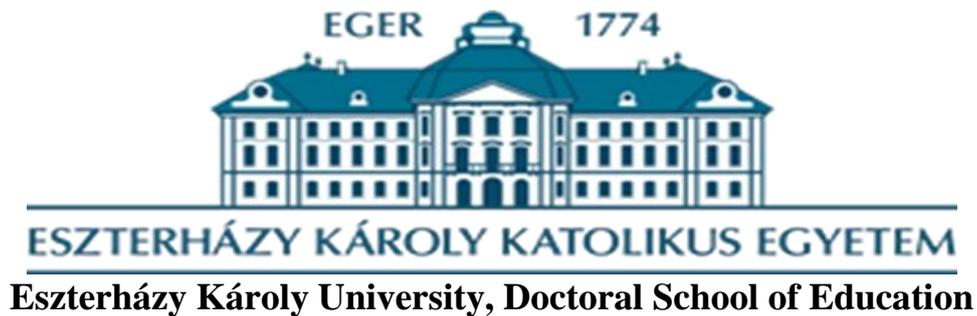**Katalin Kozma-Nagy**

Experiences of Digital Education Outside the Classroom from Parental, Teacher, and Institutional Leadership Perspectives

Doctoral (PhD) Dissertation Theses

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Introduction

The COVID–19 pandemic declared in March 2020 presented a challenge to education not seen in the modern age. Due to the pandemic, the educational system, which for decades had been built on a presence-based form and realities, had to transition to a digital work order outside the classroom with extraordinary suddenness. This shift brought not only technical innovations but also required a fundamental change in perspective in the areas of student autonomy, pedagogical methodology, and teacher-student interaction, as the lack of direct presence reduced the communication possibilities inherent in gestures and mutual eye contact (Simmel, Blasi, Jacobs, & Kanjirathinkal, 2009).

The dissertation examines the crisis situation with an interdisciplinary approach, from the perspectives of pedagogy as well as management and organizational development. The central element of the research is the interpretation of the school as an organization, drawing a parallel between the corporate sphere and the operation of public education institutions in areas such as goal setting, leadership, resource management, and internal and external communication. As Szűts (2020) points out, digital pedagogy is built from the intertwined elements of the information society and pedagogy, creating a constantly changing environment.

The research is divided into five periods, aligning with the waves of the pandemic (Hau, Wu, Chung, Chan, & Ng, 2022). During the analysis, I applied the definition of Emergency Remote Teaching (ERT), which means the temporary relocation of educational content to an alternative method in a crisis situation (Hodges, Moore, & Lockee, 2021). The research highlights that most crises could be mitigated if managers, with conscious behavior, viewed reservations as challenges (Noszkay, 2018). Digital readiness received special attention, as leaders play a key role in formulating the digital vision and leading the transformation (Westerman, Bonnet, & McAfee, 2014).

The aim of the dissertation is to help principals evaluate their institution's digital readiness and to demonstrate more conscious managerial behavior during the preparation for future tasks.

1. Topic and objective of the research

The focus of the research is the analysis of experiences regarding the digital work order outside the classroom introduced due to the COVID–19 pandemic. The pandemic brought about a sudden change in the educational system that was unprecedented in the lives of current teachers and students, forcing digital-technological solutions—previously used only on an experimental level—into the foreground. The order, content, and focus of education changed with extraordinary suddenness, where the boundaries of the study group were no longer formed based on physical togetherness.

The objective of the investigation is complex. It primarily aims to reveal how leaders of public education institutions coped with the immediate tasks and problems arising from the pandemic. The dissertation focuses specifically on managing the difficulties caused by the digital transition, examining the steps of institutional leaders' emergency education planning, with particular regard to the characteristics of Emergency Remote Teaching (ERT). Furthermore, the research aims to identify digital challenges and risks while developing good practices and solution proposals that support the future preparedness of institutional leaders and the entire organization.

The thesis employs an interdisciplinary approach, combining pedagogical, management, and organizational development aspects. During the research, the school is interpreted as an organization, drawing parallels between corporate management and public education leadership. This comparison covers areas such as strategy formulation, resource management, performance measurement, and internal-external communication, as conscious managerial behavior is essential for mitigating crises.

The dissertation emphatically analyzes digital maturity and preparedness (digital readiness), placing it in the context of everyday digital solutions, leadership competencies, attitudes, and decision-making processes. As Westerman and colleagues (2014) emphasize, leaders play a key role in digital transformation; they formulate the vision and lead the processes. The research examines the environment within a specific process, as response reactions reflect the quality of the planning processes.

The ultimate goal of the research is to present an exploratory and situational analysis that enables principals to evaluate their own leadership work and their institution's digital readiness, thereby aiding effective adaptation to crisis situations and the development of conscious managerial behavior.

3. Theoretical framework and context

The School as an Organization and Corporate Parallels

The theoretical premise of the research is to interpret public education institutions not merely as pedagogical venues but as complex organizations. Although the fundamental goals of schools (quality education, skill development) differ from those of profit-oriented companies, numerous common points can be discovered in their operational principles. The dissertation draws parallels between school and corporate management in six main areas:

1. Strategic Planning: Just as companies need to stand their ground in the market, schools must also possess short- and long-term goals, which are influenced by geographical location and the sociocultural background of the students.
2. Leadership and Management: The roles of school principals and their deputies are comparable to senior and middle managers. Their task is the coordination of daily work, decision-making, and setting the strategic direction.
3. Resource Management: Schools must manage human resources (teachers), time, financial frameworks, and infrastructure.
4. Performance Measurement: Similar to corporate KPIs, measurement systems have appeared in education, such as the Teacher Performance Appraisal System (TÉR) or national competency assessments.
5. Communication Systems: The efficiency of internal (teaching staff) and external (parents, maintainer, local community) communication is critical to the institution's success, as the boundaries of interaction have fundamentally changed in the absence of physical presence (Luhmann, 2012).
6. Innovation Compulsion: Technological development forces schools into continuous renewal, especially in the field of digital methodology.

Emergency Remote Teaching (ERT) and Pedagogical Planning

The situation that developed due to the COVID–19 pandemic was not classic distance education, but so-called Emergency Remote Teaching (ERT). Its essence is the temporary relocation of educational content to an alternative format for the duration of a crisis situation (Hodges et al., 2021). The theoretical framework of the research combines the ERT model with the steps of traditional pedagogical planning. Pedagogical planning is normally a linear process (setting goals, selecting content, determining methods, evaluation); however, the crisis situation interrupted this process. The dissertation points out that if certain steps are omitted from the planning process (for example, diagnostic measurement or methodological preparation), the system becomes deficient, jeopardizing the achievement of output goals (Molnár, 2022).

Crisis Management in Public Education

According to the theoretical background of crisis management, the impact of most crises could be mitigated if leaders treated reservations and dangers as challenges (Noszkay, 2018). At the outbreak of the pandemic, leaders of public education institutions received (or were forced into) previously unexperienced autonomy, as they had to make immediate decisions at the local level alongside central management. Key elements of conscious managerial behavior in this context include:

- Accurate recognition of the organization's current situation.
- Mitigation of damages (e.g., managing equipment shortages).
- The ability for rapid adaptation.

Digital Radiness and Leadership Competencies

One of the most important theoretical pillars of the dissertation is the concept of digital readiness. This does not merely mean the existence of an inventory of tools, but the willingness and skill with which the leader applies digital technology to create innovative opportunities (Szűts, 2020). Leaders play a key role in digital transformation: they are the ones who formulate the digital vision and manage the processes. The literature review confirms that those organizations (schools) were able to develop successfully where the leader recognized the potential of technology and was able to react to the development (Westerman et al., 2014). The components of leadership digital competence in the research are:

- Technical skills: Confident use of ICT tools.
- Strategic perspective: Integration of digital solutions into the school's long-term program.

- Attitude: Openness to new methods (e.g., gamification, blended learning).

Sociological and Communication Aspects

The digital transition has also changed the social frameworks of education. The lack of physical presence reduced communication opportunities inherent in nonverbal signals, gestures, and eye contact (Simmel et al., 2009). The theoretical framework includes the theories of Goffman (1967) and Luhmann (2012) on interaction and social systems, highlighting that student behavior is less controllable in the digital space (Mead & Morris, 1934), and the normative order can only be enforced indirectly (Vanderstraeten & Biesta, 2006). This environment required the redefinition of student autonomy and responsibility, as well as the teacher-student relationship becoming more horizontal. Resting on these theoretical foundations, the research examines how institutions were able to function as organizations even after moving from physical space to virtual space.

The theoretical framework thus forms a web in which aspects of organizational theory, digital pedagogy, and crisis management reinforce each other to help understand the decisions and efficiency of public education leaders during the pandemic.

4. Research questions and hypotheses

The doctoral dissertation research process consists of three successive phases, during which the experiences of parents, teachers, and finally, institutional leaders were examined regarding the digital work order outside the classroom.

The research questions and hypotheses for the three phases are as follows:

Phase 1: Investigation of the Parental Side

This phase examined the situation from the parents' perspective during the first stage of the pandemic, considering that the boundaries of communication between the school and the family were fundamentally modified by the digital transition.

- Research Question (K1): What differences can be observed in parents' experiences related to the digital transition at various school levels?
- Hypotheses:
  - H1: Parents can be classified into well and clearly distinguishable groups regarding their digital experiences related to the digital transition.

o H2: Parental experiences related to the digital transition differ significantly across different school levels.

o H3: In the case of parents raising lower-grade (primary) students, the perception of the home learning burden coming from schools is higher compared to those parents who do not have a child in the lower grades.

Phase 2: Investigation of the Teacher Side

The second stage analyzed teachers' perceptions of school support and their confidence, based on the starting point that methodological preparedness in digital pedagogy is crucial for successful adaptation.

- Research Questions:
  o K2: What factors influence teachers' perceptions of school support during the digital transition?
  o K3: What factors influence teachers' confidence regarding the digital transition?
- Hypotheses:
  o H4a: Teachers perceive the support arriving from the school for the digital transition at different levels depending on their educational attainment.
  o H4b: Teachers have different levels of confidence regarding the digital transition depending on their educational attainment.
  o H5a: Male and female teachers perceive the support arriving from the school for the digital transition at different levels.
  o H5b: The confidence of male and female teachers regarding the digital transition differs.
  o H6: There is a difference in teachers' age regarding digital pedagogical qualification.
  o H7a: Teachers who received digital pedagogical education during their studies perceive the support arriving from the school more positively than those who did not receive such training.
  o H7b: Teachers who received digital pedagogical education during their studies perceive the student support arriving from the school more positively than those who did not receive such training.
  o H7c: Teachers who received digital pedagogical education during their studies are more confident regarding the digital transition than those who did not receive such training.

Phase 3: Investigation of the Institutional Leadership Side

The final phase examined the reactions of all schools and their leaders within an entire school district. Here, the emphasis was on leadership digital readiness and strategic decision-making mechanisms.

- Research Questions:
  - K4: How was emergency pedagogical planning implemented among institutional leaders?
  - K5: What recommendations can be formulated regarding the situation that arose in connection with crisis management?
- Hypothesis:
  - H8: Institutional leaders developed their crisis management strategies using the steps of pedagogical planning; however, they did not apply the steps of emergency planning.

5. Research methodology

The methodological structure of the research consists of three successive phases tailored to the complexity of the subject, following the principle of data triangulation. This approach enabled the exploration of the phenomenon from multiple perspectives (parental, teacher, and leadership) by combining different methods.

Logical Flow and Research Design

The study followed an **explanatory sequential design**. This means the process began with quantitative data collection in the first two phases, and the results and identified crisis points obtained there provided the foundation for the deeper, qualitative investigation in the third phase.

Phase	Focus Group	Method Applied	Analysis Technique
Phase 1	Parents	Quantitative (Online questionnaire, N=344)	SPSS: Frequency analysis, factor analysis, cluster analysis
Phase 2	Teachers	Quantitative (Online questionnaire)	SPSS: Correlation analysis, T-test, ANOVA (variance analysis)
Phase 3	Institutional Leaders	Qualitative (Structured deep interviews)	Content analysis, category-based coding

Detailed Methodological Description

Quantitative Analyses (Phases 1 and 2):

- **Factor Analysis:** Served to reduce data and explore underlying dimensions; Varimax rotation was applied to clarify the factor structure.
- **Cluster Analysis:** Used to group respondents (parents) to create well-distinguishable digital experience profiles, employing the Ward method and Euclidean distance.
- **Comparative Statistics:** Independent samples t-tests and one-way analysis of variance (ANOVA) were performed to demonstrate differences based on teachers' education, gender, and digital qualification.

Qualitative Analysis (Phase 3):

- **Structured Deep Interview:** All institutional leaders (14 people) of an entire school district were contacted. The interviews followed a flexible guideline and lasted an average of 60 minutes.
- **Content Analysis:** The recorded and transcribed texts of the interviews were processed using category-based analysis. A coding system with three statuses (yes / partially / no) was defined regarding the implementation of individual planning steps.

Data Management and Reliability:

- Excel and SPSS software were used for the analyses.
- Participant anonymity was ensured throughout the research, and a 0.05 level was applied to check statistical significance.

This integrated methodology allowed for the scientifically rigorous exploration of the tensions between **Emergency Remote Teaching (ERT)** and traditional pedagogical planning from a leadership perspective.

6. Research results

The results of the research emerge along three main dimensions, covering the perceptions of parents, teachers, and leaders regarding the period of emergency digital education.

Parental Experiences and Clusters (Phase 1)

Factor and cluster analysis of the parental questionnaires (N=344) proved that parents' attitudes toward the digital transition were not homogeneous. Hypothesis H1 was confirmed, as parents can be classified into three well-distinguishable groups:

- **"Digital Optimists"**: Those for whom technology caused no difficulty.
- **"Overwhelmed"**: Those who experienced home learning and the management of digital platforms as a great burden.
- **"Distanced"**: Those who lacked the proper equipment or technical competence.

Hypotheses H2 and H3 were also confirmed: parents raising lower-grade children reported a significantly higher learning burden. This occurred because the autonomy of younger students is lower, making parental presence as a mediator indispensable.

Teacher Support and Confidence (Phase 2)

The analysis conducted among teachers (SPSS analysis of variance and t-tests) highlighted the decisive role of background variables. Hypotheses H7a, H7b, and H7c were confirmed: teachers who had already received digital methodological training during their studies were significantly more confident during the transition. These teachers also judged the support received from school leadership more positively.

Interestingly, hypothesis H5b (gender difference in confidence) was only partially confirmed:

- Men showed greater confidence in the use of technical tools.
- Women showed greater confidence in digital content development and communication.

Regarding age (H6), it was confirmed that younger generations experienced the shift more naturally, but the methodological routine of more experienced teachers helped in crisis management.

Institutional Leadership Crisis Management and Planning (Phase 3)

The qualitative analysis of leadership deep interviews highlighted critical points. Hypothesis H8 was confirmed: although institutional leaders applied traditional steps of pedagogical planning (goal setting, task allocation), specific elements of **Emergency Remote Teaching (ERT)** - such as structured risk analysis or a long-term digital strategy - were missing in most cases.

Leadership decision-making during the first wave of the pandemic was reactive:

- Operative survival dominated instead of strategic planning.
- During resource management, equipment shortages were often solved in an ad-hoc manner by involving external supporters.
- The level of digital maturity showed a direct correlation with the leader's personal attitude: where the principal was committed to innovation, the organization as a whole provided more flexible responses.

The research results confirm that the success of the digital transition depended not only on the supply of equipment but also on **leadership digital competence** and the **prior methodological preparedness** of teachers. Empirical data pointed out that to avoid future crisis situations, schools must be prepared for digital transformation not only from an educational perspective but also from a management perspective. The correlations presented in Chapter 6 provide the basis for the dissertation's closing recommendations and the collection of best practices.

7. Conclusions - practical applicability

The research results clearly demonstrated that the forced digital transition was not merely a technical challenge, but also brought to the surface organizational development and leadership deficiencies in public education institutions. The drawn conclusions and developed proposals are directly applicable to institutional maintainers, school principals, and teacher training.

One of the most important conclusions of the study is that leadership attitude proved to be a key factor in the process. It was proven that an institution's digital maturity and crisis-resistance are fundamentally determined by the leader's digital readiness and openness. During digital transformation, leaders play a key role, as they are the ones who formulate the vision and guide the processes (Westerman, Bonnet, & McAfee, 2014). The results highlighted that instead of reactive crisis management, a proactive, strategic approach is needed in the future. Furthermore, the vulnerability of pedagogical planning was also confirmed: in an emergency, certain steps of the planning process according to the ADDIE model - especially diagnostic measurement and differentiated evaluation - are damaged, which can cause systemic falling behind for disadvantaged student groups. As Molnár (2022) explains, if certain stages are omitted from the planning process, the system becomes deficient, jeopardizing the achievement of

pedagogical goals. Finally, regarding methodological confidence, the data supported that prior digital qualification significantly increases teachers' stress tolerance and efficiency, regardless of age or technical equipment, as digital pedagogy is built from the intertwined elements of the information society and educational science (Szűts, 2020).

The dissertation also offers specific development directions for practice. It is recommended for every institution to create a leadership digital strategy, i.e., a "digital script," which regulates platform use, communication channels, and the system of expectations not only in crisis situations but also during everyday hybrid education. Furthermore, a reform of leadership training is necessary, as it is essential for future institutional leaders to acquire knowledge of crisis management and digital organizational management, treating the school as an economic and human unit (Noszkay, 2018).

In the field of parental communication, based on the results of the cluster analysis, schools must recognize the differing digital competencies and support needs of parents, as the boundaries of interaction fundamentally changed in the absence of physical presence (Luhmann, 2012). Regarding internal knowledge sharing, or mentoring, the research highlighted that horizontal knowledge transfer within the teaching staff is a more effective crisis management tool than central instructions. Finally, within the framework of the digital adaptation of evaluation systems, it is recommended to include indicators of activities performed in the digital work order into the elements of the TÉR (Teacher Performance Appraisal System). Overall, the dissertation points out that the experiences of Emergency Remote Teaching (ERT) must be integrated into the strategic documents of public education (Hodges, Moore, & Lockee, 2021). The offered framework helps institutional leaders transform the school into a flexible, learning organization capable of giving effective responses to 21st-century technological and social challenges.

Practical Utility and Recommendations

The dissertation offers the following specific "best practices" and development directions for practice:

- Development of a Leadership Digital Strategy: It is recommended for every institution to create a "digital script" that regulates platform use, communication channels, and the system of expectations not only in crisis situations but also during everyday hybrid education.

- Reform of Leadership Training: Based on the research results, it is essential for future institutional leaders to acquire crisis management and digital organizational management skills. They must be able to lead the school as an economic and human unit (applying corporate parallels).
- Differentiated Parental Communication: Based on the results of the cluster analysis, schools must recognize the differing digital competencies and support needs of parents. The creation of targeted "parental digital aids" and support groups is recommended to help "overwhelmed" groups.
- Internal Knowledge Sharing (Mentoring): The research highlighted that horizontal knowledge transfer within the teaching staff is a more effective crisis management tool than central instructions. Utilizing digitally competent teachers as internal mentors is crucial.
- Digital Adaptation of Evaluation Systems: It is recommended to include indicators of activities performed in the digital work order and innovative content development into the elements of the TÉR (Teacher Performance Appraisal System).

Overall, the dissertation points out that the experiences of Emergency Remote Teaching (ERT) must be integrated into the strategic documents of public education. The framework offered by the research helps institutional leaders transform the school into a flexible, learning organization capable of giving effective responses to 21st-century technological and social challenges.

Research Limitations

Every scientific investigation carries certain constraints that may affect the generalizability of the results. In the case of the present research, the following limitations have been identified:

1. Sampling Limitations and Representativeness
- **Parental Questionnaire (Phase 1):** Although the sample size is relatively large (N=344), it is not representative at a national level. Due to online distribution (snowball method), it primarily reached more digitally active parents, so the experiences of families with no digital devices at all or those living in deep poverty may be underrepresented.
- **Leadership Interviews (Phase 3):** The qualitative phase focused on institutional leaders within a single school district. While this allowed for in-depth analysis, the

results may reflect the specific management culture and resources of that particular district, which may differ from the practices of other parts of the country.

2. Methodological Limitations

- **Self-reported Data:** Both the questionnaires and the interviews are based on the subjective perceptions of the respondents. There is a risk of the distorting effect of "social desirability bias," especially in the case of leaders who may present the effectiveness of their own decisions in a more favorable light.

- **Cross-sectional Nature:** The research examined the phenomenon at a specific point in time (or linked to the waves of the pandemic). A longitudinal (longer-term) study could provide a more accurate picture of the permanent integration of digital solutions into pedagogical practice.

3. Contextual Factors

- **Extraordinary Nature of the Situation:** Since Emergency Remote Teaching (ERT) was a period born of necessity and burdened with trauma and uncertainty, the responses may have been influenced by emotional involvement. Experiences of digital education taking place under "normal" circumstances may differ significantly from this.

- **Model Adaptation:** The pedagogical planning models used in the research (such as ADDIE or the ERT framework) were not originally developed for the Hungarian public education structure or for a global pandemic, so certain nuances may have been lost during the adaptation.

4. Technological and Regulatory Variables

During the period of the research, instructions from central management (ministry, school districts) were constantly changing. This "moving target" made the static analysis of leadership decisions difficult, as the leaders' room for maneuver modified weekly depending on external regulators.

Recognition of these limitations does not diminish the value of the results but rather marks the direction for further research: it is recommended to extend the study to a nationally representative sample, as well as to conduct a long-term, follow-up impact assessment of the digital transition.

8. Summary

The doctoral dissertation analyzes one of the most critical periods in modern educational history: the digital work order outside the classroom caused by the COVID–19 pandemic. The scientific novelty of the research lies in the fact that it interprets the phenomenon not merely as a pedagogical process, but as a complex organizational development and leadership challenge, while drawing continuous parallels between the tools of corporate crisis management and public education institutional leadership. The theoretical framework of the thesis is formed by a blend of emergency remote teaching and traditional pedagogical planning, particularly the ADDIE model, starting from the central assumption that the effectiveness of the school as an organization in a crisis situation depends decisively on the institutional leader's digital readiness and innovative attitude.

From a methodological point of view, the study was implemented in three successive phases, ensuring the multi-faceted confirmation of data. In the first stage, the experiences of the parental side were scrutinized, where cluster analysis showed that the adaptability of families was by no means uniform. Alongside digitally competent parents, a significant "overwhelmed" group also appeared, where the upbringing of lower-grade children and the lack of methodological support caused serious tension, given that the boundaries of interaction fundamentally changed in the absence of physical presence. During the investigation of the teacher side, it was confirmed that previously acquired digital methodological qualification significantly increased teachers' confidence during the crisis. The results also highlighted that, alongside technical assistance, the clear clarification of leadership expectations and the need for emotional support were the most decisive factors for teachers.

Institutional leadership deep interviews revealed that principals were largely left alone in their decision-making processes during the first wave of the pandemic, and their activities were mostly characterized by reactive crisis management. Although they tried to follow the basic steps of pedagogical planning, conscious emergency strategy formulation and diagnostic processes measuring student progress were often pushed into the background by daily operational survival. The main conclusion of the research is that the success of the digital transition in the long term depends not on the quantity of tools, but on the flexibility of organizational culture and leadership competencies.

The practical benefit of the dissertation is embodied in the developed proposal package, which emphasizes the necessity of institutional digital crisis scenarios and the supplementation of leadership training with modern management knowledge. Although the pandemic forcibly accelerated digital transformation, the incorporation of acquired experiences into the strategic documents of schools is essential for true systemic development. To summarize, the thesis sends the message that only schools that support internal knowledge sharing and become prepared, learning organizations will be able to provide effective responses to future challenges.

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