NÓRA FAZEKAS

UNDERSTANDING CRISIS PERCEPTION AND ORGANIZATIONAL LEARNING – A CASE STUDY OF SCHOOL ORGANIZATIONS IN THE COVID-19 PANDEMIC

A KRÍZISÉSZLELÉS ÉS A SZERVEZETI TANULÁS MEGÉRTÉSE – ESETTANULMÁNY ISKOLASZERVEZETEKRŐL A COVID-19 VILÁGJÁRVÁNY IDŐSZAKÁBAN

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 the strategic and cultural fit with the sought-after competence, as well as field of knowledge and the presence of parallel crises.

Keywords: **crisis, organizational learning, COVID-19, education, learning in crisis, school**

A kutatás a COVID-19 járvány kontextusában öt magyar oktatási intézményben vizsgálja a szervezeti krízishelyzet során való tanulás (Learning-in-Crisis – LiC) dinamikáját a digitális kompetenciafejlesztéssel összefüggésben, valamint a kontextuális tényezők szervezeti észlelésének függvényében. Az átélt krízis hatására bekövetkező szervezeti szintű tanulás útját két tényező mentén elemzi a szerző: a hatás észlelt mértéke és észlelt relevanciája. A kvalitatív, interjú- és megfigyelésalapú kutatás eredményei azt mutatják, hogy a tanulási hajlandóság különbözik azonos külső hatások esetén, amit befolyásolnak a szervezeti és pénzügyi kapacitások, valamint az autonómia és a stakeholderek érettsége a változásra. A tanulás mélysége összefügg a szükséges kompetenciának a szervezeti stratégiával és kultúrával való összeegyeztethetőségével, valamint a szakterületi tudással és a párhuzamos válságok jelenlétével.

Kulcsszavak: **krízis, szervezeti tanulás, COVID-19, oktatás, krízistanulás, iskola**

Funding/Finanszírozás:
The author did not receive any grant or institutional support in relation with the preparation of the study.
A szerző a tanulmány elkészítésével összefüggésben nem részesült pályázati vagy intézményi támogatásban.

Author/Szerző:
Nóra Fazekas[a] (nora.fazekas@uni-corvinus.hu) assistant lecturer

[a]Corvinus University of Budapest (Budapesti Corvinus Egyetem) Hungary (Magyarország)

The article was received: 03. 10. 2023, revised: 05. 01. 2024 and 24. 03. 2024, accepted: 25. 03. 2024.
A cikk beérkezett: 2023. 10. 03-án, javítva: 2024. 01. 05-én és 2024. 03. 24-én, elfogadva: 2024. 03. 25-én.

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 learn-

ing, 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.

Theoretical background

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 Figure 1, 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.

Figure 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)

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.

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).

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 base 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.

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

Table 1

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 compilation

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 1.

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 I. (online).

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.

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.

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 2 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.

Table 2

The analytical framework for learning path analysis

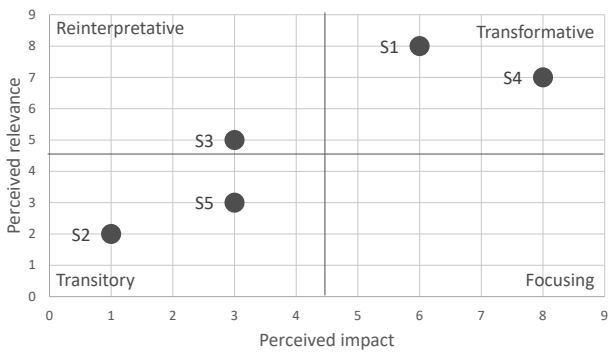
	Factors	Definition
Potential impact (willingness to learn)	Organizational capacity for change	The school has the necessary capacity (including HR and learning practices) to implement change.
	Financial capability for change	The school has the resources to financially support the necessary changes, including 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 compilation

These factors enabled the allocation of points to organizations, establishing scores along both axes and positioning schools within a matrix for comparative analysis (Figure 2). 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 scoring see Appendix II. online). 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 2

Different learning paths of the participating schools



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

Perceived potential impact

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

Organizational capacity for change

Here learning and HR capacity are in focus. 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 experienced 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 can 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 (e.g., from principal to ICT responsible level).

Perceived potential relevance

Here factors are assessed that would influence the understanding of the relation between the competence gap revealed by the crisis and the organization's identity.

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, challenges were noted in establishing digitalisation goals. The difficulty stemmed from the lack of a clear understanding of potential objectives. 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.

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.

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.

References

Ahlström, B., Leo, U., Norqvist, L., & Isling, P.P. (2020). School leadership as (un)usual. Insights from principals in Sweden during a pandemic. *International Studies in Educational Administration*, *24*(2), 35–41. https://edu.thecommonwealth.org/wp-content/uploads/2020/11/ISEA-2020-482.pdf#page=41

Antonacopoulou, E.P., & Sheaffer, Z. (2014). Learning in Crisis: Rethinking the Relationship Between Organizational Learning and Crisis Management. *Journal of Management Inquiry*, *23*(1), 5–21. https://doi.org/https://doi.org/10.1177/1056492612472730

Beauchamp, G., Hulme, M., Clarke, L., Hamilton, L., & Harvey, J.A. (2021). 'People miss people': A study of school leadership and management in the four nations of the United Kingdom in the early stage of the COVID-19 pandemic. *Educational Management Administration and Leadership*, *49*(3), 375–392. https://doi.org/10.1177/1741143220987841

Beck, T.E., & Plowman, D.A. (2009). Experiencing rare and unusual events richly: The role of middle managers in animating and guiding organizational interpretation. *Organization Science*, *20*(5), 909–924. https://doi.org/10.1287/orsc.1090.0451

Beckmann, L., & Klein, E.D. (2022). Resilience in the context of multiple adverse circumstances? Leadership capacity and teachers' practice during COVID-19 at schools serving disadvantaged communities. *School Leadership and Management*, *43*(2), 145–166.. https://doi.org/10.1080/13632434.2022.2137727

Birkland, T.A. (2009). Disasters, lessons learned, and fantasy documents. *Journal of Contingencies and Crisis Management*, *17*(3), 146–156. https://doi.org/10.1111/j.1468-5973.2009.00575.x

Birkmann, J., Buckle, P., Jaeger, J., Pelling, M., Setiadi, N., Garschagen, M., Fernando, N., & Kropp, J. (2010). Extreme events and disasters: A window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal responses after mega-disasters. *Natural Hazards*, *55*(3), 637–655. https://doi.org/10.1007/s11069-008-9319-2

Broekema, W., Porth, J., Steen, T., & Torenvlied, R. (2019). Public leaders' organizational learning orientations in the wake of a crisis and the role of public service motivation. *Safety Science*, *113*(March), 200–209. https://doi.org/10.1016/j.ssci.2018.11.002

Broekema, W., van Eijk, C., & Torenvlied, R. (2018). The role of external experts in crisis situations: A research synthesis of 114 post-crisis evaluation reports in the Netherlands. *International Journal of Disaster Risk Reduction*, *31*(March), 20–29. https://doi.org/10.1016/j.ijdrr.2018.03.021

Delcker, J., & Ifenthaler, D. (2021). Teachers' perspective on school development at German vocational schools during the Covid-19 pandemic. *Technology, Pedagogy and Education*, *30*(1), 125–139. https://doi.org/10.1080/1475939X.2020.1857826

Denzin, N.K. (2012). Triangulation 2.0. *Journal of Mixed Methods Research*, *6*(2), 80–88. https://doi.org/10.1177/1558689812437186

Denzin, N.K., & Lincoln, Y.S. (2011). *The SAGE Handbook of Qualitative Research*. SAGE.

Deverell, E. (2009). Crises as learning triggers: Exploring a conceptual framework of crisis-induced learning. *Journal of Contingencies and Crisis Management*, *17*(3), 179–188. https://doi.org/10.1111/j.1468-5973.2009.00578.x

Elliott, D. (2009). The failure of organizational learning from crisis – A matter of life and death? *Journal of Contingencies and Crisis Management*, *17*(3), 157–168. https://doi.org/10.1111/j.1468-5973.2009.00576.x

Elliott, D., & Macpherson, A. (2010). Policy and practice: Recursive learning from crisis. *Group and Organization Management*, *35*(5), 572–605. https://doi.org/10.1177/1059601110383406

Gaudet, S., & Robert, D. (2018). *A Journey Through Qualitative Research: From Design to Reporting*. SAGE Publications Ltd. https://doi.org/https://doi.org/10.4135/9781529716733

Gunawardena, C.N., & McIsaac, M.S. (2013). Distance education. In J.M. Spector, M.D. Merrill, J. van Merrienboer, & M.P. Driscoll (Eds.), *Handbook of research on educational communications and technology* (pp. 361–401). Routledge. https://doi.org/10.5688/aj7409172

Halász, G., Fazekas, Á., Fischer, M., Horváth, L., Kovács, I.V., & Pálvölgyi, L. (2019). *DigiNOIR*. http://halaszg.elte.hu/download/A DigfNOIR_stratégia_ (2019.07.30).pdf

Hámori, B. (2012). Tanulás és innováció – Elméleti dilemmák és gyakorlati nézőpontok. *Vezetéstudomány/Budapest Management Review*, *43*(11), 2–18. https://doi.org/10.14267/VEZTUD.2012.11.01

Huberman, A.M., & Miles, M.B. (1994). *Qualitative data analysis: An expanded sourcebook*. SAGE Publications Inc.

Jordán, Z. (2019). Az állami és egyházi fenntartású finanszírozásáról. *Új Köznevelés*, *75*(9–10), 14–17. https://folyoiratok.oh.gov.hu/uj-kozneveles/az-allami-es-egyhazi-fenntartasu-iskolak-finanszirozasarol

Kopp, E., & Pesti, C. (2022). Organisational Learning and Resilience in Hungarian Schools During COVID-19 Distance Education – Study of Two Cases. *European Journal of Teacher Education*. https://doi.org/10.1080/02619768.2022.2154205

Kvale, S. (2007). *Doing interviews*. SAGE Publications. https://doi.org/10.4135/9781849208963

Lampel, J., Jamal, S., & Zur, S. (2009). Experiencing the Improbable: Rare Events and Organizational Learnin. *Organization Science*, *20*(5), 835–845. https://doi.org/10.1287/orsc.1090.0479

Lee, G.K., Lampel, J., & Shapira, Z. (2020). After the storm has passed: Translating crisis experience into useful knowledge. *Organization Science*, *31*(4), 1037–1051. https://doi.org/10.1287/orsc.2020.1366

Lien, C.M., Khan, S., & Eid, J. (2022). School Principals' Experiences and Learning from the COVID-19 Pandemic in Norway. *Scandinavian Journal of Educational Research*, *67*(5), 775-790. https://doi.org/10.1080/00313831.2022.2043430

Magyarország Digitális Oktatási Stratégiája. (2016). https://digitalisjoletprogram.hu/files/55/8c/558c2bb-47626ccb966050debb69f600e.pdf

McLeod, S., & Dulsky, S. (2021). Resilience, Reorientation, and Reinvention: School Leadership During the Early Months of the COVID-19 Pandemic. *Frontiers in Education*, *6*(March), 1–13. https://doi.org/10.3389/feduc.2021.637075

Monostori, J. (2021). *The school year 2020-2021 in Hungary during the pandemic - Country report*. https://doi.org/10.2760/062696

Moynihan, D.P. (2009). From intercrisis to intracrisis learning. *Journal of Contingencies and Crisis Management*, *17*(3), 189–198. https://doi.org/10.1111/j.1468-5973.2009.00579.x

Navaridas-Nalda, F., Clavel-San Emeterio, M., Fernández-Ortiz, R., & Arias-Oliva, M. (2020). The strategic influence of school principal leadership in the digital transformation of schools. *Computers in Human Behavior*, *112*(July). https://doi.org/10.1016/j.chb.2020.106481

Pató Gáborné Szűcs, B., Dajnoki, K., Kovács, K., Kőműves, Z.S., Grotte, J., Szabó, S., Kunos, I., Metszősy, G., Hegedűs, H., Karácsony, P., & József, P. (2021). A HR válasza a koronavírus-járvány által okozta kihívásokra. *Vezetéstudomány/Budapest Management Review*, *52*(8-9.), 2–17. https://doi.org/10.14267/VEZTUD.2021.09.01

Péteri, G., & Szilágyi, B. (2022). Egyházak a köznevelési költségvetésben. *Educatio*, *31*(3), 461–478. https://doi.org/10.1556/2063.31.2022.3.8

Pogácsás, P., & Szepesi, B. (2023). A koronavírus hatása a magyar kis- és középvállalkozásokra. *Vezetéstudomány/Budapest Management Review*, *54*(2), 25–39. https://doi.org/10.14267/VEZTUD.2023.02.03

Radó, P. (2019). Market reforms in the Hungarian school system: impact of changes in the ownership structure. In *NESET Ad hoc report no. 2/2019.* https://www.researchgate.net/publication/337874248_Market_reforms_in_the_Hungarian_school_system_impact_of_changes_in_the_ownership_structure_NESET_ad_hoc_question_No_22019

Radó, P. (2022). *Közoktatás és politika. Magyarország 2010-2022*. NORAN LIBRO.

Rerup, C. (2009). Attentional triangulation: Learning from unexpected rare crises. *Organization Science*, *20*(5), 876–893. https://doi.org/10.1287/orsc.1090.0467

Robin, E., Chazal, C., Acuto, M., & Carrero, R. (2019). (Un)learning the city through crisis: lessons from Cape Town. *Oxford Review of Education*, *45*(2), 242–257. https://doi.org/10.1080/03054985.2018.1551197

Saldaña, J. (2013). *The Coding Manual for Qualitative Researchers*. SAGE Publications Ltd.

Smith, D., & Elliott, D. (2007). Exploring the barriers to learning from crisis: Organizational learning and crisis. *Management Learning*, *38*(5), 519–538. https://doi.org/10.1177/1350507607083205

Starbuck, W.H. (2009). Cognitive Reactions to Rare Events: Perceptions, Uncertainty, and Learning. *Organization Science*, *20*(5), 925–937. https://doi.org/10.1287/orsc.1090.0440

Starbuck, W.H. (2017). Organizational learning and unlearning. *Learning Organization*, *24*(1), 30–38. https://doi.org/10.1108/TLO-11-2016-0073

Weiner, J., Francois, C., Stone-Johnson, C., & Childs, J. (2021). Keep Safe, Keep Learning: Principals' Role in Creating Psychological Safety and Organizational Learning During the COVID-19 Pandemic. *Frontiers in Education*, *5*(January), 1–17. https://doi.org/10.3389/feduc.2020.618483

Zaalouk, M., EL-Deghaidy, H., Eid, L., & Ramadan, L. (2021). Value creation through peer communities of learners in an Egyptian context during the COVID-19 pandemic. *International Review of Education*, *67*(1–2), 103–125. https://doi.org/10.1007/s11159-021-09892-z

Zancajo, A., Verger, A., & Bolea, P. (2022). Digitalization and beyond : The effects of Covid-19 on post-pandemic educational. *Policy and Society*, *41*(1), 111–128. https://doi.org/https://doi.org/10.1093/polsoc/puab016

Appendix I.

Summary table of interviews

School	IndividuAL/ Group /Pair	Type	Interview code	No. of participants	Duration	Online	Without recording
S1	Individual	Administrative staff	S1-A	1	0:55:05	x	
S1	Individual	Leadership	S1-L-P	1	1:36:40	x	
S1	Individual	Leadership	S1-L-VP	1	1:20:30	x	
S1	Group	Teacher	S1-T-G	8	1:38:15		
S2	Individual	Administrative staff	S2-A	1	1:08:01		
S2	Individual	Leadership	S2-L-P	1	1:39:43		
S2	Pair	Leadership	S2-L-VP&VP	2	1:20:50		
S2	Group	Teacher	S2-T-G1	7	1:19:16		
S2	Group	Teacher	S2-T-G2	8	1:25:20		
S3	Individual	Leadership	S3-L-P	1	2:05:04		
S3	Individual	Leadership	S3-L-VP1	1	1:21:47	x	
S3	Individual	Leadership	S3-L-VP2	1	1:37:18	x	
S3	Group	Teacher	S3-T-G1	7	-		x
S3	Group	Teacher	S3-T-G2	7	1:58:47		
S3	Individual	Administrative staff	S3-A	1	0:45:48	x	
S4	Individual	Administrative staff	S4-A	1	1:38:14		
S4	Pair	Leadership	S4-L-P&VP	2	1:58:05		
S4	Group	Teacher	S4-T-G	6	1:41:29		
S5	Individual	Administrative staff	S5-A	1	1:12:34		
S5	Individual	Leadership	S5-L-P	1	1:39:18		
S5	Individual	Leadership	S5-L-VP1	1	1:21:01		
S5	Individual	Leadership	S5-L-VP2	1	1:25:05		
S5	Group	Teacher	S5-T-G1	6	1:38:22		
S5	Group	Teacher	S5-T-G2	6	1:31:36		

Summary	
No. of interviews	24
No. of participants	73
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

Source: own compilation

Appendix II.

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

Source: own compilation