2)

Autonomy for change

In S2 *regulations* of the ministry and the school district are taken very seriously by the school management. They find it risky to experiment and innovate within the boundaries of the pandemic, and digital competence building is held back. A teacher has even received a written warning from the school principal for using unsanctioned digital tools as online education started, as they threatened to overwhelm students. Moreover, the school has been "sitting" on tablets without ever using them, because they were forbidden to, due to a missing central training event that fell out in the lockdown. Accordingly, any progressive action in this field seemed fake to some of the teachers in this school.

> *[…] we were given tablets and the tablets have been here for four years and we can't use them. Because they did not provide it with the necessary program. Here, the system administrator could do it, [one of the teachers] could do it, but it is not allowed. So, as I see it, somehow these things that we want to improve, and what KC gives us, somehow, should be brought closer together […].* (S2-T-G2)

S5 and S4 point to the political, structural, and social issues that will spoil the opportunities of digitalization, namely governmental misuse of educational channels. Some teachers were rather sceptical about where digitalization can take schools and envision the replacement of onsite teachers, to solve teacher shortages, but they also fear surveillance and growing exploitation through digital spaces.

S1 and S3 have an average level of autonomy within their jurisdiction and power. Even though both schools have been subject to forced school mergers, the professional staff within the school is strong and empowered by the local leadership.

Stakeholder maturity for change

In S3 and S5 especially, students' social background has a very serious influence on the perception of possible change. During the pandemic class teachers had more frequent contact with parents and they had to experience their lack of capability or willingness to handle digital tools. Although students had been thought to be digitally more mature nowadays, it turned out that their knowledge and attitude towards these tools vary a lot too. Moreover, teachers were struggling to find pedagogically right solutions to work with primary school students and vocational students especially. The experiences, therefore, showed that for change to happen, they have a lot of educational tasks with students, parents, and other stakeholders, even before they get to use modern technology in education, making a quick change unattainable.

> *So far, I actually feel that this digital education, distance education, can be implemented quite difficult from the student's point of view, as long as they live in this structure, where usually there are networks, and service providers, that provide internet like in a fairy tale: "once upon a time there was internet". And the other thing is the devices for the students [lack of] ...* […] *A simple logging-in caused a problem, how they can enter eChalk. Username, password. So even something like this causes an issue.* (S5-T-G2)

On the perceived potential impact axis, we could observe that in a crisis organizational learning routines and available resources (HR and financial) are key for engaging in transformative learning. Organizational autonomy and stakeholder maturity can enhance the learning progress to improve digital competence, however, these factors in themselves do not guarantee change, and the lack of these factors might block learning. In a crisis, these factors are usually moderately modifiable under time pressure but can be targeted to be adapted to the situation to remove blocks from learning's way, for example by forming ICT support teams, handing out devices, educating students and parents and delegating decision rights to lower hierarchical levels (from EA or KC to school level, or from principal to ICT responsible level).

Perceived potential relevance

Here we assessed factors that would influence the understanding of the relation between the competence gap revealed by the crisis and the organization's identity. The factors emerging were very prominent. The first two, strategy match and cultural match were part of the narratives within the interviews, while the influence of field knowledge and parallel crises were revealed and emphasised by observation data and comparison of the cases.

Strategy match

In the interviews, we can see that it is decisive in the approach to learning whether the school had a digitalization strategy in place. For example, S1 and S4 perceived the high relevance of online education as both schools supported digital development. S1, as a talent-nurturing institution with a focus on natural sciences, saw its duty to keep up with the changes this new situation could bring. S4 was planning to start a class with a specialization on IT skill development and digitalized pedagogical methods; they even have a vice principal dedicated to this strategic action. These specific goals focused their attention on a deeper learning process.

> *Actually, we were also thinking about a "digital class". […] It's [digital competence] not something you won't use later in life. We believe that this could be provided, and smart usage of digital tools could be made a part of the learning process even in non-pandemic times. We still have to learn a lot and invest a lot in this, although I think we have come closer to this with the pandemic period by light years.* (S4-L-P&VP)

In S2, there were no clear strategic goals. Thus, it was hard to connect the opportunity of the crisis to any development paths. The school's philosophy also disfavours certain digital solutions, arguing that they would exclude students and families and that they must provide education equally to all. The school principal encourages steps in this direction (e.g., digital planning workshop, knowledge sharing workshop), but teachers don't believe in the sincerity of these measures. S5's school strategy focuses more on supporting students who struggle at school and on providing them with international opportunities through Erasmus+ programs. Digitalization is seen as important but is not put in focus at the time of the research. It seems, that schools learned not to pursue local strategic goals that are not financially supported on the system level.

S3 has an IT focus in its pedagogical portfolio, and as such, there is a very active and highly skilled team innovating in this field. However, the pandemic and the forced digital tool usage made them realize, that they might be much less prepared on the organizational level than they thought and that there is a gap between the level of perceived and real digital competence.

Cultural match

Crisis learnings related to digitalization closer to the organizational culture were shown to be easier to adopt. In S3 IT education has a long-lasting history, it is part of the school's identity. The leadership of the school, therefore, feels that they must adapt not only on the pedagogical but also on the organizational level.

S4's case is quite special, as this is the most well-equipped and most digitally competent school among the participating institutions, with the strategic plan to start a digital specialization. However, as a religious school, its pedagogical philosophy, emphasizing spiritual, emotional, and social education, is very strong, and digitalization comes forth as an enemy of this ethos in the interviews. The motivation for greater learning in digital solutions arises from a professional standpoint, seeing them as useful tools for their objectives.

> *[…] our institution considers upbringing to be very important in addition to education. And this upbringing is damaged. We can... we can also educate them in an online system that "this is how it is appropriate", "this is how you act", "this is how you speak", "this is how you dress", I don't know, but somehow, this was damaged. This is part of our education. And that's important to us. We can't let that get damaged. Because that's what makes us [the school's name], that's what makes us special.* (S4-T-G)

S5 demonstrates a strong leadership body and an innovative school culture, recognizing the potential of technology to empower students in their learning. They have utilized various ICT solutions for organizational purposes for a longer duration compared to most schools. However, students themselves are studying manual professions there, and digitalization seems to crawl slower into the school's pedagogical life. In contrast, S1 embraces digitalization as it aligns with its vision of innovation and progressiveness, with a commitment to remaining relevant and excellent as an institution. On the other hand, S2 lacks a clearly defined cultural focus that could facilitate or hinder the adaptation process. The school's leadership culture tends to be more autocratic, with decision-making primarily vested in the principal. As the principal is not actively engaged with technology, the school culture leans towards being reactive as well.

Field knowledge

What we can see in the case of S2 is that perceived relevance was lower also due to the lack of knowledge about their possibilities, the missing digital competence in the teacher community and especially in the management team, which has difficulties setting directions. In the digital planning workshop organized for the teachers, we observed that it was hard for them to set

goals for digitalization, choosing actions from a very small variety of options, because they did not know, what they could aim for. Furthermore, these actions were pointed mostly outside of the organization.

> *But based on the model of this [other innovation], even in this area, in the digital area [we have to be] accountable, yes. Me too, because I am mostly digitally illiterate. We have to formulate it [the strategy], and then there shall be no parrying.* (S2-L-P)

> *They forced it [eChalk] on many schools where the management was not, wasn't… [thinks as if (s)he wanted to phrase it carefully]… "up-to-date", or its digital competence was not that advanced, you could put the eChalk on them, and then they forced those members of the teaching staff who could otherwise have been able to teach effectively with more modern tools. So, it was a setback for me, a very big setback, and such a pointless fight. So how... So, it was quite unpleasant to receive a written warning because I tried to use modern tools.* (S2-T-G2)

The principals of the schools did not possess comprehensive field knowledge themselves. Therefore, leveraging the knowledge of colleagues becomes crucial for decision-making. In S4, a vice principal specializing in digital development takes responsibility for the entire institution in this domain. S3 benefits from a highly dedicated group of teachers, forming an informal collective that includes the principal, enthusiastic about exploring digital pedagogical possibilities and organizational solutions. S1 benefits from three IT teachers who are eager to improve themselves and coordinate learning within the organization, backed by the support of the principal. In S5, some digital knowledge exists at the management level but lacks systematization within the organization in everyday practice. S2 appointed relevant colleagues to coordinate efforts in the school in this field. Although S1 and S4 achieved the most efficient outcomes, it is noteworthy that the appropriate solution may vary across organizations. Notably, there was no explicit involvement of external experts, which could have been a viable method for building competence.

Parallel crisis

Parallel crises can impede organizational learning, leading to shallower learning from the less relevantly perceived one. In the cases of S3 and S5, the level of perceived relevance was significantly lower due to concurrent challenges. S3 faces a transformation from a previously high-performing institution to a more segregated and low-performing school, necessitating a

complete cultural change that emotionally impacts the teacher community, causing grief-like symptoms within the organization, and deflecting attention from crisis learning. Notably, in S3, one teacher group objected to a voice recording of the interview due to their intense emotions of fury and critique, indicating the gravity of the situation.

> *Our school is going through a crazy period of trouble right now. […] Yes, it is constantly changing, circumstances change, external conditions change, and perhaps this is the worst. Everyone has to learn to adapt to these external conditions, which is not an easy task. We were a school 10 years ago that could be said to have been the elite school of the city. […] The point is that now we are practically a – and this must be accepted – a comprehensive school. And of course, we are holding on, and I think there are a lot of good innovative ideas within the school, but we have to understand that it is no longer just about reaching the sky with everyone […].* (S3-T-G2)

In S5, students come from disadvantaged social backgrounds, leading to a persistent risk of large-scale dropout even in regular periods. During the transition to online education, the primary objective was to retain students in the system, despite their limited access to adequate tools and internet connectivity, even though the teachers were prepared for more advanced digital tasks. Additionally, the school confronts continuous, extensive policy changes, while the emergence of new religious vocational schools with competing programs creates concerns among vocational educators regarding job security.

> *Because the children are functionally illiterate, 90 per cent of them, with some honourable exceptions. And even high school graduates [who complete final exams next to their vocational exams]. And they struggle with social and other identity disorders, literally. Lacking love, with all kinds of "isms" and other [personal] stories. We are trying to bring them back to life and try to help them somehow to learn, how to learn. But in truth, we don't have the time, the energy, the number of hours, the opportunity, or any other conditions.* (S5-T-G2)

We can also observe, that in those cases where there were some parallel crisis effects, it was more difficult even to keep the interview participants on the interview topics because they kept slipping back into discussing the more painful topics and into ventilating.

In short, both schools were struggling with parallel crises that made the digital development aspect of the pandemic appear transitory in comparison. In S2 conflicts between teachers and the principal stirred some emotions and deflected focus from learning at least for a part of the

teachers. The other schools struggle with hardships too naturally, however, they were less engaged in them parallelly.

The perceived potential impact axis revealed that during a crisis, the organization's inherent strategic and cultural characteristics play a pivotal role in shaping its learning actions. Organizations lacking alignment between strategy and culture perceived the crisis as a threat that necessitates adaptation. Conversely, those in line with strategy and culture viewed the crisis as an opportunity for inspiration and change. The depth of learning is contingent upon field knowledge; organizations without experts can empower employees to become in-house experts or seek external expertise. Further research on expert involvement, prerequisites of openness, and success factors is advisable based on these cases. Parallel crises can impede learning opportunities, even when the learning is relevantly perceived in the crisis. This emerged as the most restrictive factor of transformative learning in the observed cases.

IV.5. Discussion

Within the cases diverse crisis perceptions can be observed, which lead to varying paths of organizational learning. As an answer to the research question the results pointed to the following: willingness to learn depends on capacities, autonomy, and stakeholder readiness; learning depth is influenced by the crisis's relation to strategy, values, culture, expertise, and organizational attention. The analysis reveals different orientations in all framework factors, supporting our findings.

Results reflect and support several findings of related research reviewed above. The need for firm leadership (McLeod & Dulsky, 2021), efficacy and psychological safety (Weiner et al., 2021), the trust in leadership, teaching staff and the education system in general (Ahlström et al., 2020), showed to be truly important factors of learning ability in a crisis, while preserving traditions as a part of organisational culture (Kopp & Pesti, 2022) was also pivotal in choosing learning paths.

An important contribution of this research is the observation that learning routine, stable learning practices, a "fitness" for change, and practising habits of a learning organization seemed to be the greatest accelerator for action. Results prove the necessity of organizational excellence besides upholding professional excellence in organizations, so much so, that a "Matheus effect" was characteristic, where the schools who have been exercising innovation

the most previously could profit the most from the crisis as well, similar to Monostori's (2021) findings. The level of subject-matter expertise on hand allowed organizations to understand relevance in greater complexity, enabling deeper learning as well.

This finding also shows that previous learning experiences do not have to stem from handling previous crises, but well-oiled learning mechanisms and well-trained muscle memory for handling change can be sufficient, which of course can be supported by contingency plans designed for crises.

However, high learning capacity (like in the case of S5) showed not to be enough for deep-reaching learning, if the subject of learning (digitalization) was not in line with the organization's culture and/or strategy, even though, building digital competence was their key to survival at the time. On the other hand, a weaker cultural fit with digitalization did not stop learning if the strategic focus and necessary structural prerequisites were in place (S4).

Learning was supported well by structural coordination measures, such as appointed or voluntary teams or responsible(s), who channelled the subject matter expertise in the organization, as well as became the conveyors of a firm management practice needed under time pressure. In this aspect, the empowerment of those responsible, and coordinators were key in handling the arising issues quickly and with the necessary knowledge, supporting Beauchamp and colleagues' (2021) finding connected to distributed leadership.

Another important contribution of the research is the recognition of parallel crises in organizations drawing away attention and impeding transformative learning. There were tangible signs of organizational grief in at least two of the school cases, and this phenomenon was the most intense negative force influencing organisational learning observed during the research. Weiner and colleagues' (2021) findings on psychological safety and organizational features are in line with our research findings connected to learning, suggesting that the lack of parallel crisis, as a form of psychological safety, can be coupled with the basic requirements of transformative organizational learning.

Interestingly, network learning effects, which are typical characteristics of crisis action (Robin et al., 2019) did not appear in treating the challenges, especially not in an interdisciplinary manner as discussed by Broekema and colleagues (2018) (e.g., working with IT specialists from the for-profit sector). In cases it did happen, it happened within the formal education system

(e.g., with social workers, fellow principals), or on the individual level (e.g., Facebook groups, family members). Reasons for this can be the pressing timeframe or the characteristic closedness of the sector, or that the necessary level of competence to solve the issue at hand short-term was present. In any case, this seems to be a learning gap worth exploring further.

IV.6. Conclusions

This paper's approach to contributing to organizational crisis-learning literature is special in a sense, as the research analyses crisis not as an external force, but as an internal gap revealed by external or internal crisis events. The analysis also proposes that learning results from the organizational perception of this gap. The results of this research show that the same crisis can be perceived differently in various organizational and management contexts, resulting in different learning paths. Accordingly, crisis and learning management must focus on the understanding of the organization as a cumulation of their past and current, internal, and external context, paying attention to the factors influencing crisis perception.

What we can learn from the displayed cases is that strategic focus is key to steering development actions, however, the external crisis might be overshadowed by inner crises paralysing the organization to manage transformative learning. Understanding this can help us determine what direction an organization's learning can take, and what pressure points there are to eliminate or handle to steer the organization towards transformative learning. A higher level of learning organizational capacity, however, doesn't only provide the ability for continuous improvement but keeps organizations prepared in crises as well. A firm but empowering leadership style, well-designed organizational learning support, as well as being aware of the organization's knowledge, are essential for being able to find solutions for previously unknown challenges.

Infrastructure and systems are also key elements in digital competence, and our research showed that school stakeholders' social and financial backgrounds matter and represent direct influencing factors for an organization's digital learning. This learning, however, must be supported by an adequate level of organizational autonomy too, to reach a sense of self-efficacy and inspire action.

5. Summary of research findings

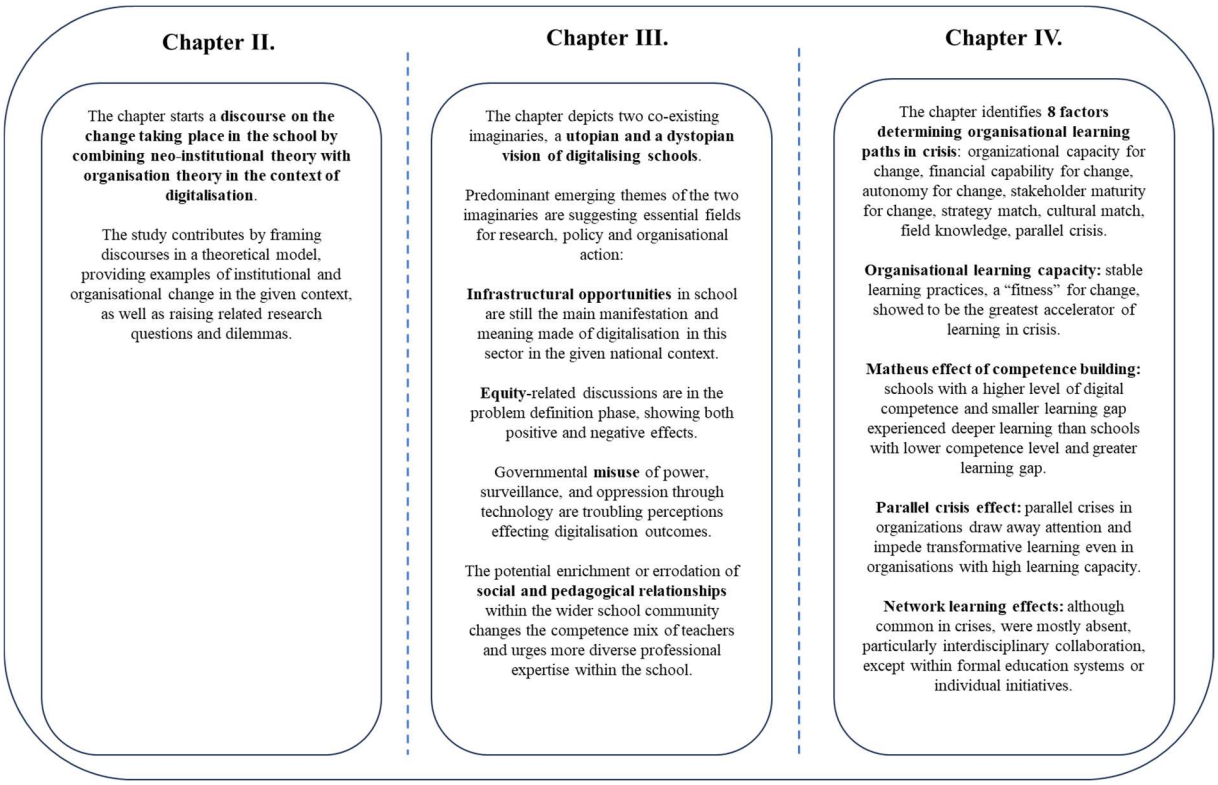
V.1. Summary of the contributions of the research

In today's rapidly evolving digital landscape, the world is witnessing a profound transformation in the realm of education, fundamentally altering the nature of schools as institutions and organizations. Teachers, as key players in this transformation, are envisioning a future where technology plays a central role in the educational landscape. This anticipation is influencing significant shifts at the organizational level, prompting schools to reevaluate their structures and strategies to align with the digital age. Implementations within educational institutions are increasingly driven by the imperative to integrate technology seamlessly into administrative processes and day-to-day operations. As schools strive to navigate this digital paradigm, there is a growing recognition of the need to enhance digital competence at the organizational level, transcending individual classrooms. The dissertation's relevance becomes apparent in this dynamic landscape, offering valuable insights into the multifaceted impact of digitalization on schools, ranging from the institution to the organization putting the role of interpretation and perception forward.

This doctoral research was designed to contribute to the understanding of the changes brought about by digitalization in schools, both at the conceptual and local levels. The articles included in this dissertation present novel scientific findings that support this overarching goal.

The second chapter explores the intricate relationship between institutional pressures, organizational learning processes, and resultant changes in educational institutions, providing insights into the evolving nature of schools in the digital age. In the third chapter, the applied utopian-dystopian theoretic approach is utilized as an effective methodology for analysing the impact of digitalization in education, allowing for a balanced assessment of potential benefits and challenges. The utopian-dystopian dichotomy proves valuable in capturing the complexities of digitalization and facilitating comprehensive discussions and decisions in this evolving landscape. Chapter four contributes significantly to management studies by examining the interplay between crisis perception, learning, and the inherent nature of crises, offering valuable insights into crisis learning and organizational adaptability. You can see a summary of the dissertation's contribution in Figure 12. In the upcoming sections, I summarise the contributions of the research papers and my dissertation and then discuss the limitations of the research.

Figure 12 Contributions and findings of the dissertation



Source: Own edit

5.2.1. Contributions of Chapter II.

The advent of the knowledge society and the widespread integration of digital technologies mark a transformative shift in the landscape of schools. School organizations are operating and learning differently than they did even a decade or two ago as a result of the development of digital technologies, notably accelerated by the adoption of online education during the COVID-19 pandemic. These shifts at the organizational level implicitly signal a transformation in the very essence of the institution, enabling it to respond effectively to new expectations and challenges.

The conceptual paper analyses the interaction of the school as an institution and schools as organizations in the light of digitalization. It aims to answer the questions, (1) how is digitalisation changing our image of schools, and (2) how do changes in the school as an organization and the school as an institution interact? It presents the external context, its relations with the institution (March & Olsen, 2011) and the organizations (North, 1990), the

dynamics of the school's institutional change, the isomorphic change (DiMaggio & Powell, 1983) of school organizations and organizational learning (Argote, 2011) aspects.

Overall, the study emphasizes the discourse on the change taking place in the school by combining neo-institutional theory with organizational theory in the context of digitalisation. It contributes by framing discourses in a theoretical model, providing examples of institutional and organizational change in the given context, as well as raising related research questions and dilemmas. The aim of this paper is to urge further academic discussions and empirical research on the role of the school in a digitising world, promoting a discourse on the unstoppable change unfolding in the institution and the evolving requirements of school management.

5.2.2. Contributions of Chapter III.

This paper aims to capture the digital imaginaries of Hungarian schools through the lens of digital utopianism (Dickel & Schrape, 2017) as a theoretical framework. This approach ties this research to discourse about digital school futures (OECD, 2020) and imaginaries (Jasanoff, 2015). This study sets out to answer the research question: What are the dreams and fears of school leaders and employees regarding digitalisation in schools influencing their attitudes toward increasing involvement of technology?

Utilizing a qualitative research approach and semi-structured interviews supplemented by observation this study contributes to the existing literature on organizational and policy-level educational management. It explores utopian and dystopian perspectives on digitalized schools in the Hungarian education system, involving participants from five institutions offering general or vocational education and representing diverse ownership structures, including state and religious ownership. The study identifies key themes in these imaginaries, including funding and infrastructure, equity, misuse, and social and pedagogical relations, proposing avenues for further research and applicable methodologies in this domain.

Results have shown that infrastructural opportunities in the school are still the main manifestation and meaning made of digitalisation in this sector in the given national context. Consequently, inefficiencies in this field influence attitudes and prospects greatly, on the managerial decision level as well, supporting research results of Keane and Keane (2020).

Results suggested that digital equity-related discussions are in the problem definition phase based on the narratives of both imaginaries. These forecast both positive and negative effects

of digitalisation and were less frequent or in-depth elaborations of potential future scenarios. This is consequent with the literature (Dimopoulos et al., 2021; Nilsberth et al., 2021), and shows that practices in the sector should be observed and analysed.

Governmental misuse of power, surveillance, and oppression through technology are troubling perceptions affecting digitalisation outcomes based on the results of the research. Empirical evidence, or even discussion about governmental misuse of digital surveillance either in Hungary (e.g., Gáspár, 2023) or abroad (e.g., Chen & Oakes, 2023) are scarce, probably due to the nature of the topic as well. Hence, it is an essential discussion to have in critical academic studies.

Results also foreshadow both the enrichment and errodation of social and pedagogical relationships within the wider school community. This complex set of changes alters the necessary competence mix of teachers and urges more diverse professional expertise within the school; even destabilising the role of professional teachers (Facer & Selwyn, 2021). The study recommends multidisciplinary research in this field to better understand how to create better human resources concepts and management within schools, making sure that educational expertise does not get discarded.

Overall, the chapter contributes by depicting two co-existing imaginaries, a utopian, and a dystopian vision of digitalising schools. By getting acquainted with these, one can gain an overview of the hopes and fears of educational professionals. Themes emerging from the two imaginaries suggest essential fields for research, policy, and organizational action, which are additional contributions of the paper.

5.2.3. Contributions of Chapter IV.

The global education system faced significant disruptions due to the impact of COVID-19, prompting urgent concerns about health and safety. The abrupt shift to online learning posed challenges for schools and teachers, who reported feeling unprepared for this unforeseen challenge. This external shock catalysed an ongoing learning process in digital competence, necessitating a comprehensive reorganization of both the education system and individual schools.

This research delves into the organizational dynamics of learning-in-crisis (LiC) in Hungarian educational institutions in the context of the COVID-19 pandemic, specifically focusing on

digital competence development and the impact of organizational perceptions of contextual factors. The primary research question addressed is: What factors influence the learning paths of the observed organizations, and how?

Examining five cases of Hungarian school organizations, the research observes pandemic-crisis-induced digital organizational learning resulting from the imperative shift to online education. The dataset is derived from the same research that formed the basis for the study outlined in Chapter III. The study analyses the learning paths within organizations resulting from the crisis event, considering factors such as the perceived impact and relevance of the rare event based on Lampel and colleagues' model (2009), with an examination of influencing factors.

Results of the qualitative empirical research show that learning willingness is different in the face of an identical external impact, influenced by organizational and financial capacity, as well as autonomy and stakeholder maturity for change. The depth of learning is related to strategical and cultural match with the sought-out competence, as well as field knowledge and the presence of parallel crises.

Organizational learning capacity: stable learning practices, a "fitness" for change, showed to be the greatest accelerator of learning in crisis. Matheus effect of competence building: schools with a higher level of digital competence and smaller learning gap experienced deeper learning than schools with a lower competence level and greater learning gap. Findings correlate with Kopp & Pesti's (2022) findings.

Parallel crisis effect: parallel crises in organizations draw away attention and impede transformative learning even in organizations with high learning capacity. This observed phenomenon can be explained by the attention-based theory constructed by Ocasio (1997), however, empirical research results have not been found on organizational learning in parallel crisis situations, hence, I consider this as a unique contribution of the research.

Interestingly, in the specific research context network learning effects, which are typical characteristics of crisis action in the literature (Robin et al., 2019) did not appear in treating the challenges, especially not in an interdisciplinary manner (Broekema et al., 2018) (e.g., working with IT specialists from the for-profit sector) which can be very beneficial in handling crises. In cases it did happen, it happened within the formal education system (e.g., with social workers, fellow principals), or on the individual level (e.g., Facebook groups, family members).

All in all, this contributes to organizational crisis-learning literature by viewing crisis not as an external force, but as an internal gap revealed by external or internal rare events and suggests that learning results from the organizational perception of this gap. The results of the research show that learning paths within the crisis can be predicted by the organizational perception of the impact and relevance of the crisis. This perception is found to be influenced by the organizational capacity for change, financial capability for change, autonomy for change, stakeholder maturity for change, strategy match, cultural match with the content of the learning, field knowledge about it, and the existence of other parallel crises. As a result, the same crisis can be interpreted very differently in various organizational and management contexts.

5.2.4. Limitations

Besides the contributions the presented research has its limitations as well. As the research applies an interpretative approach the mapped anticipations and perceptions, although supporting our understanding of the researched phenomenon through the presented patterns (see instrumental case study, Stake, 1995), cannot be objectively generalised in a functionalist sense. This can be acknowledged as an exogenous critique (Kieser, 1995) of the research.

Other limitations, that can be categorised as endogenous (Kieser, 1995), come on one hand from the human resource limitations, as the complete data collection and analysis process was carried out by me. Therefore, the sampling of school institutions is quite focused and couldn't be extended later iteratively. The same is true for including further school citizens, such as students, parents, and other public or private sector actors participating actively in the schools' lives, even though their understandings are essential as well in understanding digitalisation and change in schools. The timeframe of the research is another limitation, as to be able to evaluate not just the learning paths (as in Chapter IV.) but also the learning outcomes a retrospective data collection stage would have been necessary, as Kopp and Pesti (2022) also point out in their research.

On the other hand, in terms of data collection methodology, the research builds on the interview and observation data the most, but in a new phase of the research, I would turn to a wider toolkit of qualitative methods that support the visual manifestation of perceptions, including e.g., depiction of future visions, or drawing lines of learning intensity or depth. Both articles of Chapters III. and IV. could have benefited from this approach that became evident during the data analysis phase.

5.2.5. Contributions of the dissertation as a whole

Beyond the empirical research and its outcomes in the form of the included articles, I believe this dissertation offers further value as well. Especially in the local, and national context, the summary presented about the Hungarian educational ecosystem in relation to digitalisation is a unique added value of this dissertation. To provide a summary the PESTEL analysis framework will be used here, emphasizing the main characteristics of the national macro environment of digitalisation in the Hungarian school system (see Table 10).

Table 10 PESTEL analysis of the macro context of educational digitalisation in Hungary

Dimension	Key points
Political	• Centralized education governance limits school autonomy and innovation • Government regulations favouring religious institutions • Regulations introduced without substantive consultations, lack of commonly accepted strategy • No dedicated ministry
Economic	• Hungary lags in digital skills • Economic disparity leads to a digital divide (regionally and among schools too) • Limited public funding restricts investment in digital technologies
Social	• Digitalization has highlighted and widened social inequalities, especially during the COVID-19 pandemic • Disparities in access to technology and digital skills among different school citizens • Danger of overlooking vulnerable groups' needs • Potential for digitalization to modernize and engage students more effectively
Technological	• Outdated digital infrastructure in schools compared to European standards • Focused attention on the digitalisation of the operation of school organizations is necessary besides pedagogical developments
Environmental	• Digitalization can promote sustainability but raises concerns about electronic waste and energy use • Need for regulations on sustainable practices, like recycling and energy-efficient technology usage
Legal	• Legal frameworks needed to support digital education • Market regulations should support innovation in the edtech ecosystem better • Privacy and data protection issues require stronger legal safeguards

Source: own edit

Political: The centralization of the Hungarian education system significantly impacts the digitalization process. The dissertation portrayed how this centralization limits the autonomy of schools, making it difficult for them to innovate or implement new technologies independently, while several system-wide developments are carried out: seemingly without a transparent strategy in the past years. The government's implicit strategy of promoting religious schools over public ones further exacerbates inequalities in digital development and innovation altogether; mostly favouring religious schools due to their higher autonomy, although initially, public schools had an advantage in terms of applying for example for teacher laptops. Additionally, national policies such as Hungary's Digital Education Strategy and the later education strategy or changes in the National Assessment programme, the continuation of the Digital Welfare Programme indicate a governmental recognition of the need for digitalization, yet the lack of follow-through and evaluation highlights issues in policy execution. The lack of a dedicated ministry of education and a current, widely accepted digitalisation strategy in education reflects the lack of political focus. Furthermore, social disputes and discontent caused by frequent regulations without substantive consultation, such as at the time of the teacher demonstrations in 2022-2023 and shifts in government priorities (e.g. as a result of the changing ministry structure and responsibilities in the past years) can cause delays or changes in digital initiatives, affecting the consistency and progress of digitalization efforts in schools.

Economic: Economically, Hungary faces significant challenges in digitalizing its education system. The country lags in the Digital Economy and Society Index (DESI), and this gap suggests that Hungarian society, in general, may not have the necessary skills to effectively engage with digital tools, affecting its competitiveness as individuals in the labour market and as a national economy as well. The education market of Hungary can be characterised as centralised as well, causing the private sector ecosystem around education limited too. The economic divide between different regions and types of schools also means that wealthier institutions or school networks (e.g., religious or private) are more likely to have advanced digital infrastructure, while underfunded schools struggle, causing Hungary to be one of the least successful countries to compensate socioeconomic differences by schooling. At the same time, Hungary is spending below the OECD average both in proportion to the GDP and per full-time-equivalent student, based on the available 2020 OECD data (data-explorer.oecd.org/). The limited public funding for education further hinders the ability to invest even in necessary digital technologies, even though, increased investment in digital infrastructure and training could boost Hungary’s economy by creating a more digitally literate workforce.

Social: Socially, digitalization in Hungarian schools is a double-edged sword. While it has the potential to democratize education and provide equal opportunities for all students, the reality has been more complex. The COVID-19 pandemic underscored the deep inequalities in access to digital tools and the internet, particularly among lower-income families and rural areas. Schools, traditionally social spaces where students from various backgrounds interact, now reflect the digital divide, where those with better access to technology fare better academically. Moreover, the lack of digital skills among parents and older members of families further complicates the integration of digital tools into everyday learning. Moreover, there are several ethical questions that arise not only when considering low-income groups but also other vulnerable groups among school citizens, which require strategic actions. However, digitalization also presents an opportunity to modernize the educational experience, making learning more autonomous, interactive and engaging for students.

Technological: Hungary's technological infrastructure in education is outdated and lags European standards; not just in terms of availability and quality but often in human factors: attitude for use and depth of implementation. Many schools still lack basic digital infrastructure, such as high-speed internet, modern devices, flexible access, and digital whiteboards or even projectors. The rapid pace of technological change globally contrasts sharply with the slower adoption in Hungary, leading to a digital skills gap that could disadvantage Hungarian students in the local and global job market. Looking beyond the pedagogical adaptation of technology, progress is even slower in the operational field of school organizations, almost completely governed centrally, making schools realise this gap significantly first during the pandemic when operations had to be brought online. This area of school development needs to be at the centre of future improvement of the system.

Environmental: While the dissertation does not directly address environmental factors, digitalization can have a notable impact on the environment in the educational context. By reducing the reliance on paper and physical resources, digital tools can contribute to more sustainable practices within schools as mentioned in interviews included in the article of Chapter III. too. The adoption of digital technologies can help promote environmental education and awareness among students, however, digital devices in the education system also raise environmental concerns, such as electronic waste and energy consumption, especially if devices are re-procured according to standards (4-5 years). To mitigate these issues, schools and policymakers need to consider sustainable practices, such as recycling programs and energy-efficient technologies, in their digitalization efforts.

Legal: The legal framework in Hungary has not kept pace with the demands of digital education. The rapid privatisation and centralisation of the education system have created a complex legal environment that hampers the effective implementation of digital tools, and the natural development of the domestic edtech market. The absence of clear and progressive guidelines on digital education and the digitalisation of local school operations creates uncertainty and inconsistency in how digitalization is pursued across schools. Moreover, privacy and data protection issues are increasingly important as schools adopt more digital platforms, requiring robust legal frameworks to protect school citizens' personal information.

Furthermore, the practical contributions of the dissertation should be mentioned here as well. (1) The doctoral thesis provides insights into how digital transformation changes schools which can help policies to be crafted to better support educational goals. This includes recommendations on professional development, infrastructure investment, and support for digital competence among teachers. (2) The findings can inform the structure and content of training programs for educational professionals by identifying challenges and opportunities of digitalisation in the imaginaries of teachers. This can lead to the reorganization of educational roles and the development of targeted professional development courses that equip schools with the ability to use digital solutions effectively in their practices. (3) The research urges school leaders to foster a learning organizational culture. By showing examples of learning-oriented environments, the dissertation can provide input for practical strategies for educational leaders to manage digital transformations effectively. (4) Given the insights into how schools responded to the COVID-19 pandemic, the dissertation can serve as a practical resource for developing strategic plans that prepare organizations for future crises, ensuring that they can continue to function effectively and learn for transformative change during the crisis. (5) The research highlights disparities in digital readiness and infrastructural supplies. These findings can be used to design interventions that address digital inequality, ensuring that all students have equitable access to digital learning opportunities, and all teachers to appropriate work conditions.

V.2. Prospective research directions

From the results of my research, I have identified prospective research directions for further exploration within each of the three subfields addressed in my doctoral dissertation. These directions are succinctly presented in Table 11.

Table 11 Prospective research directions based on the findings of the dissertation

Theoretical field	Further research directions
Institutional change	• Analysis of different digital educational policies and their effect on the institutional image • The results of digital educational policy implementation and the role of school citizen and stakeholder attitudes • Digital visions and future perspectives in educational institutions in both practice- and theory-oriented education research • Empirical research based on critical traditions investigating ethical, social, and political effects of educational digitalisation
Organizational digital competence	• Causal relationships between contextual factors and the nature of organizational-level attitudes toward digitalisation • Continuous research on appropriate digital infrastructure (both pedagogical and organizational) in education and its management • Role of different school citizens/stakeholders in digital competence building (students, parents, partners, etc.) • Organizational and HR management effects of the teacher's changing role
Crisis-learning	• Empirical research of networked learning and its learning impact in schools • Retrospective research of the scope, depth, and outcomes of the in-crisis-learning of the COVID-19 pandemic in schools and/or comparatively other organizations of different sectors • Dynamics of organizational learning in parallel crisis situations

Source: Own edit

Most of the suggested research directions in the first two areas, focusing on school organizations, presuppose at least an intermediate level of digital digitalisation strategy, competence, and efforts (e.g., effects of digitalisation policies, and HR management changes) in the observed education systems. However, geographically further research can be relevant in any country, including high-performing economies and developing countries, as well as

socially, e.g., in deprived communities or in tech-savvy contexts. In the area of crisis-learning the scope is different, although the first direction is connected to school specifically, the latter two should be pursued in comparative research settings across sectors, organization types, cultures, etc.

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Appendix

Appendix I. Methodological summary table

S1	- SELFIE 2021 - Learning organization report 2020 - Learnings of the digital education period (internal report) - Pedagogical programme - Organizational and operational rules - Webpage	individual: July 7. (1) August 26 (1), August 27 (+1) group: 28. June (1)	2021.10.25 report	2022.04.27 4 classes (the half of each class) 1 meeting
S2	- SELFIE 2021 - Learning organization report 2020 - Pedagogical programme - Organizational and operational rules - Webpage	individual: 22. June (2+1) group: 23. June (2)	2021.08.19. report 2021.08.24. presentation	2021.10.18 3 classes
S3	- SELFIE 2018, 2020, 2021 - DNR 2020 - Learning organization report 2020 - DigComp good practice - Pedagogical programme - Organizational and operational rules - Webpage	individual: 24. June (2+1), 1. July (1) group: 1. July (2)	2021.08.24. report 2021.10.11. presentation	2021.10.11 3 classes 2 meetings
S4	- SELFIE 2020 - DNR 2020 - Institutional digital development plan - Organizational strategic goals - Pedagogical programme - Organizational and operational rules - Webpage	individual: 30. June, (2+1) group: 30. August (1)	2021.10.28 report	2021.09.27 3 classes
S5	- SELFIE 2021 - Learning organization report 2020 - Yearbook 2019-20 - Pedagogical programme - Organizational and operational rules - Webpage	individual: 29. June (3+1) group: 31. August (1)	2021.09.28 report	2022.05.25 3 classes

Appendix II. Summary table of interviews

SCHOOL	INDIVIDUAL/ GROUP/ PAIR/	TYPE	INTERVIEW CODE	DURATION	ONLINE	WITHOUTH RECORDING
S1	Individual	Administrative staff	S1-A	0:55:05	x	
S1	Individual	Leadership	S1-L-P	1:36:40	x	
S1	Individual	Leadership	S1-L-VP	1:20:30	x	
S1	Group	Teacher	S1-T-G	1:38:15		
S2	Individual	Administrative staff	S2-A	1:08:01		
S2	Individual	Leadership	S2-L-P	1:39:43		
S2	Pair	Leadership	S2-L-VP&VP	1:20:50		
S2	Group	Teacher	S2-T-G1	1:19:16		
S2	Group	Teacher	S2-T-G2	1:25:20		
S3	Individual	Leadership	S3-L-P	2:05:04		
S3	Individual	Leadership	S3-L-VP1	1:21:47	x	
S3	Individual	Leadership	S3-L-VP2	1:37:18	x	
S3	Group	Teacher	S3-T-G1	-		x
S3	Group	Teacher	S3-T-G2	1:58:47		
S3	Individual	Administrative staff	S5-A	0:45:48	x	
S4	Individual	Administrative staff	S4-A	1:38:14		
S4	Pair	Leadership	S4-L-P&VP	1:58:05		
S4	Group	Teacher	S4-T-G	1:41:29		
S5	Individual	Administrative staff	S5-A	1:12:34		
S5	Individual	Leadership	S5-L-P	1:39:18		
S5	Individual	Leadership	S5-L-VP1	1:21:01		
S5	Individual	Leadership	S5-L-VP2	1:25:05		
S5	Group	Teacher	S5-T-G1	1:38:22		
S5	Group	Teacher	S5-T-G2	1:31:36		

SUMMARY

NO OF INTERVIEWS	24
SUM DURATION	34:12:08
MIN. DURATION	0:45:48
MAX. DURATION	2:05:04
NO. OF INDIVIDUAL	14
NO. OF GROUP	8
NO. OF PAIR	2

Appendix III. Applied decrees of the Hungarian Government

- 110/2012. (VI. 4.) Korm.rendelet a Nemzeti alaptanterv kiadásáról, bevezetéséről és alkalmazásáról (NAT 2012) / Government Decree 110/2012 (VI. 4.) on the publication, introduction and application of the National Core Curriculum (NAT 2012)
- 5/2020. (I. 31.) Korm.rendelet A Nemzeti alaptanterv kiadásáról, bevezetéséről és alkalmazásáról szóló 110/2012. (VI. 4.) Korm. rendelet módosításáról (NAT 2020) / Government Decree 5/2020. (I. 31.) on the publication, introduction and application of the National Core Curriculum (NAT 2020)

Appendix IV. Scoring of the schools along the determined factors

	Factors	Definition	Scale	S1 score	S2 score	S3 score	S4 score	S5 score
Potential impact (willingness to learn)	Organizational capacity for change	The school has the necessary capacity (including HR and learning practices) to implement change.	0- no 1- partly 2- fully	2	0	1	2	1
	Financial capability for change	The school has the resources to financially support the necessary changes, including infrastructure.	0- no 1- partly 2- fully	1	0	0	2	1
	Autonomy for change	The school has the autonomy to make strategic decisions about issues connected to digitalization.	0- no 1- partly 2- fully	1	0	1	2	1
	Stakeholder maturity for change	Stakeholders, mostly students and parents, are capable and willing to handle tools and services that are outputs of the digital innovations in the school.	0- no 1- partly 2- fully	2	1	1	2	0
Potential relevance (type/depth of learning)	Strategy match	The organizational strategy includes digital innovation as a key element.	0- no 1- partly 2- fully	2	0	1	2	1
	Cultural match	The school's organizational and pedagogical culture and values are supported by digitalization.	0- no 1- partly 2- fully	2	0	2	1	1
	Field knowledge	The school has the professional knowledge to understand and leverage the opportunities provided by digitalization.	0- no 1- partly 2- fully	2	1	2	2	1
	Parallel crisis	The school has no parallelly ongoing crisis affecting its foundational operations.	0- severe parallel crisis 1- neutral 2- no parallel crisis	2	1	0	2	0
Impact score				6	1	3	8	3
Relevance score				8	2	5	7	3