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KNOWLEDGE AND KNOWLEDGE MANAGEMENT IN EDUCATION

Theses of the Doctoral (PhD) Dissertation

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Budapest, 2024

Justification of Topic Choice in the Context of Knowledge Society

In the 21st century, knowledge has become the cornerstone of social and economic life. The knowledge-based society paradigm treats knowledge as a fundamental resource and value, shaping the functioning and development of modern societies. In this context, the choice of this topic is justified on several grounds.

Knowledge is the engine of economic growth and innovation. Knowledge-intensive industries and knowledge workers have become the driving force of modern economies. The creation, sharing, and application of new knowledge are essential for the development and deployment of new products, services, and technologies, which contribute to the competitiveness and sustainability of national economies. (WEF, 2023; UNESCO, 2023)

Knowledge accessibility and sharing promote social inclusion, democratic participation, and the preservation of cultural diversity. Equal access to information and knowledge promotes fairness and social justice. Its absence can be a source of division and marginalization. In "Homo Deus," Harari highlights that modern society focuses on short-term goals and quick rewards, which conflicts with the long-term sustainability goals. (Harari, 2016)

The knowledge-based society demands a rethinking of political frameworks and regulations, particularly in the areas of information and knowledge dissemination, intellectual property protection, and ethical considerations. Questions of knowledge reliability, disinformation, and the revolutionary yet ethically unclear possibilities of access to knowledge play a central role in the knowledge-based society and economy.

This presents challenges for education systems as well. Education must focus not only on the transmission of previously established, scientifically validated knowledge but also on the creation of new knowledge and the development of critical thinking skills. The importance of lifelong learning and continuous skill development is growing, and the transformation of some previous norms and the lack of solutions to the current crisis symptoms create a further demand for new knowledge.

In the knowledge-based society, technology, particularly information and communication technologies (ICTs), has played a key role in knowledge production, sharing, and utilization in recent decades. ICTs enable the rapid dissemination and accessibility of

knowledge, which has a radical impact on social and economic innovation as well as human relations.

Knowledge, as the fundamental driving force of modern society and economy, determines the possibilities of the future, depending on who uses it and for what purpose. The world faces numerous unresolved issues that emerge as global challenges, such as the environmental crisis, economic inequalities, the rapid pace of technological change, the lack of social cohesion, political instability, and war risks. These challenges are complex and require innovative solutions. The stakes are whether the knowledge to contribute to the solution of these global problems is available or, on the contrary, leads to an escalation of tensions.

Education systems can play a key role in ensuring that socialized knowledge is used to address global challenges. Traditionally, the knowledge imparted by education has meant the encyclopaedic study of scientific disciplines. Today, much more is expected of it, namely the creation of competencies, values, and commitments that shape the decisions and actions of individuals and their communities in the ethical and sustainable management of global challenges. The extent to which education can fulfil this role will decisively influence its relationship to knowledge.

The author of this assessment was driven by the recognition that an education system tasked with preparing people for the challenges of the future cannot function solely according to its internal logic or short-term political interests. The knowledge deficit is not just about outdated curricula or a lack of innovation in pedagogical methods. It is a deeper problem, as the shortcomings of knowledge management extend far beyond the classroom and the subjects taught.

Education must not only impart knowledge but also practical competencies, values, ways of thinking, empathy, innovation, problem-solving, and value-creation and participation skills. The current education system needs to keep pace with technological developments and labor market demands, and it needs to prepare students to solve social problems. Deficiencies in knowledge and knowledge management in the field of education become not only a deficit of the sector but of the whole society. Both for the assessment of the situation and for the development of measures to support the system of knowledge and knowledge management, relevant knowledge is available. As an example, it is sufficient

to highlight the OECD studies that integrate the criteria of research rigor and policy applicability (OECD, 2000, 2004, 2006, 2008, 2012, 2018, 2019).

The author's inspiration for this dissertation topic stems from the belief that innovation, the integration of research findings, continuous professional development for educators, and bridging the gap between theory and practice can all contribute to preparing future generations to effectively respond to change.

Research Questions

One group of research questions aimed to map out the knowledge available at the system level and the modes of knowledge management, while the other examined the opportunities and limitations of personal knowledge development. In an educational system and institutional environment where external conditions, although not necessarily supportive, individual freedom of action, the knowledge guiding that action, awareness, and learning can enable improvements in work effectiveness under any circumstances – regardless of the institutional function involved.

The research questions of the paper are as follows:

1. What knowledge is available and can be utilized to deepen understanding of the concept of knowledge? What are the most contributory disciplines to knowledge and knowledge management? What large unexplored areas of knowledge should be brought closer to the sector?
2. What are the recent historical phases of knowledge management?
3. What do we know about the knowledge management system in education?
4. What are the key knowledge areas that support the operation of the educational system/sector? Can relevant knowledge areas for the educational sector be identified, possession of which could better assist in adapting to the challenges of the age? Can the internal content and key knowledge elements of the identified knowledge areas be outlined?
5. What do the stakeholders in education think about:

o the importance of the selected knowledge areas?
o the quality of the selected knowledge areas?
o the presence of knowledge gaps in the selected areas?
o the application of existing knowledge in these areas?

6. Finally, what has changed in the 14 years since the empirical data collection, and what are the opportunities for addressing the uncovered deficiencies and exploiting the emerging opportunities?

While the answers to the first three questions were brought closer by processing relevant literature and related research outcomes, responses to the four questions under points 4 and 5 were facilitated by the results of an empirical study titled "The Knowledge Map of Education," conducted from 2009 to 2011 within the framework of the NOIR (National Education Innovation System) research and strategy development (Balázs et al., 2011; Kovács, 2011).

The applied research methods

The research sought answers to some of the questions through the analysis of relevant literature and others through studies in which the author participated. The third group of questions was reviewed through the lessons learned from an empirical investigation (interviews and questionnaire surveys) previously conducted by the author. The number of questions and their individual complexity precluded striving for completeness. According to the dissertation's author, the work proved to be meaningful and useful even as a "surface exploration," as the adopted perspective directed attention to further important questions and tasks. The cautious conclusions invite collective reflection from researchers in the field, practitioners in the sector, and education policy decision-makers.

Theoretical Background

The processed studies dealing with knowledge and knowledge management were presented in a literature review for this research. The goal was an integrated approach to the concept of knowledge and its related development across multiple scientific fields, which also provided conceptual-conceptual frameworks for the research.

The dilemmas of interpreting knowledge management, the main characteristics of the approach, and its stages of development identify concepts, processes, and techniques of knowledge, learning, and knowledge management that are interpretable in the field of education, as well as existing patterns and dilemmas of knowledge.

The research addresses questions relevant mostly to educational science and andragogy but also utilizes enriching results from related disciplines. This outlook, through the

author's subjective selection from a rich array of philosophy, corporate knowledge management (Tomka, 2009), information science, educational and organizational sociology, cognitive and neuroscience (Sousa, 2022), signals the interdisciplinary knowledge potential available for the sector. Elevating their concept and tool systems into a common analytical framework was challenging but exciting. Comparing the conclusions formulated within this framework with traditional approaches to education was also interesting for this research. It raises questions about what kind of synthesizing research, "translations" for practice, knowledge sharing, diffusion processes, and organizational solutions the mentioned interdisciplinary knowledge potential might necessitate to dissolve the isolation of disciplinary areas.

Expert Workshop

The discussed topics refer to several research projects involving the author that employed numerous empirical methods. A central element of this research was the author's "Knowledge Map of Education" sub-study, which consisted of expert workshops, in-depth interviews, and a questionnaire survey.

Interviews

The qualitative basis of the survey's findings were interviews conducted with key players in Hungarian education at the time within the framework of the Knowledge Map research.

Following the definition of interview questions, the selection of interview subjects was made so that their expertise closely related to the objectives of the investigation. The questions aimed to find out: which knowledge areas the interviewee considers important for improving the effectiveness of education (the answer is inevitably a function of what the respondent considers effective, in connection with which factors they identify, and which direction of change they see as improvement), how explored and what quality the named knowledge areas are (see later for knowledge quality criteria), what system-level assumptions and hypotheses they identify that are not adequately substantiated, and what missing knowledge they identify.

The selected interviewees had an appropriate level of insight (informed about available knowledge) into education and the research-designated sub-areas, yet they looked at the 10 knowledge areas from a more generalist perspective. Among the respondents was only one knowledge management expert, for whom the sectoral perspective posed a challenge.

Knowledge Map - Survey

A significant analytical task was the broad understanding of the profession's opinion about the educational knowledge background, the relevance of the identified 10 knowledge areas, and the existence, quality, and practical relationship of essential knowledge for the development and effectiveness of the educational system. A questionnaire survey was conducted to gather and analyze these opinions. Despite the 1280 respondents did not represent the entire Hungarian educational system, their answers were suitable for affirming the designated knowledge areas and allowed for deepening the research interest in several questions. They provided important input for formulating suggestions for longer-term research themes and sectoral tasks in the final part of the research. Re-presenting the empirical research more than a decade after data collection raises exciting questions. A separate study could analyze and interpret the changes in the Hungarian educational system (partly due to sectoral policy, partly due to changes in the educational environment) that have shaped its thinking regarding knowledge and knowledge management. The changes over these 14 years combined strong interventions (e.g., centralization, control), stagnation (e.g., teachers working in despair), a misguided nostalgia for content-based learning (since this approach continues unwaveringly), and forced innovative results due to local adaptation requirements (e.g., extraordinary adaptations during Covid). Recent decades of innovative research targeting educational institutions have reported substantial innovative results and successful individual and organizational level innovations within institutional microenvironments (Fazekas et al. 2021, Halász, Horváth 2017).

This dissertation can only refer to a few defining factors shaping the relationship to knowledge among the complex changes. Where Hungarian education stands in 2024 as a result of these changes can only be accurately gauged by analyzing the experiences of the educational communities in the public education system, the academic communities in universities, including the diverse experiences of those eager to learn, possibly through a PISA examination.

Kovács (2011) "Knowledge Map of Education" research forms the basis of this dissertation. Some elements of the theoretical overview and the empirical research part are improved, expanded versions of the related 2011 research report. Over the past decade, the author has continuously expanded the content of the study. No citations or

references to text elements carried over or modified from this one precedent document have occurred in this case. The research sought answers to some questions by processing relevant literature, while it addressed other questions through studies involving the author's participation.

Conceptual foundations

The concept of knowledge accompanies the history of mankind. It is complex, leading to a variety of interpretations. While some approaches delve into the epistemological foundations, others focus on the practical applicability of the concept. In education, enriching the concept of knowledge is crucial because it is an essential part of the curriculum, including the expected learning outcomes, educational goals, and teaching methods. Due to the context-dependent nature of the concept of knowledge, education professionals must critically assess what knowledge to convey, in what form, and in which context to students. Knowledge does not exist in isolation but as a rich system of combinations and interactions that facilitate opinion formation and action. Benő Csapó states that it is no longer a question of quantity, but about the processes by which an individual organizes their prior knowledge, understood connections, and experiences related to application (Csapó, 2003). The knowledge that broadly defines the effectiveness of the education system is also crucial.

The legitimate form of knowledge production is research. Education builds around scientifically valid areas of knowledge. If such knowledge is overly context-dependent and the research communities are isolated, highly valid knowledge (or knowledge-worthy truth) is produced, but is it utilized for societal benefit? (Fullan, 2007; Gibbons et al., 1995). Despite the more institutionalized and deep-rooted traditions of educational research in Anglo-Saxon countries compared to Hungary, there have previously been numerous criticisms regarding the applicability of educational research findings. The research typically reflected theoretical considerations, had too narrow a focus, and therefore provided limited practical value (Levin, 2004; Hargreaves, 1996).The theoretical frameworks offer insights into the approaches of philosophy, neuroscience, cognitive psychology, and management science, aiming to broaden and enrich thinking about knowledge while highlighting the opportunities in interdisciplinary openness.

The thesis pays special attention to the rise of knowledge management in recent decades and the subsequent waning of explicit efforts. Knowledge management's roots go back to

the dawn of humanity, when major decisions were made by gods or sages, and knowledge was passed orally. Knowledge management as a distinct discipline began to solidify in the mid-20th century, followed by related scholarly reflections. Early efforts in the 1950s started with the recognition of the importance of knowledge sharing. This raises the issue of whether there is a chance for organizational knowledge continuation when every employee leaves and there is high-level codified knowledge (written standards, norms). (Alavi & Leidner, 2001) The goal was to make individual knowledge organizational, for which job-related procedures and guidelines were developed. These initial steps laid the groundwork for the concept of knowledge management and recognized the importance of knowledge for organizational success. It is also interesting from a knowledge management perspective that Popper emphasizes the importance of continuously testing hypotheses and theories in the development of knowledge. This encourages organizations to apply critical thinking and openness, creating an environment where employees can freely share and discuss ideas and approaches (Popper, 1997). The 70s and 80s brought the era of data and information management. The concept of knowledge management became widespread, and new tools emerged for storing, sharing, and utilizing knowledge. The advent of personal computers, the internet, and databases revolutionized access to knowledge but also posed challenges in managing information overload, relevance, and obsolescence.

From the 1990s to the present, knowledge management has been characterized by the increasing prominence of tacit knowledge alongside explicit knowledge (Polányi, 1966, 1999). The recognition of tacit knowledge, which is difficult to articulate and based partly on experience and unconscious learning, transformed the focus of knowledge management. The goal became to share and utilize knowledge combined with tacit knowledge, using new tools such as communities of practice and knowledge-sharing platforms. Thomas H. Davenport was a significant interpreter and shaper of KM (Davenport & Prusak, 1998), and Wenger developed the model of communities of practice (Wenger, 1990; Wenger et al., 1991, 2002).

The strategic significance of knowledge management grew as it was recognized that knowledge provides a competitive advantage for organizations. The thesis discusses the paradigm shifts in knowledge management, the influence of technological development, and the changing strategic significance of knowledge management. It touches on some

future opportunities for knowledge management but does not substantially address the ethical issues of knowledge sharing, the measurement possibilities of knowledge management, or the application practices in different industries and organizations. The strategic opportunities and dilemmas in complex adaptive systems are excellently modelled by the Cynefin framework, which distinguishes between simple, complicated, complex, and chaotic systems. The complexity provides substantial lessons for modern governance forms (EC et al., 2021; Halász, 2005; Stehr et al., 2013). The interventions offered by the model and the knowledge they require have distinctly different patterns. In this context, organizational learning behavior can only be understood by considering both the socio-institutional context and individual learning processes. Horváth considers organizational knowledge crucial in an organization's strategic decision-making, innovation capability, and maintaining competitiveness, as it helps the organization adapt to the changing environment, improve its processes, and thus respond more effectively to market challenges (Horváth, 2022).

Regarding knowledge management in the educational sector, the thesis refers to research that examined the role of knowledge management within the chapters of the reasearch on the development of National Education Innovation System (NOIR). The research stations served a dual role: they provided a framework for the conceptions of knowledge management and examined how it contributes to innovation and thus to enhancing the effectiveness of education. The broader goal of the NOIR research was to analyze the R&D+I system of the education sector to make the creation, sharing, and use of new knowledge more effective. Among several theoretical and empirical foundations was the analysis of the R&D world of the domestic education system (Lannert, 2009). The research program involved significant participation from Tom Schuller, who assisted the work with his objective observer status and significant international experience gained as a director at numerous universities in the United Kingdom and the OECD CERI (Center of Educational Research and Innovation) (Schuller, 2010).

Based on the research findings, the NOIR strategy formulated five areas of intervention, one of which was the development of knowledge management. The NOIR+ research focused on unfolding the "Human Conditions Development" pillar of the NOIR strategy. The goal was to strengthen the role of master and research educators to promote innovation. The research highlighted the importance of knowledge management in

teachers' work and proposed specific measures to improve the conditions for knowledge sharing and management. The DigiNOIR research examined the aspects of NOIR development offered by educational technology. The thesis emphasized that technology applications are playing an increasingly important role in knowledge management. The intervention areas of the DigiNOIR strategy also formulated several tasks with dimensions of knowledge management (Halász et al., 2021).

The empirical research presented by the dissertation.

The empirical research presented in the dissertation, titled "The Knowledge Map of Education," was part of the NOIR research series, aimed at mapping relevant knowledge areas in the education sector to enhance its innovative capacity and performance (Kovács, 2011).

The study examined ten selected knowledge areas in education, dividing them into two main groups: five areas primarily define the professional profile of those working in educational institutions, while the other five define the expert knowledge profile of education. The review of these knowledge areas also allows for an assessment of how well they meet the expectations related to improving the effectiveness and efficiency of education.

The process of knowledge discovery and questionnaire data collection proceeded as follows: assessing the relevance of each knowledge area (whether the area is important), evaluating knowledge gaps, assessing the quality of knowledge in each area, and how well the work in the area aligns with the available knowledge.

The initial examination of the knowledge areas included in the questionnaire was based on the following expert criteria:

- the contribution of the knowledge area to educational effectiveness
- the accumulated knowledge in the given area
- the consensus on the importance of the knowledge area
- the added value of the mapping process, and its ability to inspire educational innovation, development, and the continuous renewal of the educational system.

Questionnaire Survey

The purpose of the questionnaire survey was to explore the key characteristics of the selected 10 knowledge areas in Hungary. Respondents had to provide their views in five different dimensions. For all 10 knowledge areas, they had to answer questions regarding:

- o   the importance of the area,
- o   the presence of knowledge gaps in the area,
- o   the quality of existing knowledge,
- o   the alignment between practice and knowledge,
- o   and the most important knowledge sources in the area.

The selection of participants aimed to ensure that respondents were well-informed representatives of the profession. The design and distribution of the questionnaire aimed to gather as many expert opinions as possible, including participants in the NOIR project, experts, educational researchers, higher education leaders, educational sociologists, leaders of teacher training institutes, leaders and key staff of public education institutions, and leaders of adult education institutions. Although the questionnaire was not representative, it served its purpose as the informed respondents typically confirmed the importance of the area, similarly evaluating questions related to quality, knowledge gaps, and alignment with practice.

The questionnaire was sent out to more than five thousand institutions, targeting three respondents from public education institutions (institution head, a colleague specializing in humanities, and one in sciences). A total of 1,280 responses were received, representing a response rate of nearly 10%. The demographic and professional composition of the respondents highlighted the diversity of the sample and the possibilities for analyzing the responses. Most respondents felt most comfortable with pedagogical tool knowledge, while sector policy knowledge and sector-specific professional needs were less characteristic among the respondents.

The survey was conducted using Google Survey, and the data analysis paid special attention to the relationships between knowledge areas and respondents. The results of the questionnaire survey thus provided substantial insights into the current state of the educational profession, but most importantly, the respondents' opinions about the 10 knowledge areas were pivotal.

Composite indices relating to "importance," "knowledge gap," "quality," and "alignment" were created based on the arithmetic mean of respondents' answers to each category. Since the respondents chose from categories, replacing individual responses with numbers does not automatically allow operations with these numbers without the risk of distortion. Consequently, the following figures help formulate hypotheses and illustrate key features of the responses, but they are not mathematically precise representations of the responses.
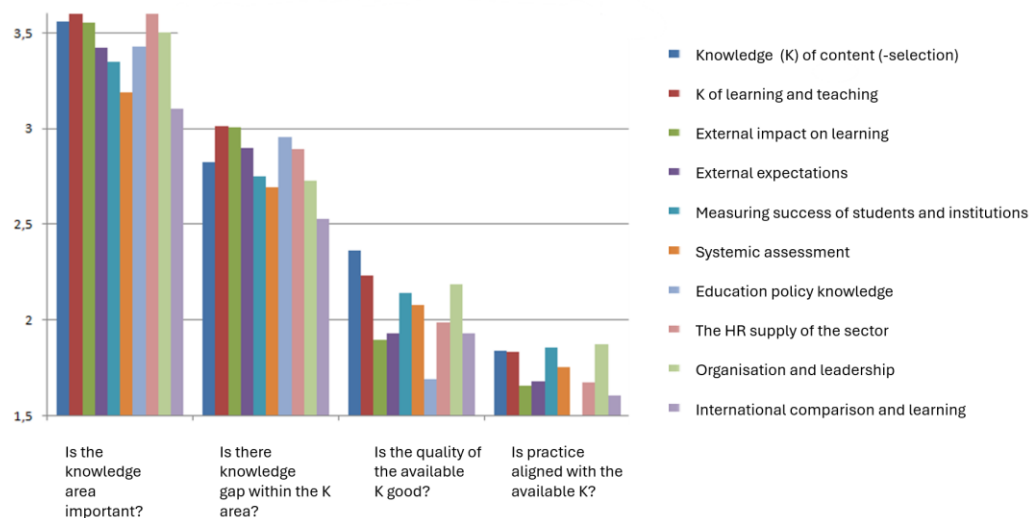
Figure: Evaluation of importance, knowledge gaps, available knowledge, and the alignment of practice with this knowledge across the 10 knowledge areas (averaged on a four-point scale)

The chart suggests that respondents considered the 10 areas important or very important with minor differences (leftmost column group). Although the specified knowledge areas are not independent of each other, it is surprising that respondents consider each one important. The highest values were given to areas related to sector staffing and methodology, while the lowest were given to system-level evaluation and international (macro-level) knowledge.

Respondents also see knowledge gaps in the specified areas with minor differences, indicating they identify problems and tasks in the system that currently cannot be resolved based on certain knowledge or facts. Among these, they perceive greater knowledge gaps in areas they also consider more important. Interestingly, the smallest knowledge gap is reported in the area of international knowledge, which could indicate recognition of

international knowledge (e.g., PISA test results) or a more modest perspective or interest in the area.

There are slightly larger differences in the predominantly negative judgments about the quality of existing knowledge in various areas. Knowledge related to school practice (content, methodology, organization) is rated somewhat higher, while the quality of knowledge related to the educational environment is rated lower. It is worth mentioning that the quality of policy knowledge is considered the worst.

Surprisingly unanimous is the opinion on how little practice in various areas builds on the available knowledge. Consequently, the problem is not only whether we have enough knowledge but also whether we use the existing knowledge. The least alignment is seen in policy practice, but the consideration of knowledge related to the educational environment and its role in practice is also low. An exciting new topic in this area will be the development of AI and digital technologies. How will AI systems influence what we consider knowledge, and how will we evaluate the information they generate? (Floridi, 2014; KPMG 2023)

The dissertation provided answers to the research questions that could serve as a solid basis for further work, even though changes over the 14 years since the data collection, might lead to different results today.

Proposals for actions

The knowledge management proposals of this thesis fully rely on the strategic recommendations of the NOIR, NOIR+, and DigiNOIR studies (Balázs et al. 2011, Halász et al., 2015, Halász et al., 2021); however, in the context of this dissertation the following 10 tasks are highlighted.

> 1. Easier to target if the area has undergone diagnostic evaluation and if a desirable state to be achieved, considering policy goals and necessary knowledge, is clearly outlined.
>
> The study of knowledge supply and demand should remain open to the results of other disciplines besides educational science, and these results should be elevated into professional discourse for reflection and applicability assessment.

2. Requires a research, development, and innovation environment where top-down and bottom-up processes reinforce each other, characterized by adaptive thinking and behavior suitable for managing changes in complex systems.

3. It's prudent to recognize every participant in education—including students and administrative staff—as not just lifelong learners but also potential sources of knowledge who can generate, share, and reflectively use new knowledge to support organizational goals (both independently and in interaction with others). This correlates with the level of cooperation and trust within the organization.

4. Supporting applied research and developments affecting the sector, as well as events and training related to knowledge management, fosters emerging professional communities and encourages participation in basic and advanced training, including leadership development, promoting the socialization of knowledge related to education.

5. It is advisable to support grant applications for inter-institutional and especially international networking cooperation in knowledge management.

6. Alongside fact-based policies, committed educational management can significantly benefit sectoral knowledge management, which in turn can enhance the effectiveness of education policy.

7. Given that the resource needs for knowledge management can be significant, it is advisable to consider it a strategic thinking tool and a necessary investment for achieving goals at all levels.

8. We are in an era of technological leaps. The emergence of opportunities from changes requires rapid adaptation. The paper refers to exploiting the potentials of blockchain technology and artificial intelligence. Individual adaptations are inevitable but costly and carry a high risk of falling behind. System-level support, which is knowledge-intensive, can be strengthened not only by top-down but also by bottom-up and horizontal knowledge support.

9. System-wide, regional, institutional, and personal knowledge management are all crucial and require a reinforcing chain of these elements.

10. The success of educational management and institutional leadership can also be measured by the effectiveness of change-oriented programs. It is advisable to extend the quality approach to knowledge management. The evaluation of related interventions is both an assessment of the knowledge used and a source for

planning and implementing future development processes through a cyclic learning process.

The author hopes that one day schools will not just be places of knowledge transmission, but inspiring centers for creativity, innovation, and shaping thought processes. Life-long learning opportunities should ideally build on accumulated past knowledge, current dynamics, and future challenges to ensure sustainability. This requires an immeasurable amount of valuable knowledge and technology. It's not just a pedagogical or educational policy issue. Knowledge management is not only the task of educators or educational policymakers; it involves everyone, as the quality of education indirectly or directly affects their future as well.

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