VISION AND TRANSFORMATION IN TEACHER EDUCATION

V. ISTANBUL EDUCATION CONFERENCE INSIGHT REPORT

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ISTANBUL EDUCATION CONFERENCE

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epam RESEARCH CENTER FOR EDUCATION POLICY

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TOTAL PARTICIPANTS 326

TEACHERS 86

STUDENTS 64

ACADEMICIANS 57

MONE ADMINISTRATORS 47

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RESEARCH CENTER FOR EDUCATION POLICY

The Research Center for Education Policy (EPAM) undertakes the core mission of observing, understanding, interpreting, explaining, and developing policies for the future of Türkiye in the field of education with a sense of social responsibility.

EPAM focuses on gathering, interpreting, and energizing Türkiye's experience, knowledge, and opportunities in the field of education without sacrificing these to artificial debates and agendas in order to produce solutions to the problems of today and the future. The ultimate goal is to strengthen the educational field in Türkiye by promoting equal opportunities and fairness in education.

EPAM continues its efforts for monitoring and analyzing transformations in Türkiye's education sector and for developing concrete, actionable policies for the future of Türkiye. EPAM uses its annual Education Monitoring Reports, policy notes, analysis reports, and opinion pieces for guiding education policies. Additionally, EPAM aims to enhance field expertise and strengthen collaboration among stakeholders through field research, educational programs, workshops, and conferences. The aim of these activities is to contribute to a more inclusive, effective, and innovative education system in Türkiye.

ISTANBUL EDUCATION CONFERENCE

The Istanbul Education Conference (IEC) is an annual event dedicated to fostering innovation and collaboration in the field of education. By bringing together educators, researchers, policy makers, and industry professionals, IEC serves as a platform for focused discussions, inspiring presentations, and networking opportunities.

IEC aims to address the challenges and explore the opportunities of the ever-evolving education landscape with a commitment to promoting excellence in education. Participants from Türkiye come together at this prestigious conference to exchange ideas, share best practices, and engage in meaningful dialogues on a wide range of topics such as curriculum development, pedagogical approaches, educational technology, and inclusive education.

Nourishing an inclusive and dynamic environment, IEC empowers participants to shape the future of education, drive innovation, and transform the way we teach and learn.

The V. Istanbul Education Conference was held this year on October 4, 2025, at Yıldız Technical University, in collaboration with ILKE Foundation Research Center for Education Policy (EPAM) and Yıldız Technical University. The conference was organized to discuss the skills and competencies required for the teaching profession, evaluate the transformation in teacher training processes, and address new visions and policy recommendations for the field. The event provided an opportunity for in-depth discussion of the impact of digitalization, artificial intelligence, and innovative educational approaches on teacher training, with a focus on Türkiye's context and international teacher training models.

TRACING EDUCATION: ISTANBUL EDUCATION CONFERENCES

V. Istanbul Education Conference

The conference was held with the theme “Vision and Transformation in Teacher Education”, and it addressed the skills and competencies required for teaching in the 21st-century; and by focusing on institutional models and policy approaches, it simultaneously offered a comprehensive platform for discussing the transformation of teacher training processes. The event evaluated the changing role of teaching, the effects of digitalization on education, and Türkiye’s new teacher-training policies, using national and international examples.

https://iek.ilke.org.tr/en/conference/2

IV. Istanbul Education Conference

It was held with the theme “Redesigning Education: 21st Century Skills”. The conference provided an important platform to discuss the effects of educational transformation, focusing on skill-based education models worldwide. The event addressed the skill-based education model and examples from around the world, the impact of 21st-century skills on learning areas and assessment processes, and the theoretical foundations of the skill-focused education approach. Furthermore, the skill-based education approach and the structure of teaching curricula within the Century of Türkiye Education Model were evaluated.

https://iek.ilke.org.tr/en/conference/4

III. Istanbul Education Conference

It was held with the theme “New Horizons in Vocational and Technical Education”. The conference addressed the importance of vocational and technical education, its current status in Türkiye and globally, and contemporary issues. The conference was held with the aim of bringing together education stakeholders and sector representatives to thoroughly discuss current debates in vocational and technical education.

https://iek.ilke.org.tr/en/conference/6

II. Istanbul Education Conference

It was held with the theme “Mass Education: The Search for a Way Out”. At the conference, where Dr. Saeeda Shah from the University of Leicester was the keynote speaker, and figures from Türkiye’s leading universities and non-governmental organizations discussed the future of mass education in Türkiye and the world.

https://iek.ilke.org.tr/en/conference/8

I. Istanbul Education Conference

The I. Istanbul Education Conference was held under the title “Skill Acquisition in the Digital Age”. The conference brought together leading stakeholders in the field of education in Türkiye to discuss the new skills emerging in the digital age and their integration into education.

https://iek.ilke.org.tr/en/conference/10


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V. ISTANBUL EDUCATION CONFERENCE

Introduction: The Transformation of Teaching in the 21st Century

Assoc. Prof. Ayhan Öz

EPAM Director

The Istanbul Education Conferences series, organized by ILKE Foundation Education Policy Research Center, has maintained its presence for five years as a significant platform for stakeholders to exchange ideas, expand professional networks, and access up-to-date insights about education. These conferences benefit participants through fostering a holistic examination of key issues by expert contributions from Türkiye and abroad, and encouraging the sharing of practical experience, research-based knowledge, and forward-looking perspectives. This year's conference, whose theme is "Vision and Transformation in Teacher Education", offers participants the opportunity to gain first-hand, reliable information on teacher training, an increasingly prominent issue, and supports the reimagining of teacher training processes aligned with the Century of Türkiye Education Model (Türkiye Yüzyılı Maarif Modeli, TYMM).

The success of educational policies is directly and substantially correlated with the quality of teachers. Extending its influence beyond individuals to societies and ultimately entire civilizations, education serves as the most potent instrument for shaping the future. In the contemporary world, access to information has accelerated, learning styles have been transformed, and instructional processes have been redefined under the influence of technology.

Despite these pervasive transformations, the teacher still preserves its status as the foundational component of the teaching and learning environment. Consequently, the roles and competencies of educators are being continually reshaped to align with the spirit of the age and the necessities of modern life; thus, new qualifications are being added to the fundamental attributes expected of a teacher. As a result, novel approaches and models in teacher education are emerging globally. Furthermore, each and every society endeavors to implement the necessary structural transformations in this field, taking its unique dynamics into serious consideration.

The papers presented at the V. Istanbul Education Conference comprehensively addressed the theoretical, historical, and applied dimensions of this transformation. The conference evaluated Türkiye's deep-rooted heritage in the teacher education system from the past to the present, considering the historical trajectory pursued since the *Dârülmuallimîn* (Teacher Training Institute for the Education of Boys), and it also discussed ways to integrate this legacy with today's digital, social, and cultural necessities.

The conference was divided into three sessions to address teacher training from different perspectives; the first session aimed to build on common international experience and new approaches to teacher training

through contributions from international speakers. In the second session, the teacher training process was evaluated from the perspectives of two significant institutional actors in Türkiye's teacher training: the faculties of education and The National Education Academy *(Millî Eğitim Akademisi)*. The third session focused on teacher competencies, especially digital ones, from an academic perspective.

In the digital age, teaching is transforming into a multidimensional field of expertise that goes beyond classical roles. As technologies such as artificial intelligence, big data, and augmented reality transform learning processes, it becomes crucial for teachers to be able to use these tools with pedagogical knowledge. Nevertheless, no kind of technological tool can replace a real teacher. On the contrary, in this new era, the teacher must function as the guide who utilizes technology for students' benefit, blending a value-based education with the opportunities of the digital age. In line with this perspective, the conference's prominent emphasis on the necessity of positioning digitalization in a value-centered manner rather than a mere instrumental one is highly significant.

Another important dimension of this year's conference is the alignment between the conference content and various aspects of the Century of Türkiye Education Model's conceptual framework. The term Maarif (Education/Enlightenment) exists in a deep semantic field that brings an educational approach based on knowledge, skill, and value, encompassing both traditional and contemporary elements. The Model aims for the individual to achieve not only academic success but also moral maturity, aesthetic sensibility, and a worldview grounded in irfan (gnosis/wisdom). In this context, the papers' emphasis on a paradigm moving beyond knowledge to centralize wisdom in education, coupled with the mention of a teacher education that produces value and meaning, is noteworthy.

The success of educational policies is largely determined by the quality of teachers.

The international papers presented at the conference offered an opportunity to evaluate Türkiye's ongoing transformation in the teacher training process under the light of global experiences. The experiences of pioneering countries in teacher education, such as Finland, Singapore, and Canada, were referred; these nations' research-based, autonomy-focused and value-centered approaches were drawn attention. The inclusion of such successful global models in the conference provides a significant contribution in terms of comparison and exemplification at this juncture, where Türkiye is on the verge of transforming its teacher education process.

The conference also addressed issues such as the social status of the teaching profession, the prevention of professional burnout, the establishment of a lifelong learning culture, and ethical leadership. In this context, the monitoring of teacher competencies and development was also discussed; the feasibility of achieving this through a model based on the use of AI-supported big data analysis was explored. The ability of teachers to fulfill their roles in an age of change and transformation, to avoid professional burnout, to acquire new competencies, and to embrace a lifelong learning culture is

The main outcomes of the conference will provide guidance across a wide range of areas, from teacher education policies and in-service professional development programs to digital transformation strategies and values-based education practices.

closely related to monitoring competencies, which plays a key role in this regard. Thanks to this monitoring system, giving feedback to teachers and taking actions to address lacking competencies have been made possible. All these efforts offer policymakers alternatives and proposals to address the systemic deficiency in monitoring teacher competencies in Türkiye.

The Istanbul Education Conferences are not merely events where academic papers are presented; they are also a common-sense platform where dialogues shaping the future of our education system are generated. The papers in this report offer original contributions which can guide teacher training and education policies. The multi-voiced structure of the conference builds bridges between the academia, the public sector, the private sector, and the non-governmental organizations, paving way for the collaborative construction of Türkiye's educational vision. The key outputs of this conference will guide many areas, including teacher training policies and in-service development programs, as well as digital transformation strategies and value-based education practices. The papers presented at the conference do not only address current problems but also offer a profound vision for the future of education.

On this occasion, we extend our thanks to all institutions that contributed to the organization of the V. Istanbul Education Conference, to the experts who contributed to this process with their papers, and to all the participants whose presence made the conference meaningful. We believe that this collective wisdom will leave a lasting mark on Türkiye's journey of Maarif. We hope that these studies focusing on the quality, vision, and irfan in education will widen horizons for Türkiye's education system.

THE FRAMEWORK OF VISION AND TRANSFORMATION

Atty. Ahmet Sait Öner

ILKE Foundation | Chairman of the Board

Teachers must be placed at the heart of educational visions for systems to function effectively.

The success of educational policies depends on the enhanced competencies and mentorship capacities of the teachers who implement these policies in the classroom. Within this framework, positioning the teacher as a central element in educational vision emerges as a fundamental requirement for the functioning of the education system. The Century of Türkiye Education Model stands out as a comprehensive educational vision that has been developed through a long-term effort and intensive labor, aiming to shape the country's future over the next century. One of the most fundamental components of this model is, undoubtedly, the teacher. As the flagships of the education system, teachers play a decisive role in implementing and sustaining the model.

The teacher is a guide who not only conveys the knowledge but also shapes the individual's character, assumes a leading role

in social change and transformation, and develops students in accordance with their individual capacity. In this context, the most fundamental goal of teachers should be to raise individuals who build systems and possess original frames of mind, rather than individuals who merely conform to the existing order. Consequently, the quality of the teacher directly determines the quality of society, and the teacher's vision shapes the student's horizon.

The effective continuation of this critical mission undertaken by teachers necessitates their involvement in a continuous professional development and renewal process. Gaining competence in areas such as digital literacy, artificial intelligence literacy, and technology adaptation has become an indispensable element of the teaching profession, which makes teachers an active part of lifelong learning. The teacher is no longer solely an instructor but has also become an actor who continues to learn.

While theoretical and practical training provided by higher education institutions and The National Education Academy contribute to the acquisition of this expertise, the voluntary participation of teachers in their own development processes is an inevitable necessity. This awareness will guarantee the continuity of professional competencies and the permanence of innovative approaches in education.

In conclusion, this conference aims to re-emphasize the central role of teaching in the education system, contribute to the implementation of the Century of Türkiye Education Model, and develop potential policies and strategies for transforming the teaching profession. In this regard, increasing teachers' knowledge and skills, and empowering their vision will be the strongest guarantee for Türkiye's future vision in education.

The teacher acts as a guide who effectively transforms individual growth into the foundation of social progress through recognizing the student's capacity and focusing on improving each student in accordance with their unique talent while moving beyond ready-made forms.

Prof. Eyüp Debik

Yıldız Technical University | Rector

Although the Century of Türkiye Education Model has been introduced as a comprehensive educational vision, focusing on how the teachers as the implementers of this model will be trained is of great importance. Teachers shape our future and lead social transformation, thus training them in a manner compatible with the core principles of the Maarif Model is a prerequisite for the ultimate success of this model.

Alongside its wide opportunities, the digital age also brings certain risks, which directly affects the quality of education systems. Younger generations can adapt to the technology much more than the elder ones however, the integration of this adaptation with national and spiritual values is of great importance. The fundamental actors to ensure this integration are the teachers. Universities and The National Education Academy must adopt a holistic approach in teacher training processes that will integrate the requirements of the digital age with national values.

In this framework, significant responsibilities fall on teachers. Strengthening professional competencies and gaining expertise in areas such as artificial intelligence and digital literacy are indispensable for contemporary teaching. Towards this goal, Yıldız Technical University will conduct studies in the near future to integrate artificial intelligence-based applications into the educational programs of all its academic units. Within this scope, the inclusion of artificial intelligence into the teaching of diverse disciplines, such as psychology, Turkish language and literature, and engineering, has been planned. The teacher's ability to manage technology with pedagogical knowledge is a strategic factor determining the quality of students' learning experiences.

Digital platforms facilitate access to information, but also create challenges in

conveying values. Therefore, teachers need to improve their digital literacy skills and use these tools consciously, with a pedagogical approach. Today, teachers should occupy a position where they can appropriately integrate the tools of the age into educational processes, evaluating technology with a pedagogical perspective, rather than merely settling for classical teaching methods. That is why, teachers are required to assume a role not only as users but also as guides and directors.

The integration of digital transformation in education with national and spiritual values must be one of the most fundamental objectives of teacher training processes. This approach requires the construction of an educational culture grounded in values, meaning, and identity, moving beyond mere information conveyance. The Century of Türkiye Education Model's target transformation will be possible through an educational philosophy which can integrate the opportunities of the digital age with a value-centered vision under the guidance of qualified teachers. In this direction, collaboration among universities, The National Education Academy, and all stakeholder institutions is of strategic importance for strengthening teachers' professional capabilities. Ultimately, an education system that can blend the opportunities offered by the information age with wisdom (*irfan*) will be the strongest guarantee for the sustainable development and social progress goals of the Century of Türkiye.

Yıldız Technical University has the capacity to offer support to the Ministry of National Education through various institutional infrastructures towards this goal. Our university's Distance Learning Center provides a suitable platform for disseminating microlearning methods among teachers. Furthermore,

The implementation of the Century of Türkiye Education Model depends on equipping the future's visionary teachers with high qualifications and training them in full alignment with the model's fundamental principles.

training sessions can be organized in the areas demanded by teachers through the Continuous Education Center, and our university's academic resources are effectively utilized in this process. Programs introducing the Century of Türkiye Education Model have previously been carried out in collaboration with various district directorates of national education, and the generalization of such practices across the country is also planned.

In short, achieving a teacher profile which blends the technological requirements of the age with national and spiritual values is our shared responsibility. We, the universities, ministries and non-governmental organizations, are all stakeholders in this transformation. With these thoughts, I hope that the V. Istanbul Education Conference will contribute to our country's education system, our teacher training policies, and the formation of future generations imbued with irfan.

Dr. Ömer Faruk Yelkenci

Ministry of National Education | Deputy Minister

Teacher education in our country has a deep-rooted tradition which has been continuing in various forms for a very long time. The first Teacher Training Institute for the Education of Boys (*Dârülmuallimîn*), established for the purpose of training teachers, was opened in 1848. The first director of this institution was Ahmet Cevdet Pasha. The building of this institution, run by Ahmet Cevdet Pasha, who held many important positions and produced very significant works for this country, is the school which was used until recently as an Anatolian Teacher Training High School and now operates as Çapa Science High School. This building reminds us of the legacy extending back to 1848 and enables us to draw strength from this historical heritage. Over time, teacher training activities in various forms and institutional structures continued with the establishment of the Teacher Training Institute for the Education of Girls (*Dârülmuallimât*), which trained female teachers in the early period. Ayşe Sıdıka Hanım, considered the first female faculty member, served and ran this institution. Ayşe Sıdıka Hanım's work, Lessons on the Methods of Teaching and Education (*Usûl-i Talim ve Terbiye Dersleri*), was produced in a period that can be considered quite early in terms of global educational history. At this point, it would not be wrong to state that many of the issues being discussed today, including those addressed in Osman Nuri Ergin's History of Turkish Education (*Türkiye Maarif Tarihi*) and Selim Sabit Efendi's Guide for Teachers (*Rehnümâ-i Muallimîn*), were also discussed approximately one hundred and fifty years ago; yet, slow progress

Rehnümâ-i Muallimîn, which means "guide for teachers," is the first pedagogical work written in Turkish educational history with the aim of guiding teachers. It was prepared to inform teachers about the principles and methods of education and instruction.

has been made when more distance should have been covered. Nevertheless, it must also be stated that the deep-rooted educational tradition and historical accumulation extending from the past to the present offer a significant source of strength to us, to the educators shaped by historical consciousness.

In accordance with The National Education Academy's founding rationale, the importance of including teachers in a second training process, supplementary to their education in the faculties, is closely related to the transformation in the structure of educational processes beginning with the 21st century. In this period, educational processes have acquired a much more dynamic nature compared to the past; the need for more flexible institutional structures and faster decision-making and implementation mechanisms has increased. As a result of these necessities, it has become mandatory that the changes implemented by the Ministry of National Education are reflected to teachers as quickly as possible.

Along with the requirements of the age, technological developments that directly affect educational and social life are gaining importance day by day. However, reflecting these changes, which were made in line with the mentioned developments, rapidly and effectively on the teacher training is not easily possible within the existing structure, since regulations implemented by the Ministry of National Education must be simultaneously reflected across all faculties of education. This situation is not limited solely to the faculties of education but also encompasses other undergraduate programs providing staff for teaching. Let us give a current example: Although the **Century of Türkiye Education Model** was implemented in the 2024-2025 academic year, it can be hardly said that the model was quickly integrated into the programs of education faculties, aside from some individual efforts. Therefore, the coordinated implementation of this rapid change process, which necessitates regulating the field of education, is also essential in teacher training institutions. In this context, the establishment of The National Education Academy or a similar academic structure where teachers can be rapidly included in training, has emerged as a fundamental necessity.

It should be especially emphasized that The National Education Academy is not limited solely to the process defined as preparatory training. In line with the planning, these preparatory trainings are foreseen to include comprehensive application processes ranging approximately between 350 and 450 hours, since it has been determined that the practical side of the pedagogical formation courses in current undergraduate programs is insufficient, and in some universities, it is hardly seen at all. For this reason, the planned applied training process aims for teacher candidates to directly gain experience in the field and internalize the changes.

The National Education Academy is designed not only to strengthen existing teacher training practices but also to encompass the current developments contained within the Century of Türkiye Education Model and potential future regulations. With this model, not only literacy skills but also a literacy system (systematic approach to literacy), representing a higher-level approach, is brought to the forefront. The aim here is to instill literacy in students not merely as a skill but as a systematic way of thinking, and to ensure that teachers can effectively teach this skill. Within this framework, digital literacy competence constitutes an important part of the system. However, it is clear that the wisdom *(irfan)* dimension of the model must also be nurtured. The project titled *Emotion-Value Based Digital Well-Being Program,* currently being conducted by the Ministry of National Education (MoNE), constitutes a concrete example of

this approach. The project is being developed to integrate digitalization processes in education with a value-based perspective; the participation of universities in this study is also being encouraged.

There is a symbiotic relationship between education and technology, based on mutual and continuous interaction. The increase in scientific knowledge and technological production enables educational processes to benefit more from these developments, and as educational processes effectively utilize these technologies, new developments and advancements emerge in the fields of knowledge and technology. This cyclical structure clearly demonstrates that the fields of education and technology are in a dynamic interaction, mutually feeding, transforming, and developing each other. As education benefits from these technologies and becomes more effective, the knowledge and technology grow, expand, and develop. So, within the context of this symbiotic relationship, the process between education and technology must also be planned and managed. The person to achieve this is the teacher. Within this framework, Rector Prof. Eyüp Debik's statement, "We want to provide artificial intelligence training in every department" is gratifying. Artificial intelligence should be positioned as a supportive element in every department rather than a standalone program; indeed, artificial intelligence is ultimately a technological tool. When positioned in this way, the teacher will always be needed, despite artificial intelligence being the highest technology available today. Individuals who have utilized artificial intelligence need to teach those with less or no experience how to use it. When considered within the teacher-student relationship, The National Education Academy will train the teacher who can most effectively design and present this to the student, or it will reinforce this training process.

It should be specifically noted that the preparatory training process planned to be carried out within The National Education Academy will be performed concurrently with teacher appointments. However, if the faculties of education can effectively manage the process of preparing teacher candidates for the profession, the priority of The National Education Academy will shift toward in-service professional development activities, since, according to the relevant legislation, all teachers and administrators are required to undergo training once every five years. Therefore, if the faculties of education can adequately meet the needs of the preparatory phase of teacher training, The National Education Academy (NEA) will be able to focus its resources and expertise capacity on strengthening teachers' in-service professional development processes. This is evaluated as one of the essential duties of the NEA and constitutes one of the main elements determining the institutional structure of the institution.

For the effective management of the dynamic and constantly changing nature of the present day, supporting teachers during in-service processes is considered one of the priority work areas of The National Education Academy. When the subject of teacher training is examined within the framework of Türkiye's educational history, it is observed that institutions such as the Teacher Colleges (*Dârülmuallimîn* and *Dârülmuallimât*), Village Institutes (*Köy Enstitüleri*), teacher schools, faculties of education, and today The National Education Academy focused on the goal of educating the most qualified teacher under the conditions of their respective periods.

Before the establishment of The National Education Academy, starting from the years 2014-2015, teacher education models around the world were examined. Within this framework, the example of the *Centre International d'Études Pédagogiques* (International Center

for Pedagogical Studies) in France was observed on-site; it was determined that the scope of academic structures supplying personnel for teaching was wider there and that in some faculties, undergraduate education had been reduced to three years. A similar approach came up for discussion in a recent Higher Education Council meeting; it was evaluated that the time gained from pedagogical training, especially in faculties of education, could be arranged to shorten the undergraduate education, thereby enabling young people to start their professional lives sooner. Within this scope, it is important to discuss issues such as whether teachers should be trained in universities, academies, or institutes, which undergraduate programs should serve as sources for teaching; and which ones must necessarily be maintained in faculties of education. The results obtained from this discussion are expected to guide the work of the Ministry of National Education.

Finally, it will be useful to briefly touch upon the semantic framework of the term maarif used in the Century of Türkiye Education Model. Maarif carries a three-dimensional semantic field within the Turkish educational tradition. Firstly, maarif refers to education and instruction affairs and has thus been included in the names of various institutions, especially the Ministry of National Education, throughout history. Secondly, the term encompasses a wisdom (*irfan*) dimension, in the sense of a person recognizing themselves and their environment, knowing their language, and directing themselves toward the knowledge of the universe. In this aspect, the concept covers not only the mere transfer of knowledge but also its internalization at the level of wisdom and awareness. Thirdly, maarif is connected to the concepts of marifet (proficiency) and maharet (skill), representing the individual's acquisition of skills and expertise.

To the extent that faculties of education can effectively and qualitatively prepare teacher candidates for the profession, the National Education Academy will be able to focus its resources and specialized capacity on strengthening in-service professional development.

Thus, the concept offers a framework that integrates intellectual, practical, and moral dimensions. The Century of Türkiye Education Model takes this triple layer of meaning as its basis, centering on an educational approach grounded in knowledge, skill, and values. The concept of maarif provides a holistic conceptual framework which reflects the basic philosophy of this model in the best way. Therefore, the concept offers a semantic integrity that brings together both the historical roots and the contemporary understanding of education within the model. In this framework, maarif is not just a word preference but a conceptual foundation representing the identity, epistemological orientation, and value-centered approach of the Turkish education system. Building the Century of Türkiye Education Model upon this concept is regarded as an indicator of a new paradigm that unites wisdom, skill, and moral competence in the comprehension of education.


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SESSION I

SHARED EXPERIENCE IN TEACHER EDUCATION

Prof. Low Ee Ling
Dean of The National Institute of Education | Nanyang University

Rethinking Teacher Education Paradigms and Approaches in the Age of Disruptions

Rethinking paradigms and approaches in teacher education has become an imperative in today's era, which is defined by crises and uncertainty. Contemporary education operates within an environment shaped by global instability and rapid transformation. Geopolitical tensions, environmental degradation, and the accelerating pace of technological innovation are reshaping the very conditions under which people teach and learn. Among these forces, the rise of artificial intelligence represents one of the most profound and urgent challenges for training in general. AI's growing presence in classrooms is redefining the nature of pedagogy, assessment, and professional judgment, necessitating a parallel evolution in teacher education systems.

In this context, the OECD has proposed the ***OECD Learning Compass 2030*** framework as a conceptual foundation for reorienting education systems on a global scale. This framework rests on three interrelated principles that promote education for human flourishing.

1. It is essential to develop a broad range of competencies that encompass not only cognitive and technical skills but also the social, emotional, and moral dimensions of learning.
2. Emphasis is placed on preparing individuals to become designers of fair and sustainable futures, thereby equipping them to address global inequalities and environmental crises through ethical and creative action.
3. The restoration of education's role in giving meaning to human life constitutes the most fundamental principle.

Aligned with these principles, the restructuring of teacher education demands constant attention to raise a future-ready teacher educator archetype. Such an educator must embody adaptability, ethical discernment, and a deep commitment to human-centered learning-serving as both a stabilizing force and a forward-looking guide amid constant change and uncertainty.

A systematic field review conducted by Wang et al. (2024) reveals a remarkable increase in research exploring the intersections between artificial intelligence and education. A search using the keywords "artificial intelligence" (AI) and "education" yielded 2,223 academic articles, an indication of the dramatic surge

in scholarly attention devoted to this topic. This escalation in research intensity compels educators and policymakers alike to confront three fundamental questions concerning the future of education:

- How must education systems be reimagined to be meaningful and relevant in an era of rapidly advancing technological development?
- Which elements of existing systems should be repositioned or redefined to align with shifting social and professional demands?
- In an age characterized by automation and information satiety, how can we rekindle an intrinsic passion for lifelong learning in both teachers and students?

Answering these questions requires a principled foundation for teacher education, one that can remain steady in the face of crises. In this regard, four enduring anchors emerge as the core reference points for teacher preparation, serving to preserve quality, purpose, and the human dimension within an increasingly globalized educational landscape.

The first and most enduring anchor of teacher education is resilience. The COVID-19 pandemic exposed both the fragility and the adaptive capacity of global education systems, bringing deep inequalities to light while simultaneously accelerating pedagogical innovation. Data presented in various international reports clearly illustrate the magnitude of the crisis. During the pandemic, an estimated 463 million children worldwide were unable to access remote learning (World Bank, 2022), and 24 million were projected to be at risk of never returning to formal education (ACAPS, 2020; World Bank, 2022). According to various reports by McKinsey & Company (Dorn et al., 2021) and the

98.6% or 1.725 billion global learners affected in 200 countries
(United Nations, 2020)

24 million children at risk of not returning to schools
(ACAPS, 2020; The World Bank, 2020)

At least 463 million children without remote-learning access
(The World Bank, 2022)

96% of children surveyed had increased negative feelings towards schooling
(ACAPS, 2020)

Learners worldwide lagged between 4 and 12 months
(McKinsey & Company, 2022)

Figure 1. Estimated Learning Loss

United Nations (2020), more than 1.7 billion global learners were affected and students across the globe experienced an average learning loss of four to twelve months, marking one of the most severe setbacks in the history of modern education.

From a teacher educator's perspective, the pandemic created a profound paradox. For decades, education reformers had advocated for learning that extends beyond the classroom, for reducing exam-centered assessment practices, and for developing pedagogies that nurture autonomy and creativity. Yet, the pandemic unexpectedly and forcibly brought these ideals to life on a global scale. When digital and remote learning environments became the norm, many students demonstrated their capacity for self-directed and intrinsically motivated learning. At the same time, this transformation laid bare the limits of virtual education—most notably, the absence of social interactions that are indispensable for character formation, empathy, and collaboration.

The pandemic also revealed the deep-seated educational inequalities across many nations. Disparities in technological access and the stark contrasts in home learning conditions further amplified existing injustices. Moreover, the crisis underscored the central importance of well-being for both students and teachers. Prolonged uncertainty, digital fatigue, and emotional exhaustion led to rising rates of teacher attrition, and, in many cases, it was the most dedicated and highly competent educators who were the first to leave the profession.

Therefore, building resilience in education cannot be achieved through structural reforms alone. It requires a fundamental reimagining of the very purpose of education, one that embraces a holistic vision aiming to restore balance between academic achievement and human development, technological progress and social connection, and performance orientation and well-being.

An upcoming research project of ours, presently under revision, proposes a systemic

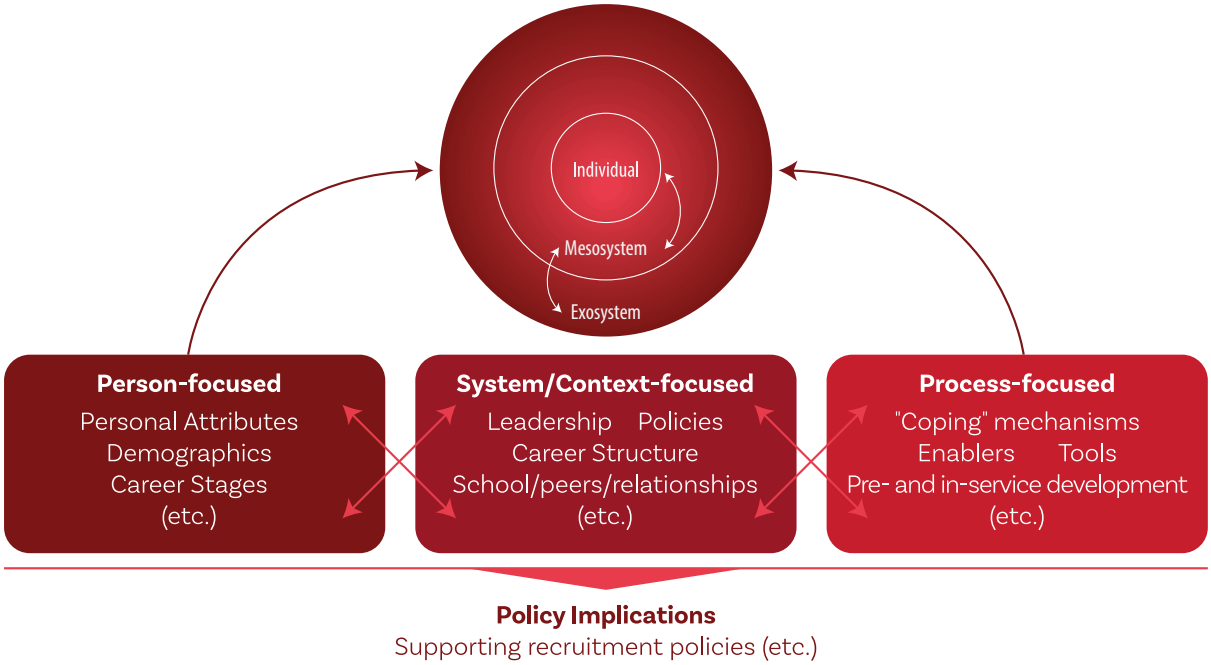

Figure 2. Conceptual Framework for a System Ecology to Build/Support Teacher Resilience and Promote Well-Being

Source: Low, 2025

ecological model (Figure 2) that conceptualizes teacher resilience and well-being across three interconnected levels: the individual level, the meso level (process/organizational), and the ecosystem level (policy).

At the **individual level**, the model focuses on *person-focused resilience*. It identifies the personal traits and dispositions that enable teachers to sustain professional resilience in the face of adversity, such as adaptive coping skills, reflective practice, a sense of self-efficacy, purpose, and meaning in life, as well as the capacities that allow them to remain professionally functional during crises.

At the **meso level**, attention shifts to *process-focused facilitators*. This dimension centers on the tools, routines, and support mechanisms that intentionally foster resilience: mentoring and peer support networks, workload design, dedicated time for planning and reflection, access to psychological counselling and well-being resources, and targeted opportunities for professional development all fall within this scope.

At the **ecosystem level**, the model addresses the *policy-focused conditions* of the system/context that sustain teacher growth and resilience. These include comprehensive well-being policies, resource and staffing arrangements aimed at reducing chronic workload, equitable digital and learning infrastructures, and accountability systems that balance performance expectations with professional judgment and human sensitivity.

The second enduring anchor in teacher education is values anchoring, the grounding of all educational practice in a firm moral and ethical foundation. As Singapore's founding Prime Minister Lee Kuan Yew (1966) once remarked: "Just as a country is as good as its citizens, so its citizens are, really, only as good as their teachers" (p. 21). This perspective underscores that teachers are not merely conveyors of knowledge but pivotal agents in nation-building. As individuals who shape the moral and intellectual fabric of society through each of their students, teachers stand as both the custodians of values and the architects of the future.

A holistic reimagining of education is needed to restore balance between academic achievement and human development, technological progress and social connection, and performance orientation and well-being.

At Singapore's National Institute of Education (NIE), the teacher education process is explicitly built upon a value-based paradigm, embodied in what the institution describes as the *teacher's schematic DNA* model (NIE, 2025b). At the core of this model lies the conviction that values form the essence of professional identity. Accordingly, teacher education is not solely a process of acquiring pedagogical knowledge and technical skills; it is equally a process of character formation and commitment-building, through which teachers cultivate integrity, purpose, and a deeply human-centered ethos.

This paradigm rests upon three interrelated core values:

> ***Just as a country is as good as its citizens, so its citizens are, really, only as good as their teachers.***
>
> **Lee Kuan Yew**

1. **Commitment to the learner** - Recognizes that the student lies at the heart of all educational endeavors. Every aspect of teaching is directed toward expanding learning opportunities, nurturing potential, and honoring the individuality of each learner.
2. **Commitment to the profession** - Views teaching not as an occupation but as a vocation. This calling is grounded in a collective sense of responsibility for the continual growth and renewal of the teaching profession. Teachers are both practitioners and stewards of professional knowledge.
3. **Commitment to the community** - Acknowledges that education extends far beyond the classroom, permeating the social and cultural fabric of society. Teachers play a vital role in shaping compassionate, cohesive, and forward-looking communities.

These values are also embodied within the competency dimensions that underpin NIE's teacher education framework. In the domain of professional practice, teachers are expected to uphold strong ethical principles and maintain the highest professional standards. In the area of personal growth and development, teachers are regarded as role models who exemplify integrity, empathy, and character in both their personal and professional lives. Looking ahead, values will continue to serve as the moral compass of the teaching profession. This compass enables teachers to exercise their knowledge, skills, and judgment with integrity in complex situations, and to prioritize the well-being of students and communities in times of uncertainty. In an era defined by technological and social upheaval, values remain the enduring element that anchors teaching in humanity.

The third anchor of teacher education is commitment to evidence-informed practice. This approach calls for grounding educational policy, pedagogy, and professional learning in systematic research and empirical findings. One example is the BEST initiative (*Building an Evidence base for growing Singapore Teachers*; NIE, n.d.). Since 2009, the research-based BEST initiative has been designed to strengthen the entire continuum of teacher education.

The BEST initiative clearly demonstrates how sustained, long-term research can support a coherent, scalable, and context-sensitive process of reform. The initiative is built upon systematic collaboration among three interrelated institutions:

- **Ministry of Education (MoE)**: Formulates national education policies.
- **National Institute of Education (NIE)**: Prepares teachers at the pre-service level and oversees ongoing professional learning.
- **Schools across Singapore**: Bear the responsibility of implementing and contextualizing the principles developed within this framework.

This tripartite partnership forms the cornerstone of Singapore's educational ecosystem. As a result, decisions made at every level of the system are both grounded in research evidence and aligned with classroom realities.

In this structure, evidence is not a static collection of data but a living system built on continuous feedback and reflection. Findings from ongoing research directly inform curriculum design, pedagogical innovation, and professional development programs, while policy directions are continually reshaped in response to empirical insights emerging from schools. This cyclical interaction ensures an enduring coherence and alignment between research, policy, and practice.

Our research project titled *Building an Evidence-base to Support Teacher Growth: A Career-Long Perspective* aims to establish an evidence-based foundation within a systemic perspective to support teachers' continuous professional growth throughout their careers. The primary goal of the project is to examine how Singaporean teachers' professional experiences influence their identity, competence, and commitment. Within this framework, teachers' developmental trajectories are analyzed across six career stages defined by years of service (Stage 1: 0–3 years, with subsequent stages progressing by seniority and culminating in over 30 years of classroom experience).

The analyses reveal strong and significant positive correlations among the key variables. Teacher resilience is closely linked to classroom teaching competence, while leadership support aligns with teachers' sense of autonomy and initiative, factors that collectively define the overall quality of the education system. Teachers' cognitive self-concept (their perception and confidence of themselves as effective and good teachers) shows a positive relationship with resilience and predicts their perceived classroom management competence, which in turn indirectly strengthens their sense of instructional effectiveness. The most striking finding concerns the positive association between affective self-concept, the sense of pride in being a teacher, sense of enjoyment in teaching and sense of fulfillment in the profession, and the intention to remain in the profession. The results indicate that this self-concept is a meaningful predictor of teachers' desire to stay in the field. Overall, the findings suggest a coherent chain: enhancing classroom competence reinforces cognitive self-concept, which, in turn, strengthens resilience; and resilience is sustained by professional pride.

Affective self-concept encompasses teachers' sense of pride in their profession, the enjoyment they derive from the teaching process, and their overall professional fulfillment.

From these results, two primary points of intervention emerge. First, supportive learning environments must be established both at the pre-service and in-service levels to enable teachers to sustain their professional growth throughout their careers. Second, education systems must nurture and sustain teachers' initial passion for the profession; doing so enhances professional pride and strengthens long-term commitment to teaching. Three key insights arise from the research:

1. Professional development should be tailored to the different stages of teachers' careers.
2. Practicum is an indispensable component of teacher education, providing authentic and diverse learning experiences.
3. Programs must be continuously reviewed and renewed, not only to align with the demands of the present era but also to remain prepared for future transformations.

Adopting a career-long continuity perspective carries important implications for stakeholders:

For teachers: Education systems must equip and empower them to contribute meaningfully to their communities, their nations, and the wider world throughout their professional lives.

For educational stakeholders: Recognize that teachers' needs evolve over time when developing new support mechanisms or reviewing present ones with the perspective of differentiating such mechanisms according to career stages.

For researchers: Studies should move beyond examining isolated stages of teachers' careers and instead approach teacher development as a continuous trajectory, spanning from pre-service preparation to the later phases of professional life.

Teachers' professional development needs vary across different stages of their careers. Early-career teachers tend to prioritize experience-based learning, that is, practical tools and strategies that help them succeed in the classroom and manage emerging challenges. Mid-career teachers, by contrast, often seek additional qualifications or certifications that strengthen their confidence and competence in roles such as mentoring and instructional leadership. Late-career teachers increasingly recognize gaps in their digital literacy and show interest in programs designed to enhance these skills, as well as in training that supports purposeful retirement planning. These differentiated needs clearly underscore the importance of developing career-stage–sensitive and evidence-based support mechanisms that accompany teachers throughout their professional lives.

The fourth and enduring anchor of teacher education is commitment to lifelong learning and professional growth. As we rethink the design of future education systems, learning must be understood not only as a process for students but also as a lifelong journey for teachers. Traditionally, education systems have been front-loaded, structured around the intensive transmission of content during teachers' university years. This approach rests on the assumption that foundational academic knowledge will sustain teachers throughout their professional lives. Yet, in today's rapidly changing world, this model is increasingly losing its relevance.

The present world, defined by geopolitical tensions, environmental crises, and the accelerating pace of technological change, is complex and academic knowledge alone is no longer sufficient. Both students and teachers must cultivate the capacity to continually renew, expand, and adapt their knowledge and skills. Consequently, lifelong learning has become not a choice but a professional imperative.

The *SkillsFuture* initiative in Singapore stands as a powerful testament to the nation's commitment to lifelong learning (SkillsFuture Singapore, 2025). Through this initiative, every citizen is supported with SkillsFuture credits that can be used to pursue courses aligned with their personal and professional development needs. For teachers, the SkillsFuture for Educators (SFEd; Academy of Singapore Teachers, 2025) provides a structured system designed to promote continuous professional growth. Developed in response to teachers' feedback, SFEd focuses on six priority areas:

1	Character and citizenship education
2	Support for students with special educational needs
3	Inquiry-based learning
4	Differentiated instruction
5	Assessment literacy
6	E-pedagogy (including the integration of artificial intelligence)

Within this framework, teachers' professional development follows a progressive structure that begins at the beginning level, which emerges after graduation, and advances through the proficient, accomplished, and leading stages. This gradual progression ensures that teachers remain engaged in a continuous process of professional growth throughout their careers, allowing professional learning to evolve in tandem with the realities of the classroom and the changing expectations of society.

Building such a strong culture of lifelong learning also requires preparing faculty members who are equipped to educate future-ready teachers. Sustaining pedagogical innovation, school improvement, and educational leadership depends on ensuring that teacher educators have access to adequate resources. Beyond this, innovative learning environments like spaces where teachers can design student-centered, interactive, and technology-adaptive pedagogies should be encouraged.

As then Minister for Education Chan Chun Sing (2022) observed, the post-COVID-19 world can be defined by three key concepts:

1. Universities must evolve from being institutions of higher education into institutes of continuous learning. One example that embodies this vision is the National University of Singapore's 40-years credit initiative, which allows graduates to return to the university at any point over the four decades following graduation to participate in professional development programs.
2. Making the connections between research, innovation, and practice tighter has become more urgent than ever. In an age of such rapid change, educational innovations cannot take years to reach classrooms; the knowledge discovered today must inform practice tomorrow.
3. Confidence reflects the belief that educators, by acting collectively, can lead transformative change. University leaders and faculty members must be guided by real-world experience and by a vision capable of anticipating, advancing, and adapting knowledge.

Therefore, the archetype of the future-ready teacher educator is defined by qualities of determination, confidence, and resilience. Such educators lead with integrity, innovate with purpose, and unite around a shared commitment to lifelong learning. In doing so, they embody the understanding that education, for both teachers and students, is a journey shaped by continuous growth and renewal.

This vision is systematically articulated in the framework known as *Holistic Faculty Development "4" Life* (NIE, 2025). The phrase "4 Life" is intentionally designed as a multilayered wordplay, representing four dimensions: *life-long* (learning across a lifetime), *life-deep* (learning with depth and meaning), *life-wide* (learning across multiple contexts), and *life-wise* (learning with wisdom). Together, these dimensions express the belief that faculty development should extend beyond the acquisition of academic expertise to encompass personal purpose, professional integrity, and social contribution.

The foundation of this framework lies in cultivating an institutional culture of trust and care that supports faculty members from recruitment through retirement. This culture is built upon principles of values-based selection processes, robust opportunities for professional growth, meaningful mentoring relationships, and the formal recognition of contributions. The philosophy is simple yet profound: when educators truly feel valued, they continue to serve their institutions and professional missions with deeper commitment.

The "4 Life" model has given rise to a range of practices and initiatives that reflect its four core dimensions. Within this model, faculty members are encouraged to:

- Cultivate **lifelong learning** through continuous professional development opportunities
- Develop **life-deep learning** through reflective practice and ethical leadership
- Pursue **life-wide growth** through interdisciplinary collaboration and innovation
- Foster **life-wise learning** through moral awareness and a strong sense of citizenship

The future-ready teacher education archetype, which is built upon these foundations, contributes to the nurturing of teachers, who are viewed as shapers of character, facilitators of learning, architects of learning environments, creators of knowledge, and agents of educational change. Teachers of such caliber do not emerge spontaneously; they require future-ready teacher educators who can both guide and exemplify these qualities.

Thus, for teachers to become *shapers of character*, the teacher educators who prepare them must serve as professional and ethical role models. For teachers to be facilitators of learning, teacher educators must be exemplars who possess a lifelong learning mindset and dispositions. For teachers to be architects of learning environments, designers of innovative and engaging blended learning spaces must instruct them. For teachers to be creators of knowledge, teacher educators must be experts of interdisciplinary breath and disciplinary depth themselves. For teachers to act as *agents of change*, their mentors must be inspiring guides who demonstrate innovation and resilience in tangible ways.

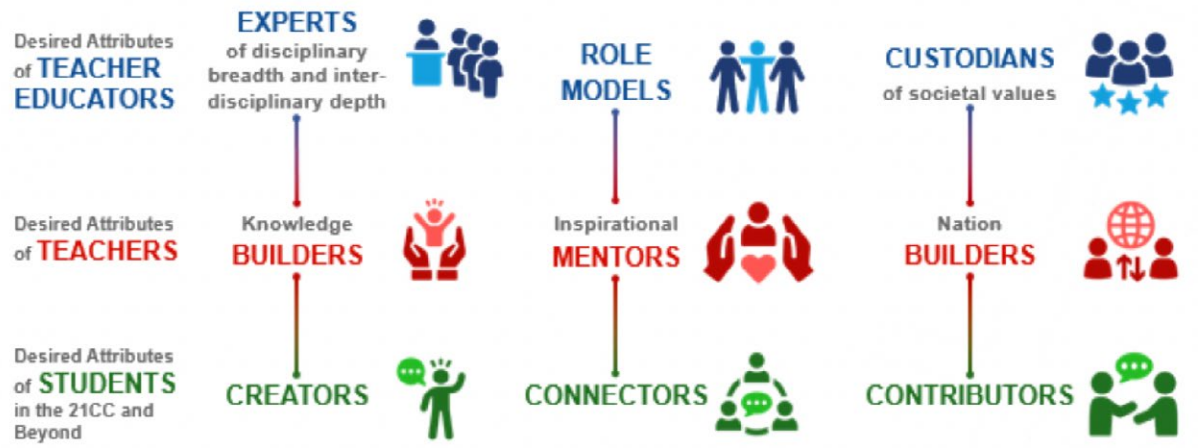

Figure 3. Desired Outcomes of Education

Source: Low, 2025

This hierarchical alignment extends throughout the entire educational continuum, from teacher educators to teachers and from teachers to students. The then Education Minister Chan (2024) also envisioned success for students by possessing the needed attributes that would make them creators, connectors, and contributors. These attributes can only be cultivated by teachers who construct knowledge, offer inspiring guidance, and strengthen a sense of national identity. Likewise, such teachers can develop only under the guidance of teacher educators who embody interdisciplinary expertise, exemplary professionalism, and a deep commitment to safeguarding societal values.

Therefore, future-ready faculty development is structured around the abovementioned five core attributes that define the ideal profile of higher education professionals. Faculty development programs, lecture series, and learning communities are designed in alignment with these attributes, ensuring coherence and continuity between institutional values and faculty competencies.

One notable initiative in this regard is the FacTEL (Faculty Technology-Enabled Learning Development Program), developed in collaboration with NIE's InLearning department, the innovative learning team within the Chief Learning and Innovations Office. FacTEL operates across three interconnected levels:

- **Micro level:** Focuses on strengthening faculty members' digital literacy and their capacity to generate pedagogical innovation at the individual level.
- **Meso level:** Encourages collaboration, sharing, and the integration of innovative practices at the departmental and program levels.
- **Mega level:** Aims to develop leadership capacity and a strategic vision for technology-enabled education across institutes.

All faculty members, including senior academic leaders, participate in AI-focused core courses offered under the FacTEL program. Following these foundational modules, faculty can deepen their expertise in the application of artificial intelligence to instructional design and learning processes through elective courses such as *From Prompt to Pedagogy*.

Through the "4 Life" and FacTEL initiatives, the institution embodies a vision of faculty development that is continuous, reflective, and future-oriented. This approach positions faculty members not merely as transmitters of knowledge but as lifelong learners, innovative thinkers, and leaders of educational transformation.

In conclusion, rethinking teacher education in the age of disruptions requires a decisive shift from reactive adaptation toward proactive transformation. As the global landscape continues to evolve under the pressures of technological acceleration, social upheaval, and environmental crisis, teacher education must serve as both an anchor and a catalyst, preserving the human essence of teaching while driving pedagogical innovation. Resilience, value-anchoredness, evidence-informed and lifelong learning must form the enduring pillars of this transformation. To prepare teachers who can thrive amid uncertainty, education systems must invest not only in knowledge and skills but also in purpose, adaptability, and moral courage. Ultimately, future-ready teacher education should empower educators to lead with integrity, teach with empathy, and learn with curiosity, ensuring that education remains, at its core, a force for human flourishing in an uncertain world.

Recommendations

Reimagining teacher education and professional development requires context-specific anchors, which are, for Singapore, resilience, value-anchoredness, evidence-informed, and lifelong learning.

Build systemic resilience through person-, process, and policy-focused perspectives.

Emphasize the importance of values in education so that teachers impart good social values that will benefit their students.

Evidence must inform practice in shorter and more meaningful ways. For example, an education system may consider the mechanisms to enhance classroom competence, which reinforces cognitive self-concept to strengthen resilience, which is sustained by professional pride. Mechanisms should be tailored to the specific career stage teachers are in.

All citizens, including teachers, must be lifelong learners, and universities should be repositioned as centers of continuous learning, offering graduates long-term opportunities to return and update their professional knowledge.

Teacher development should be structured through progressive competency levels (beginner → advanced → leader) across key domains such as character and citizenship education, special educational needs, inquiry-based learning and design, differentiated instruction and assessment, literacy education, and e-pedagogies/AI.

Technology-enabled teaching programs for teacher educators should offer training at the micro (digital fluency and AI in the classroom), meso (departmental/program collaboration), and mega (inter-institute) levels.

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Being a Teacher in the 21st Century: Special but Shadowed Work

The metaphor "special but shadowed", originally derived from Daniel Lortie's (1975) sociological study, is reinterpreted to describe the unique combination of privilege, responsibility, and constraint that characterizes the teaching profession in contemporary times. The phrase continues to encapsulate both the meaningful and burdensome aspects of teaching, where educators occupy a vital yet often undervalued role in society.

Teaching in the twenty-first century is situated within an increasingly demanding global context. At the start of every academic year, teachers confront universal challenges such as preparing classrooms, establishing routines, and identifying the individual learning needs of their students. Yet, these routine tasks now unfold amid escalating global uncertainty. Today's educators work against a backdrop of wars, school shootings, and incidents of violence across universities and places of worship. Added to this are natural disasters and the enduring socio-psychological effects of the COVID-19 pandemic, which have collectively reshaped the educational landscape (Flores & Craig, 2023). These conditions compel teachers to act not only as instructors but also as stabilizing figures in times of crisis, often extending their emotional labor beyond traditional pedagogical boundaries.

Technological transformation represents another defining feature of current educational practice. The rapid introduction of new digital tools within classrooms evokes both enthusiasm and apprehension among teachers. On one hand, technology promises innovation, interactivity, and pedagogical advancement; on the other hand, it generates anxiety related to digital ethics, privacy, and student safety. Teachers must therefore negotiate a delicate balance: embracing innovation while maintaining vigilance over potential misuse. This duality reinforces the idea of teaching as simultaneously special in its transformative potential and shadowed by the pressures and responsibilities it concurrently entails.

At a meeting with secondary school teachers, participants were invited to share brief reflections from their professional lives. What initially seemed as though it might turn into a session of complaints about the challenges of teaching instead evolved into a moment of pride and affirmation. The teachers, however, chose not to focus on difficulties but highlighted achievements and meaningful experiences that defined their work:

> "I am so proud that one of our students received a scholarship to attend a top ten university."
>
> "I've been teaching the girls' soccer team. They just won the senior finals."
>
> "The superintendent visited my classroom and featured my students in his newsletter."
>
> "I'm so excited! I started a fundraiser to pay for the field trips of our low-income students."
>
> "My struggling pre-calculus student from last year stuck with it, and he passed the course after repeating it over the summer months."

These statements indicate that teachers forge strong emotional bonds with their students and relationships grounded in empathy, encouragement, and shared accomplishment beyond curriculum delivery and classroom management.

However, this emotional dimension has both a bright and a shadowed side. The same bonds which bring fulfillment can also expose teachers to emotional fatigue and vulnerability. Their emotional and temporal investment in students' well-being leads teachers to share in both the joys of success and the pains of struggle, extending their professional labor into the realm of personal care. Interviews with undergraduate and graduate students further illuminate this phenomenon. Many recall at least one teacher who left a lasting imprint on them, someone who taught them to read, sparked a passion for a particular kind of learning, or guided their career choices. Educators have been called "unsung teachers" (Craig et al., 2019), a term that captures both their transformative influence and their frequent lack of public recognition.

The image of the unsung hero reflects a central paradox of contemporary education: teachers play a decisive role in the intellectual and emotional development of young people, yet their contributions are frequently underappreciated. Most teachers spend more waking hours with the children they teach than the children's parents or caregivers; accordingly, they serve not only as instructors but also as guides, protectors, and moral exemplars for the young. In this sense, teaching persists as both a special vocation, defined by deep commitment and care, and a shadowed endeavor, marked by unseen labor and structural pressures.

At this point, the discussion examined five interrelated issues:

- The distinction between the teacher as a curriculum implementer versus a curriculum maker (Craig & Ross, 2007; Craig, 2020)
- The positioning of teachers below other professional groups in society (Lortie, 1975)
- The proliferation of competing teacher education programs (Craig, 2016)
- Persistent challenges such as teacher burnout and workforce shortages (Craig et al., 2023)
- The temporal constraints on teachers' work (Jackson, 1968).

The first of these, the distinction between the teacher as a *curriculum implementer* and the teacher as a *curriculum maker*, captures one of the most fundamental debates in education. Government and policy documents across

the world typically emphasize the teacher's role as an implementer, someone responsible for delivering predesigned curriculum materials in compliance with official standards. In this model, the teacher's primary duty is to execute prescribed content without necessarily adapting it to the unique needs of individual students, the social context of the classroom, or their own professional insights.

In many regions, this approach results in highly standardized teaching practices. Lessons are often drawn from fixed workbooks or textbooks that act as proxies for the curriculum, and in some cases, even pre-prepared PowerPoint slides replace interactive instruction. Students are thus exposed to repetitive, decontextualized materials that lack vitality or personal relevance. Such environments produce what can be described as "dead spaces" (Dewey, 1938) in education, which means settings devoid of creativity, dialogue, and human connection (Craig et al., 2025). When teaching becomes reduced to the mechanical implementation of external directives, teachers lose their sense of agency and professional fulfillment. The absence of personal engagement and intellectual autonomy erodes motivation, often leading to disillusionment and, ultimately, departure from the profession. Scripted instruction, while intended to ensure uniformity and efficiency, paradoxically undermines the very qualities, curiosity, reflection, and responsiveness, that make teaching meaningful.

In contrast to the image of the teacher as a *curriculum implementer*, the notion of the teacher as a *curriculum maker* foregrounds creativity, reflective practice, and professional agency. Such teachers still deliver the curriculum in accordance with governmental standards, yet they do so through an interpretive and flexible process that attends to the diversity of learners and contexts. They adapt prescribed materials to classroom realities, integrating personal experience, pedagogical insight, and a keen awareness of students' needs into the instructional process. Curriculum-making teachers are not

passive vessels but active intellectuals. They continually evaluate and renew their practice in a dynamic, cyclical fashion. In effect, they breathe life into official curricula, transforming standardized objectives into meaningful learning experiences that connect with students' expectations and lived realities.

However, even the curriculum-making model contains shadowed dimensions. As American educator Joseph Schwab (1973) noted, every act of curriculum-making demands a delicate balance among four essential elements: the teacher, the learner, the subject matter, and the milieu, meaning curriculum commonplaces that are near-universal (Goodson, 2007). Problems arise when one of these is privileged at the expense of the others. When teachers foreground their own preferences or areas of expertise over students' needs or elevate certain topics while neglecting others, the equilibrium of the educational process is disrupted. Such imbalances carry pedagogical as well as ethical implications. They raise complex questions of authority, representation, and equity, issues that are increasingly visible in legal and policy debates over curriculum content and educational freedom. Thus, even within the seemingly empowered stance of the curriculum maker, tensions persist between autonomy and accountability, personal expression and public responsibility. These tensions expose a broader paradox of teaching: even the most inspired forms of creativity are shadowed by the moral and institutional constraints that define the profession itself.

Around the world, few systems truly prepare teachers for this role; among them, Finland and Canada stand out as distinctive examples of nations that cultivate curriculum-making educators. Finland's education system is founded on the principle of teacher professionalism rather than on external control or prescriptive rule-following. Teaching is regarded as a high-status, research-informed profession that relies on trust rather than surveillance (Federick, 2020). Finnish teachers are rigorously prepared over a five-year period (which includes three field-based experiences) and possess significant autonomy in designing instruction suited to their students' needs. A recent study (Liyuan, 2025) indicates that a large percentage of beginner level Finnish teachers demonstrate above-average levels of professional agency. This reflects Finland's education system, which values judgment, reflection, and expertise.

Canada represents a parallel model. Finnish educators frequently cite Canada as their closest comparison group, acknowledging shared values of inclusivity, reflective practice, and professional respect. The long-standing *Canada-China Reciprocal Learning Project* has highlighted how Canadian teachers embody curriculum-making principles through locally responsive pedagogy and intercultural understanding. Their practice demonstrates how teacher agency, when combined with strong understandings of local and regional contexts, leads to meaningful learning experiences.

A story shared at a European conference further illuminates the essence of curriculum-making (see Craig, 2013a; 2013b). A teacher from the Middle East was observed twice by the same superintendent. During the first evaluation, she taught a self-designed lesson; during the second, she adhered strictly to the directives in the teacher's guide. In both instances, she demonstrated solid command of the lesson; yet before leaving the classroom, the superintendent offered a striking piece of advice:

This reflection underscores the transformative power of teacher presence. When educators infuse their personality, creativity, and professional insight into their teaching, the classroom becomes a living space of

> ***Don't ever leave yourself out of your teaching. There is so much more student engagement when you're in your teaching. Everybody's happier when you're in it.***

learning rather than a site of compliance. The difference between an average and an exceptional lesson often lies in this subtle yet profound act of self-inclusion. Teaching, therefore, reaches its highest form when teachers are empowered to bring themselves, fully and authentically, into the curriculum they shape.

The discussion of the teacher's role leads naturally into a broader and more systemic issue: the hierarchical positioning of teachers within society. Despite their education, expertise and societal contribution, teachers are routinely situated beneath other professional and administrative groups in both status and authority across many contexts.

Research in the United States (Walker, 2022) illustrates this disparity clearly. Individuals with comparable levels of education, credentials, and professional experience typically earn 20 to 25 percent more than teachers. Beyond this income gap, teachers often subsidize their classrooms out of their own paychecks, spending an average of one hundred dollars per month on materials and supplies for their students. These figures, echoed in studies from other countries, highlight the economic undervaluation of teaching.

This diminished status extends beyond financial measures. Since education is mostly publicly funded, many citizens assume that their role as taxpayers grants them the authority to dictate how teachers should perform their work. The result is a pervasive public scrutiny that other professions rarely encounter. Teachers, therefore, operate in a paradoxical position: they hold immense responsibility for the development of future generations yet are consistently denied corresponding levels of respect and autonomy.

The problem is further compounded within the academic and institutional hierarchies of education itself. In graduate programs, teacher candidates often study under professors who have never taught in a school setting yet feel entitled to prescribe pedagogical methods. Similarly, educational researchers, frequently detached from classroom realities, issue directives on teaching practice without firsthand experience. Within school districts, administrative officials sometimes have less classroom experience or pedagogical training than the teachers they supervise, yet wield greater decision-making power. This layered structure perpetuates a top-down culture of control, leaving teachers subject to external judgments from individuals less qualified in the practice of teaching itself.

Even in relationships with parents, who are the immediate partners in the educational process, teachers occupy a subordinate position. They cannot tell parents to improve their parenting skills or to spend more time with their children, yet parents freely critique teachers' methods, demand greater attention for their children, and take complaints directly to principals, superintendents, or school boards. This asymmetry exemplifies how teachers' professional voices are routinely silenced or overridden, even by those without pedagogical training.

Another problem is the lack of professional mobility, which prevents teachers from moving flexibly across institutions, levels, and roles throughout their careers, and the rigid

The quality of an education system cannot exceed the quality of its teachers.

compartmentalization that hinders movement across domains. In this regard, an alternative model can be seen in Singapore. There, the teaching profession is supported by a career ladder that is structured yet flexible. In this system, teachers are not confined to a single institutional role; they can move across different sectors and levels of education. A teacher may spend one phase of a career at a university, another in a school, and yet another one contributing to curriculum design or textbook development. This dynamic mobility deepens professional expertise and prevents stagnation. It also enables educators to grasp the broader educational ecosystem, cultivating a multidimensional perspective that enriches both teaching and education policy.

A similar approach has emerged in Hong Kong, where movement between academic and school-based leadership roles is increasingly common. For instance, university professors may take up positions as school principals, bringing academic insights into the practical realities of school management. This interchange fosters a more integrated knowledge base and dismantles the silos that traditionally separate teachers, professors, and policymakers.

The dual nature of teacher education programs reflects both opportunity and uncertainty within modern education systems. In the United States, alternative certification programs, originally designed to address teacher shortages in urban areas, have evolved into a complex and often commercialized enterprise. What began as a practical solution has come to exemplify a neoliberal reform, treating teacher preparation as a market commodity rather than a professional process.

In cities such as Houston, the growth of these programs has been striking: six universities now coexist with more than 120 other teacher education providers, including private consultancies and online platforms (Craig, 2016). This oversaturation has blurred the line between genuine professional preparation and profit-driven credentialing. Ironically, even major universities now compete with their own traditional teacher preparation programs through alternative certification pathways.

Research shows that those who succeed in these programs are often career changers or individuals returning to an early vocation for teaching after attaining financial security elsewhere (East Texas A&M Office of Education Certification, 2024). Yet the shadow side is clear: in Texas, alternatively certified teachers will outnumber those prepared through traditional programs this year, even though data indicate that the latter are 50 percent more likely to remain in the profession (Wurman, 2025).

Similar trends are emerging globally. Estonia, once hailed as one of the world's highest-performing Western education systems, now faces comparable challenges as its teaching workforce ages and retention declines. These developments reaffirm the OECD's central insight: the quality of an education system cannot exceed the quality of its teachers. To safeguard the profession's integrity, education systems should prioritize depth of preparation and long-term professional commitment over short-term fixes and market efficiency.

Teacher attrition and shortages represent some of the most persistent and concerning

challenges facing education systems worldwide. Insights from international research underscore both the structural and individual dimensions of this issue. In 2017, a special issue on international teacher attrition (Craig, 2017; Kelchtermans, 2017) reported similar patterns across multiple countries, including the UK, Norway, the Netherlands, Australia, and the US.

The Norwegian case (Smith & Ulvik, 2017) offered a striking example. Despite being one of the wealthiest nations in the world, Norway faces teacher retention challenges not due to economic scarcity but because of lifestyle and wellbeing concerns. One teacher, for instance, left the profession for a job in the lunch room of an offshore oil rig, a position that provided both higher income and greater work-life balance. Remarkably, she continued to teach part-time as a substitute teacher during her time off, allowing her to maintain a connection to the profession without the pressures of full-time responsibilities. This story encapsulates a growing global paradox: even in prosperous nations, the emotional and temporal demands of teaching drive capable educators away.

An older British managerial approach once sought to address this by recording whenever a teacher resigned, whether the failure lay with the teacher education program or with the school system (Towers & Maguire, 2017). This simple but revealing practice underscored a key question still relevant today: are teachers leaving because they are inadequately prepared, or because their working environments have become unsustainable?

Long-term observations in Houston since 1998 strongly support the latter explanation, namely, the unsustainability of systemic conditions. Both novice and experienced teachers leave the profession when they lack institutional support, confront unrealistic expectations, or experience chronic stress. One

Teaching remains deeply meaningful, grounded in connection and care, yet it is shadowed by structural pressures that erode well-being and drive talent away.

teacher described her situation as "teaching in the eye of the storm," a phrase that vividly captures the emotional turbulence of contemporary education; not long afterwards she resigned (Craig, 2013b).

Underlying these patterns is what may be the greatest shadow over the profession: the relentless demand on teachers' time. Teaching consistently ranks among the most stressful occupations, comparable to firefighting or dentistry (Morrison, 2022). In the United States, teachers work more assigned hours than their counterparts anywhere else in the world. Despite these pressures, they are expected to appear calm and composed, giving individualized attention to every child often within classrooms that include students with special needs, behavioral challenges, or linguistic and cultural barriers.

The cumulative burden is immense. Teachers must manage not only instructional responsibilities but also administrative tasks, parental expectations, and their own professional development goals. International data from different countries, reveal a particularly troubling pattern: it is often the most capable, dedicated, and high-performing teachers who leave first (Yinon & Orland-Barak, 2017). This reality encapsulates the tension at the

heart of the profession. Teaching remains deeply meaningful, grounded in connection and care, yet it is shadowed by structural pressures that erode well-being and drive talent away. Recognizing and addressing these tensions is essential to sustaining both teacher quality and the moral core of education in the twenty-first century.

In conclusion, the image of teaching as special but shadowed work makes visible the fundamental tension in contemporary education: teachers are the principal agents who transform students' intellectual and emotional worlds, yet they face systemic barriers in terms of status, autonomy, time, and sustainable working conditions. Overcoming this paradox requires positioning the teacher not merely as a curriculum implementer but as a context-sensitive curriculum-maker, framing technological innovation within principles of ethics and privacy; establishing institutional support mechanisms for emotional labor (workload balance, supervision and flexible schedules); redesigning career pathways in flexible and permeable ways, as in the examples of Singapore and Canada; and, finally, tangibly strengthening the profession's social standing through compensation, authority, and participation in decision-making processes. Unless this holistic approach, which safeguards teachers' time, recognizes their pedagogical judgment, and nurtures their professional learning, is put into practice, the desired goals of quality and equity in education will not be sustainable. When it is enacted, however, teaching will both burnish its special character and dispel the shadows that fall upon it.

Table 1. Special and Shadowed Dimensions of Teaching

Special Dimensions	Shadowed Dimensions
Builds strong emotional bonds with students; forges meaningful relationships through empathy and encouragement.	Faces risks of emotional fatigue, burnout, and vulnerability.
Preserves social stability and hope during times of crisis (war, disaster, pandemic).	Endures heightened emotional load and psychological pressure amid ongoing crises.
Develops innovative pedagogical approaches using digital technologies.	Confronts issues of digital ethics, privacy, and safety.
Contributes creativity, intuition, and contextual knowledge to the process as a curriculum-maker.	Experiences loss of autonomy due to over-standardization and scripted instruction.
Serves as a guide, protector, and moral role model for students.	Performs largely invisible labor; suffers from limited public respect and recognition.
Acts as an architect of social development and the future.	Works under low pay, constrained status, and intense public scrutiny.
Bridges academia, policy, and practice.	Has its professional voice muted by decisions made by actors with limited classroom experience.

Note: Lortie, 1975, as interpreted by Craig

Recommendations

Teachers should be granted the flexibility and pedagogical autonomy to adapt the curriculum to their local contexts.

Teacher education programs should strengthen reflective practice, emotional resilience, and ethical decision-making.

In-service professional development should establish systematic support mechanisms to promote teacher well-being and prevent burnout.

Teachers' professional growth should be supported through mobile career models that enable movement across schools, universities, and policy roles.

In-service preparation should include robust quality assurance and long-term mentoring, and retention rates should be monitored.

Non-instructional administrative burdens should be reduced, and protected time should be allocated for planning and self-evaluation.

During digital transformation, teachers should receive ongoing professional development regarding ethics, privacy, and safe technology use.

Teachers' economic conditions should be improved, and fair pay and incentive policies should strengthen the profession's sustainability and social status.

Achievements, innovative practices, and social contributions should be visibly recognized to elevate the profession's public standing.

Programmatic, parental, and administrative pressures should be alleviated, and teachers' professional autonomy and voice in decision-making should be strengthened.

Teachers need to have substantive representation at decision-making tables so their perspectives can be genuinely incorporated, rather than merely token representation.

SESSION II

THE TRANSFORMATION OF TEACHER-EDUCATION INSTITUTIONS IN TURKIYE

Prof. Yusuf Alpaydın
Marmara University, Faculty of Education | Dean

The Future of Higher Education Institutions for Teacher Education

First of all, it is necessary to scrutinize teacher employment and the number of graduates to assess the current state and future of faculties of education in Türkiye. As of the 2024-2025 academic year, a total of 1,187,000 teachers are employed in Türkiye. Out of these teachers, 177,738 work in private schools, while the rest are employed in public schools (Figure 4). Currently, there are 95 faculties of education across Türkiye. A total of 10,509 academic staff members are employed in these faculties, and 226,000 students are enrolled. Faculties of education graduate approximately 40,000 students each year on average (YÖK, 2025). In addition, graduates from faculties such as science and letters, theology, fine arts, and sports sciences may also pursue the teaching profession. A considerable portion of the approximately 600,000 students enrolled in these faculties aim to become teachers after graduation.

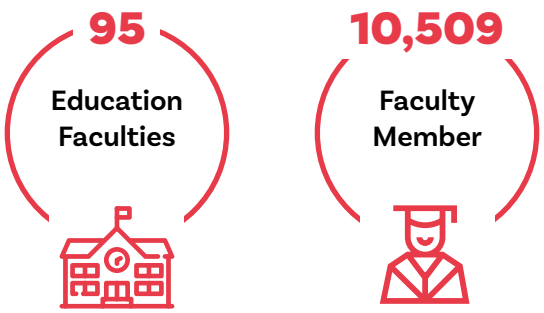
Number of Students in Faculties of Education p.103

In 2024, the KPSS Educational Sciences Exam was administered under the title of the Academy Entrance Exam (AGS). While the number of candidates was approximately 500,000 in previous years, this figure declined to 400,000 this year (ÖSYM, 2025). As of 2025, public sector teacher recruitment stood at 15,000, and this figure is projected to decrease to approximately 10,000 in 2026. These data indicate that despite the high volume of prospective teachers, employment opportunities are progressively diminishing.

The graduation and employment data for the period from 2018 to 2025 give supportive evidence for this trend. In 2018, while approximately 25 thousand teachers were employed, around 50 thousand students graduated from faculties of education (Figure 5). In 2019 and 2020, nearly 40 thousand students graduated, and nearly 40 thousand teachers were employed as well. However, in 2021, employment dropped to 20 thousand

Figure 4. Number of Teachers Working in Public Schools and Private Schools

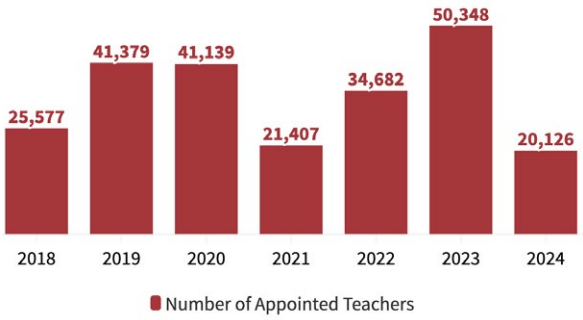
Source: MoNE, 2025a



while the number of graduates were still 40 thousand. In 2022, 30 thousand teachers were employed, and in 2023, it was around 40 thousand. In 2024 and 2025, however, despite the number of graduates remaining stable at around 40 thousand, employment declined to 10 thousand teachers. The mentioned data are based on the figures announced up to October 2025. We can list several reasons for this situation. Demographic developments constitute an important aspect of this trend. In addition, technological developments also support this process. The increasing use of technology in work life leads to a decrease in employment in labor-intensive sectors. The education sector is also affected by these developments, and teacher employment has correspondingly shown a decline.

Technology significantly affects education and is used extensively in educational processes. Therefore, the picture for teacher employment in the coming years will most likely point toward a substantial contraction in the public sector. This situation suggests a prediction in which teacher recruitment will continue to remain within the range of 2000 to 5000 positions annually. While new teachers are expected to be hired to replace those who retire, overall employment is anticipated to remain limited. Higher education institutions, and particularly faculties of education, must adapt to this transformation process. It is also important for individuals who aspire to become teachers to recognize this reality and take appropriate measures accordingly.

When the faculties of education and the teacher training system are examined more closely, it is seen that there are currently five different pathways for preparing teachers for the profession. The first of these is the teacher training process carried out within faculties of education. The second is teacher preparation conducted in faculties of theology. Unlike other faculties, theology faculties have long trained teachers within their own institutional structure and possess a distinct tradition in this regard. The third pathway is the practice known as the pedagogical formation program



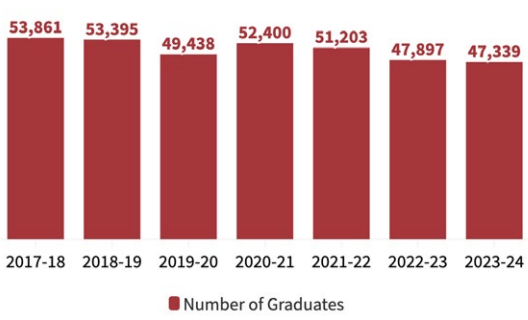


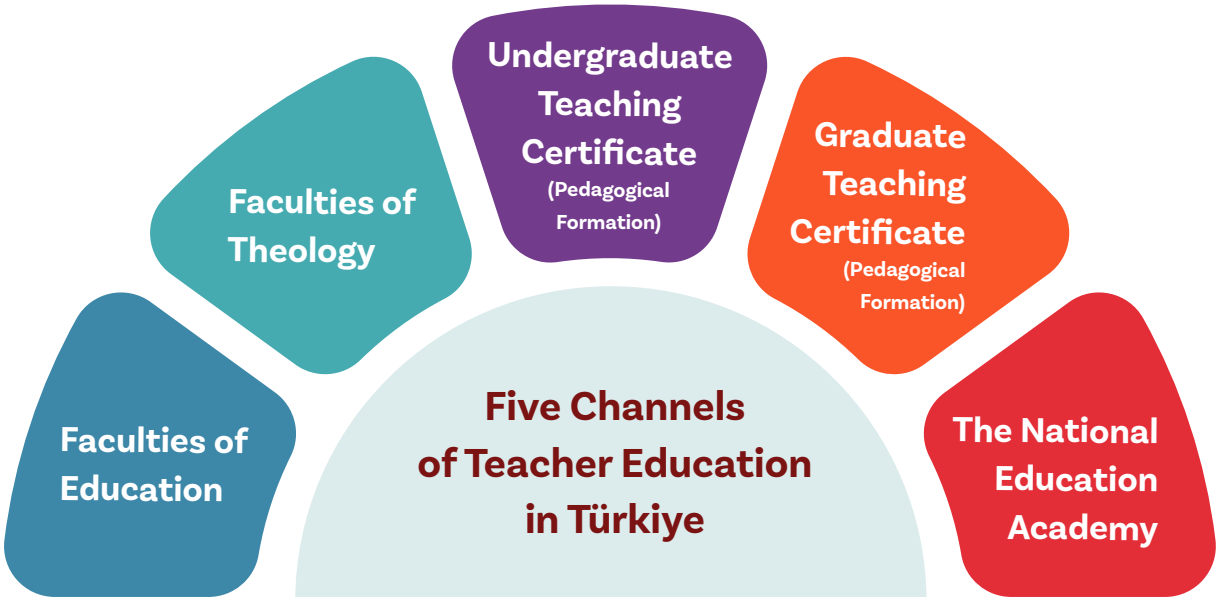
Figure 5. Teacher Appointments and the Number of Graduates from Faculties of Education in Türkiye (2018–2024)

Source: MoNE, 2018; 2019; 2020a; 2021; 2022a; 2023a; 2024a

at the undergraduate level. Students enrolled in faculties of science and letters or other undergraduate programs may receive pedagogical formation if their GPA is above 2.50, in accordance with the decision of the Council of Higher Education. As in the past, the phrase indicating the completion of pedagogical formation is added to the graduates' diplomas. This practice has been in effect for the past few years. Consequently, the rational reasons that previously encouraged students to choose faculties of education appear to have significantly weakened. Indeed, students who wish to do so can obtain pedagogical formation more easily, and most of these courses are conducted online. From the universities' perspective, the formation process constitutes a significant burden. Implementing this program, which is offered free of charge to students studying on different campuses, is not easy. As a result, most courses are conducted online, and students complete only their internships in person. The fourth pathway is the postgraduate formation program. Individuals who have completed any undergraduate program can obtain a pedagogical formation certificate by participating in a one-year pedagogical formation program. Final pathway is the teacher preparation with the help of the newly established The National Education Academy, which is about to begin operations. All in all, teachers are prepared for the profession through five different channels.

This situation indicates that the teacher training system has a fragmented structure. Many researchers agree that this long-debated system needs to be simplified and integrated. However, simplification has not been achieved yet. One of the main reasons for this is that cooperation between the Ministry of National Education and higher education institutions has not been established on a sound basis. It appears that the Ministry of National Education and the Council of Higher Education have not, to date, achieved effective cooperation with universities in developing a teacher training model on which all stakeholders can agree. This situation also shapes the framework of the current policy.

Cooperation between the Council of Higher Education and the Ministry of National Education is an unavoidable necessity. This cooperation should ensure the effective use of the capacity of higher education institutions while also providing a framework that meets the concrete expectations and needs of the Ministry of National Education. Türkiye has



95 faculties of education, 10,509 academics (YÖK, 2025), a strong physical and technological infrastructure, and a longstanding educational tradition. Faculties of education have a long history in teacher training. For example, the Atatürk Faculty of Education continues the tradition of *Dârülmuallimîn* (Teacher Training Institute for the Education of Boys), the first teacher training school of the Ottoman Empire, founded in 1848. This heritage indicates a historically strong institutional capacity. Therefore, the existing capacity must be utilized effectively, and the teacher training system should be restructured on these foundations.

As institutions with significant social impact, faculties of education are clearly required to be responsive to the demands of the Ministry of National Education. Ultimately, faculties of education serve and supply the Ministry with human resources thanks to their graduates. Therefore, it is essential that the Ministry's needs be taken into account in the teacher training process. At present, there are multiple models for teacher preparation. These models need to be streamlined, and a new framework must be developed in which both the Ministry and higher education institutions participate as effective and productive stakeholders.

One of the main criticisms highlighted in the research on faculties of education in Türkiye is the lack of practical training. It is frequently emphasized that the duration of internship and practicum experiences for teacher candidates is insufficient. For this reason, it is of great importance that any possible new model takes into account these shortcomings and needs identified through scientific research. Although a new curriculum has been introduced within the scope of the Century of Türkiye Education Model, it does not seem easy for the faculties of education to internalize this program in a short time and to transform their teacher training processes accordingly. Higher education institutions, by their nature, are structures that change more slowly. Therefore, adapting to such comprehensive and rapid program changes takes time. At the same time, concerns have long been expressed that the Ministry may, at times, remain outside the teacher training process. This issue now needs to be resolved permanently. In this context, it is essential that the Ministry of National Education take part as an active stakeholder in the planning of teacher training processes. Such cooperation is critically important for strengthening the practice-oriented capacities of faculties of education and for ensuring a healthy adaptation to the new model.

The success of the qualified teacher training process depends on the development of a strong and productive collaboration between the Ministry of National Education and the Council of Higher Education.

At present, there are no alternative programs within faculties of education for fields such as psychological counselling and guidance, special education, elementary education, and early childhood education, and these departments will continue to operate at the undergraduate level within faculties of education. In contrast, in areas such as physics, chemistry, mathematics, biology, literature, Turkish, history, and geography, educational opportunities can be taken both through faculties of education and other higher

education programs like faculties of science and letters. Therefore, restructuring and new models are needed in these fields. Looking at international practices, a two-stage model is generally adopted for subject-area teaching: individuals first receive an undergraduate education focused on content knowledge, and then they complete a practice-oriented process such as a teacher preparation program, a master's degree, or a teacher training academy. In this approach, content knowledge is acquired in higher education institutions, while teaching competencies are supported through separate mechanisms.

Considering a similar model in Türkiye, particularly for subject-area teaching, may improve resource utilization and effectiveness of the program within the faculties of education. Accordingly, it appears likely that subject-area teaching programs within the faculties of education will be phased out. Indeed, students' demand for these fields has been steadily decreasing, and quotas in many departments remain unfilled. Maintaining different models for the same field also leads to ineffective use of resources.

As a result, it is probable that undergraduate programs such as physics, chemistry, mathematics, history, and geography teaching will be closed in the medium term. Under current circumstances, these departments have begun to lose their sustainability. There are alternative pathways available for students; for example, faculties of science and letters graduates who wish to become teachers can obtain the necessary qualifications through pedagogical formation, graduate studies, or a teacher training academy. At this point, what is needed is the effective use of the existing capacity of higher education institutions and the restructuring of the teacher training process within this framework.

Although the current capacity in the field of teacher education in Türkiye is quite high, the effective use of this capacity requires taking into account both the institutional needs and the institutional motivation of the Ministry of National Education. Alongside faculties of education, the Ministry of National Education must assume a real and active role in the teacher training process.

In this context, taking Türkiye's unique conditions into consideration, the transition into the teaching profession should be structured through a graduate-level education program.

Rather than directly transferring international models, it is important to develop a model that aligns with the country's own realities. Within the proposed model, a program equivalent to a Master of Education could be designed. This program may be implemented through the collaboration of faculty members from faculties of education and expert teachers or master teachers employed by the Ministry of National Education. In this regard, a professional graduate program specific to education, similar to the widely used Master of Business Administration (MBA) programs in the business world, could be developed.

The first year of the program should focus primarily on theoretical content, while the second year should center on an intensive, practice-based process. The practicum could be carried out within a supervision model jointly overseen by Ministry of National Education personnel and faculty members from faculties of education. In this way, teacher candidates would undergo a learning experience that integrates both academic and practical competencies. However, the current contraction in teacher employment requires faculties of education to reassess their missions. In parallel with the decreasing capacity for teacher preparation, it is important that the human resources and infrastructure of these faculties be directed toward a broader framework in line with Türkiye's overall education policies and research and development activities. The efficient utilization of these resources will also help ensure the sustainability of the country's established higher education capacity.

Approximately 1.2 million teachers are employed in Türkiye (MoNE, 2025a). This large scale underscores the importance of establishing a systematic structure to support teachers' professional development. Within this framework, one of the primary functions of faculties of education should no longer be limited merely to preparing new teachers, they should also support the lifelong learning and professional development processes of in-service teachers. The implementation of in-service training programs by faculties of education in cooperation with the Ministry of National Education and private educational institutions represents a significant step in this direction. In this context, some faculties have begun institutionalizing continuous professional development activities for teachers by establishing structures similar to "In-Service Training Academies" within themselves. Such practices strengthen the relationship between universities and schools and facilitate the transfer of academic knowledge to the field.

One of the main objectives of higher education programs should be to enhance the employability of graduates.

Another important issue for which faculties of education can support the school system is school consulting. Criticisms regarding faculty members' lack of school-based experience can be addressed through more systematic cooperation mechanisms established with schools. In this regard, it is recommended that each faculty of education works closely with a certain number of project schools, pilot schools, or laboratory schools. These schools can receive direct support from faculties in areas such as curriculum development, material design, teaching methods, and administrative processes. Faculties, in turn, can provide academic guidance, consultancy, and evaluation support throughout these processes,

thereby making tangible contributions to instructional quality.

Directing the energy and capacity of faculties of education toward the areas of lifelong learning and school consulting will significantly enhance both teacher quality and school-level educational outcomes. However, despite the relatively limited employment opportunities in the teaching profession at present, faculties of education continue to admit a certain number of students. Contrary to expectations, there has not been a noticeable decline in demand for teacher education programs. This indicates that the value attributed to the teaching profession in society, as well as the attractiveness of faculties of education, persists.

One of the most significant challenges that faculties of education are facing is the preparation of their current students for an increasingly uncertain future in terms of employment. In Türkiye, some faculties have thousands of undergraduate students; for example, there are faculties with more than five thousand students. Ensuring that this large body of students is trained in accordance with the future dynamics of the education sector is among the primary responsibilities of the called faculties. A key requirement not only for faculties of education but for all higher education programs is to increase the employability of their graduates. To this end, it is recommended that the general skills (thinking, communication, research, and problem solving) in undergraduate programs must be given more place. In this way, graduates can acquire a more flexible set of competencies that allow them to be employed in different sectors.

Regardless of the field, whether engineering, social sciences, or education, it would strengthen the holistic nature of the higher education system if all undergraduate programs shared a certain set of common courses and were integrated around general skills. In this direction, faculties of education must update their programs and prepare their students not only for the teaching profession but also for the broader education ecosystem. Today, learning models that move away from mass education and instead emphasize individualized and differentiated learning are becoming prominent worldwide. In Türkiye as well, the decline in the student population and the fact that basic infrastructure has been largely completed make it necessary to shift the focus toward educational quality and individual differences.

However, the sub-sectors that support education are also growing rapidly. With the expansion of digital opportunities, guidance, coaching, mentoring, boutique study centers, and small-scale educational initiatives have become widespread. Large educational institutions are increasingly being replaced by smaller, more flexible, and digitally supported structures. This transformation points to an emerging field in which new forms of employment and entrepreneurship opportunities are arising for students in faculties of education. Therefore, faculties of education must support their students not only in relation to public-sector employment but also in the areas of entrepreneurship, innovation, and educational investment. Faculties should institutionalize this process not only at the level of discourse but also through program structures, practical courses, advisory mechanisms, and project-based learning models. Students should be encouraged to start their own educational initiatives from the early stages, and the teaching profession should be transformed into a creative and entrepreneurial professional identity that extends beyond public sector employment.

Recommendations

The intersection between the existing capacity of faculties of education and the practical needs of the Ministry of National Education (MoNE) regarding teachers' job requirements should be placed at the center of designing new teacher training models.

Cooperation between the Council of Higher Education and MoNE should be strengthened. This cooperation should not be limited to formal protocols or meetings; it should encompass all operational and strategic areas such as planning teacher training policies, program design, coordination of internship and practicum processes, data sharing, employment projections, and the establishment of pedagogical standards.

The internship and practicum experiences of teacher candidates should be increased, and pedagogical and professional skills should be reinforced through field experience. New teacher training models must take these shortcomings into account. When planning the quality and duration of internship processes, a balanced acquisition of both theoretical knowledge and practical skills should be ensured.

Teacher training programs should be made more compatible with technological developments and their impact on education. Educational technologies, online courses, digital tools, and interactive applications should be integrated into programs to support both the pedagogical and professional competencies of teacher candidates.

Given the limited nature of teacher employment, faculties of education should develop alternative career pathways that enable graduates to enter not only the teaching profession but also the broader education ecosystem and various other sectors. Programs enhancing graduates' skill diversity should be offered.

Especially in secondary-level subject teaching, programs should be structured at the graduate level through a Master of Education model. The first year of the program should focus primarily on theoretical knowledge and pedagogical foundations, while the second year should emphasize school-based practice and field experience. The practicum process should be carried out under the joint supervision of MoNE personnel and faculty members in faculties of education, enabling teacher candidates to acquire integrated academic and practical competencies through supervision mechanisms.

The human resources and infrastructure of faculties of education should be utilized more effectively in areas such as developing National Education policies, improving program designs, conducting educational research, and fostering pedagogical innovation. The academic expertise and technological capacity of faculties should be leveraged as a resource for defining National Education goals, designing and implementing educational strategies, and supporting research and development activities.

Faculties of education should place greater emphasis on individualized and differentiated learning models. Since students differ in interests, abilities, and learning pace, teacher candidates must be equipped with pedagogical skills that enable them to recognize and effectively respond to these differences.

Members of faculties of education should work closely with designated "project schools", "pilot schools", or "laboratory schools". Academic support should be provided to schools in certain points like curriculum development, material design, teaching methods, and administrative processes.

Prof. Ali Fuat Arıcı
MoNE | President of the National Education Academy

A New Actor in Teacher Education: The National Education Academy

The National Education Academy is a newly established institution affiliated with the Ministry of National Education and is created to operate in the fields of teacher training, professional development, and the development of education policies in Türkiye. Emerging as a result of long-standing structural needs voiced within the education system, the Academy aims to strengthen the teaching profession, to integrate pre-service and in-service training processes into a holistic structure, and to enhance teachers' professional competencies. The National Education Academy is neither an alternative to nor an equivalent or rival of faculties of education, nor does it seek to eliminate the functions of these institutions. On the contrary, it is a complementary structure that aims to improve the quality of education and increase practical capacity by working in cooperation with faculties of education and other teacher training institutions. In this respect, the Academy is regarded as a new institutional model within Türkiye's teacher training ecosystem.

Nevertheless, questions such as "What kind of function will the National Education Academy perform, different from faculties of education?" or "Why is there a need for such an institution?" are frequently raised in public. Some of these questions stem from a misunderstanding about the concept of education. This is because the Academy is, in essence, an educational institution, and adopting an attitude against education itself is unacceptable, especially from the perspective of educators. Education is a necessary and continuous activity at every stage of individual and social life. For this reason, it is inconceivable for an educator to oppose education or the effort to provide education in any form. The understanding of "education from womb to the tomb" constitutes the foundation of this approach.

The National Education Academy is not an institution solely intended for prospective teachers. Likewise, it is not a structure that provides services only to graduate teachers or to individuals who have obtained a diploma from faculties of education. The Academy is an institution that conducts in-service training activities, contributes to the development of the teaching profession, and supports teachers' professional advancement processes. Within this scope, the implementation of the specialist teacher and head teacher training programs, which have been successfully carried out in recent years, also falls within the Academy's area of responsibility. By decision of the Ministry of National Education, September 1, 2025 has been designated as

the official date when The National Education Academy commenced its activities. Therefore, this date, frequently mentioned in public discourse, refers to the process by which the Academy effectively began its duties.

Another important responsibility of the Academy is the training of educational administrators. In this direction, the planning of programs related to administrator training is ongoing, and the called training programs are aimed to be implemented in the near future. Thus, the Academy will carry out capacity-building activities not only for teachers but also for the administrative cadres of the education system.

The scope of activity of The National Education Academy is not limited solely to providing education. The Academy also aims to contribute to the development of education policies, to conduct scientific research on teacher training processes, to engage in publication activities, and to develop policy recommendations related to the national education system. In this respect, the Academy constitutes a strategic institution that produces ideas in the field of education policies in Türkiye and serves as a bridge between theory and practice. Therefore, The National Education Academy is not an alternative to faculties of education, but rather a structure that complements them. Enhancing the quality of the teaching profession, improving the professional competencies of educational administrators, and contributing to the grounding of education policies on scientific foundations form the core rationale for the Academy's existence. Through these functions, the institution aims to bring a new vision to Türkiye's education system.

It should be noted that debates held solely on the basis of whether The National Education Academy is established or not established in certain cities are not based on a solid foundation. Focusing on the provinces where Academy buildings are located and addressing the issue only at a local level means confining the Academy's overall purpose to a narrow framework. In fact, the majority of these institutional buildings already exist and had previously been referred to as education institutes or in-service training institutes. With the enactment of the new law, this structure has changed, and the institutions in question have acquired a different function and identity. As the scope of educational activities expands, new educational facilities are naturally being designed, and this process is still ongoing. It can be stated that these facilities will be completed in the near future and that the preparatory training programs frequently mentioned in public discourse will also be launched.

The National Education Academy aims to enhance the quality of the teaching profession and to strengthen practical capacity by working in cooperation with faculties of education.

At this point, several issues need to be addressed. First of all, it is important to focus on

The National Education Academy will operate in the provinces of Ankara, İstanbul, Erzurum, Gaziantep, Sivas, Aksaray, and Kayseri.

why the Teaching Profession Law was considered necessary and what kind of innovations have emerged with its implementation. As is known, Law No. 657 on Civil Servants, which contains the fundamental regulations regarding public personnel in Türkiye, is currently in force; however, this law does not include provisions specific to the teaching profession. Based on the need to define teaching as a professional occupation, the Teaching Profession Law and The National Education Academy Law entered into force simultaneously.

One of the main reasons why discussions on education in Türkiye receive widespread attention is that the national education system directly affects a very large segment of society. Currently, there are more than one million teachers employed in public educational institutions affiliated with the Ministry of National Education and approximately two hundred thousand teachers working in private educational institutions. Additionally, when students at the high school, middle school, primary school, and preschool are taken into account, it becomes clear that the education system encompasses a huge population. When parents and guardians are also considered, it can be observed that at least half of Türkiye's population is directly or indirectly connected to the education system. For this reason, institutional arrangements such as The National Education Academy are closely monitored and extensively discussed by broad segments of society. In an era when information circulates rapidly, be it accurate or inaccurate, securing teachers' rights through a law specific to their profession represents an extremely important development. In this respect, the enactment of the aforementioned law can be regarded as a significant achievement for the teaching profession.

In the previous period, teacher training processes were already being carried out. However, what kind of structure will emerge from now on is an issue that needs to be carefully considered. To date, neither in Türkiye nor even in the world has there ever been a single, uniform model of teacher training. When the teacher training process in Türkiye is examined, it becomes evident that not only faculties of education but also faculties of science and letters, theology, engineering,

Map 1. Teacher Education Models - Early Childhood and Primary Education Levels

Source: European Commission EACEA/Eurydice Reports, 2018; 2023a

Map 2. Teacher Education Models-Secondary Education Level

Source: European Commission EACEA/Eurydice Reports, 2018; 2023a

The National Education Academy is an institutional model developed as a result of a comprehensive research process in which international examples were examined, national and international literature was reviewed, and the views of teachers and parents were systematically analyzed.

and many undergraduate programs in different fields have served as pathways into the teaching profession. This situation is not a new practice introduced by The National Education Academy but rather the continuation of a structure that has been existing from the past to the present.

The process of admission to the teaching profession has sometimes been carried out through pedagogical formation or professional teaching knowledge courses taken concurrently, and at other times through formation training undertaken after graduation from faculties of education. Today, however, a transformation is taking place in these processes, and new models are being brought to the agenda.

When teacher education models are examined on a global scale, it is observed that there are different practices, particularly at the early childhood and primary education levels (Map 1). At the secondary education level, there are various examples similar to or differing from those in Türkiye (Map 2). In some countries, teacher education is conducted in an integrated manner with university education, whereas in others, professional teacher training is provided after the completion of university studies. In Europe as well, there are various models reflecting these two different approaches.

As is the case at the primary and pre-primary levels, the content of these models also varies from one country to another. Today, in countries generally regarded as relatively successful, such as France, Germany, England, and Italy, institutions similar to The National Education Academy that Türkiye has recently established is witnessed. However, even in these countries, there is no single, uniform model in practice.

In some countries, teacher education is conducted in an integrated manner with universities and is implemented within a structure shared with higher education institutions. This arrangement can be partially compared to the pedagogical formation model that was previously applied in Türkiye. Additionally, teacher education is carried out entirely as an activity administered by ministries of education in certain countries. The duration of teacher education also differs from the model in Türkiye, where it is typically four years for each faculty; instead, programs may be structured as 3+1.5 years, 2 years, or 1 year. These durations vary depending on whether the programs are organized directly by the ministries or in cooperation with universities.

At this point, one issue should be particularly emphasized: the emergence of an institution such as the National Education Academy is not an initiative unique to Türkiye nor the result of a short-term design. On the contrary, during the establishment process of this institution, international examples were

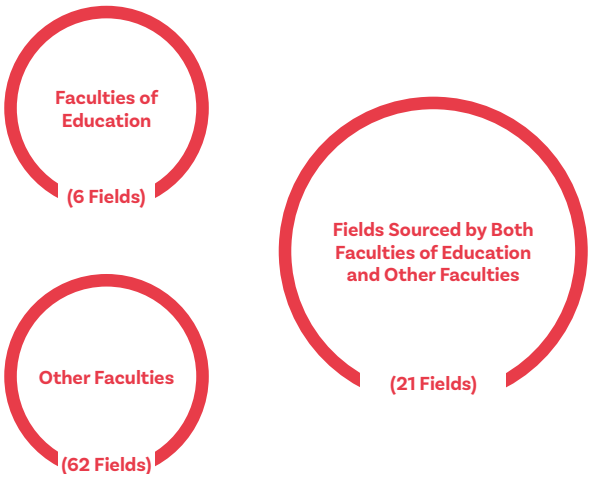


Figure 6. Distribution of Teacher Appointment Fields by Source Disciplines

Source: Ministry of National Education, Board of Education and Discipline, Decision No. 9

examined, national and international literature related to Türkiye was reviewed, and relevant academic studies were evaluated; moreover, the expectations, needs, and deficiencies identified by teachers currently working in Türkiye were systematically determined. In this process, not only the views and expectations of teachers but also those of parents regarding teachers were taken into consideration. And then, these data were analyzed, and a framework was developed following a holistic evaluation of all such feedback. Therefore, The National Education Academy is not a coincidental or temporary practice, but rather an institutional model developed through research, analysis, and comparative studies.

Under the current circumstances, it is desirable for teachers to be recruited solely from faculties of education or similar institutions; however, due to various structural factors, this objective remains limited in practice. According to Decision No. 9 of the Board of Education and Discipline, teacher recruitment is carried out across 89 different fields (Figure 6). Of these 89 fields, only six can have their teacher needs met directly by faculties of education (MoNE, 2014a). Consequently, the number of fields in which faculties of education alone provide teacher training is only six.

According to Decision No. 9 of the Board of Education and Discipline, teacher appointments are made across a total of 89 different fields, indicating that teaching has become a multidisciplinary profession that is not confined solely to faculties of education.

It is anticipated that approximately 10,000 or more of the 15,000 teaching positions announced on 24 November 2025 will be allocated to these six subject areas. Nevertheless, teacher recruitment from other faculties than education faculties continues.

Table 2. Examples of Higher Education Programs Serving as Sources for Teacher Appointment

Field	Source Program
Information Technologies	1. Computer Teaching 2. Computer Systems Teaching 3. Computer and Control Teaching 4. Electronics and Computer Teaching/Education 5. Computer Engineering 6. Computer Science Engineering 7. Control and Computer Engineering 8. Computer Education and Instructional Technologies 9. Mathematics-Computer Science 10. Statistics and Computer Science 11. Computer Technology / Computer Technology and Information Systems 12. Information Technologies 13. Software Engineering 14. Information Systems Engineering 15. Computer and Control Technology Teaching 16. Electronics and Computer Studies 17. Information Systems and Technologies 18. Computer Science 19. Management Information Systems
Music	1. Music Teaching 2. Department of Music 3. State Conservatory 4. State Conservatory of Turkish Music 5. Faculty of Fine Arts 6. Faculty of Fine Arts and Architecture 7. Faculty of Fine Arts and Design 8. Faculty of Fine Arts, Design and Architecture 9. Faculty of Performing Arts 10. Faculty of Music Sciences and Technologies 11. Faculty of Music and Performing Arts 12. Faculty of Art and Design 13. Faculty of Art, Design and Architecture 14. Faculty of Social and Human Sciences 15. State Conservatory of Turkish Music 16. State Conservatory of Turkish Classical Music

Field	Source Program
Mathematics	1. Mathematics Teaching 2. Department of Mathematics 3. Mathematics-Computer Science 4. Mathematical Engineering 5. Department of Mathematics and Computer Science
English	1. English Language Teaching 2. Department of English Language and Literature 3. Department of American Culture and Literature 4. Department of Translation and Interpreting (English) 5. Department of English Linguistics 6. Department of Translation Studies (English) 7. Department of English Language and Culture 8. Department of Translation and Interpreting (Turkish / English / French) 9. English Translation and Interpreting 10. English Language Education

Source: Ministry of National Education, Board of Education and Discipline, Decision No. 9

Table 3. Number of Students Participating in Teaching Practice

Year	Semester	Number of Pedagogical Formation Students	Number of Undergraduate Students	Semester Total	Overall Total
2020-2021	Fall	15,011	17,134	32,145	50,000
	Spring	-	60,704	60,704	
2021-2022	Fall	22,304	53,646	75,590	80,000
	Spring	22,846	63,323	86,169	
2022-2023	Fall	37,871	62,047	99,918	95,000
	Spring	35,443	61,482	96,925	
2023-2024	Fall	38,039	54,992	93,031	208,865
	Spring	56,383	59,451	115,834	

Source: MoNE, 2020b; 2024b

Table 4. Teaching Practice Around the World

Country	Duration
France	216 hours
Belgium	160 hours
Spain	550 hours
Netherlands	370 hours
Italy	550 hours
Türkiye	96 hours

Source: MoNE, 2024c

For instance, in the field of early childhood education, not only graduates of early childhood education departments within faculties of education but also graduates from other faculties, such as child development, and even individuals who once graduated from open and distance education faculties are appointed as teachers. Therefore, the structure for meeting teacher demand involves the inclusion of graduates from different faculties and academic programs in the recruitment process.

Similarly, in certain subject areas, this diversity is observed to be quite extensive. For example, in the field of music teaching, graduates from 16 different disciplines are eligible for appointment as teachers in accordance with Decision No. 9 of the Board of Education and Discipline. This decision functions as a comprehensive guideline booklet, containing wide-ranging regulations related to teacher recruitment. Likewise, appointments to the position of information technologies teaching may be made from 19 different disciplines, from 5 disciplines for mathematics teaching, and from various disciplines for English language teaching (Table 2).

Pedagogical formation has long been a subject of debate in Türkiye and continues to remain on the agenda. Nevertheless, the uncertainties surrounding this issue now need to be resolved. As previously stated, pursuant to Law No. 7528, the Ministry of National Education has abolished the pedagogical formation practice. Accordingly, obtaining a pedagogical formation certificate is no longer a requirement for appointment as a teacher within the Ministry of National Education. In other words, whether or not an individual holds a formation certificate is no longer a determining factor for admission to the teaching profession. The formation process implemented to date has been conducted within this framework and, at this point, has lost its validity. The figures also demonstrate the fluctuating nature of this process, as the number of formation students has increased and decreased significantly in previous years (Table 3). Most likely, this year will mark the final cohort of formation students. Therefore, a similar practice should be considered in the future or a new standard will need to be established. However, under the current circumstances, the continuation of the formation practice no longer has a meaningful justification.

In Türkiye, the inadequacy of practicum settings constitutes a significant problem in teacher education processes. Currently, the practicum hours allocated to pre-service teachers amount to approximately 96 hours (Table 4). Our objective is to increase the hours to 400-500 in line with the global average. Accordingly, the preparatory education process will be restructured in this direction. A review of National Education Councils indicates that proposals aimed at increasing teaching practice have been placed on the agenda of the 2006, 2010, 2014, and 2021 National Education Councils (MoNE, 2006; 2010; 2014b; 2021c). Therefore, the need to assign greater emphasis to practice within teacher education programs has been articulated for a considerable period of time.

When the historical background of the idea of The National Education Academy is examined, it can be traced back to a process

extending as far as 1989. This idea matured through various debates and preparatory phases and was ultimately put into practice in 2024. The duties of The National Education Academy are explicitly defined in the law. Accordingly, the Academy has a broad and multifaceted mandate, including conducting preparatory education, providing leadership training and professional development activities, developing education policies, and carrying out publication activities.

An examination of the organizational structure of the Academy reveals that a supreme body defined as the Academy Monitoring and Steering Board is at the top. Beneath this body are the President of the Academy, followed by the Academic Board, then the department heads, training staff, and education and practice centers. This organizational structure represents a model implemented for the first time within The Ministry of National Education.

The structure of the Academy differs fundamentally from that of the Board of Education and Discipline and does not resemble other institutions. This is because the Academy operates under a higher governing board, and the Academic Board is directly responsible for both decision-making and the preparation of those decisions. The Academy comprises a total of nine departments, some of which have been transferred from the Directorate General for Teacher Training and Development. In addition, units newly established within the Academy -the Department of Digital Content and Publications and the Department of the Maarif Archive and Museums- represent innovations unique to this institutional structure.

With regard to the teacher employment process, the conditions for admission to preparatory education include the fundamental requirements that have traditionally been sought for entry into the teaching profession. The process conducted in line with these requirements continues with admission to the Academy following the Academy Entrance Examination (AEE). An examination of the content of the preparatory education provided to candidate teachers admitted to the Academy indicates that one of the primary objectives is to enhance the quality of teaching practice. In this process, it is aimed that teachers encounter a more efficient and effective education system compared to existing practices. In addition, a culture-centered education model is being designed to strengthen candidate teachers' confidence in their profession, their country, and their nation, and to reinforce their sense of professional belonging. Furthermore, in alignment with the Century of Türkiye Education Model, course contents are being updated, and specialized field education components are being developed to strengthen the integration of these contents into practical implementation processes. For candidate teachers who have graduated from fields outside faculties of education, complementary teacher education programs designed to consolidate pedagogical competencies are also being developed.

Recommendations

Systematic cooperation mechanisms should be established between faculties of education and The National Education Academy; joint programs, internship practices, and research projects should be implemented.

The scope and duration of practice-based components in teacher education programs should be expanded.

SESSION III

TEACHERS' PROFESSIONAL COMPETENCIES

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Rethinking Teacher Competencies for 21st Century Skills: Artificial Intelligence, Big Data Analytics, and Practical Wisdom

It is observed that not only state institutions but also the critical and constructive contributions of non-governmental organizations (NGOs) play an important role in shaping education policies. Platforms like the Istanbul Education Conference create a multidimensional environment for interaction among policymakers, academics, researchers, and practitioners, contributing significantly to the development of a common intellectual framework in the field of education.

The need to re-evaluate teacher competencies in the context of 21st-century skills is increasingly evident. Towards this end, the focus will primarily be on three core concepts -artificial intelligence, big data analytics, and practical wisdom (*phronesis*)- to make sense of the transformation of the teaching profession. Addressing the teaching profession through these concepts will make significant contributions to the comprehensive evaluation of the current situation, the identification of problematic areas, and the development of solution-oriented approaches.

The international literature on teacher competencies forms the theoretical basis of the subject. The work titled *Evidence and Public Good in Educational Policy, Research and Practice*, co-authored with American Educational Research Association President Barbara Schneider, examines the education systems of 24 countries, drawing on contributions from OECD experts, and presents a comparative analysis of the use of scientific evidence in the formation of education policies. This study highlights the role of evidence-based policy-making in improving educational effectiveness.

Another important resource concerning the philosophical dimension of the teaching profession is the work titled *Teaching and Practical Philosophy*. In this study, teaching practice is considered not merely as knowledge transfer but also as a communicative, ethical, and intellectual activity, framed by Hans-Georg Gadamer's concept of *phronesis* (practical wisdom) and Jürgen Habermas's communicative action theory. This approach proposes redefining teaching as an intellectual, reflective, and value-based profession,

integrating this concept with the understanding of wisdom (*irfan*) in the Turkish educational tradition.

Furthermore, a significant contribution is the school evaluation approach based on big data and artificial intelligence found in the work titled *Using Big Data in Evidence Informed School Evaluation*. This model strengthens data-driven decision-making in educational institutions by proposing a measurable, analytical evaluation framework for teacher performance, institutional excellence, and quality assurance. The use of big data in education points to a holistic approach that involves not only numerical analysis but also pedagogical improvement and strategic planning.

Finally, the book series titled *Education Science, Evidence, and the Public Good* is published by the *World Education Research Association (WERA)* and features studies that comparatively examine educational data across countries, opening the scientific and ethical foundations of education policies to international discussion and thus making a significant contribution to global education research.

One of the agenda items in education is the issue of paradigm shift. The most prominent characteristic of the present age is change. Change can radically transform social, economic, and institutional structures, with both positive and negative aspects. Moreover, not only the direction of change but also its speed is noteworthy. It is observed that higher education institutions, in particular, face various difficulties in adapting to this rapid transformation. This situation requires state institutions, policymakers, and practitioners to review their readiness for change. Consequently, it can be said that the field of education is entering a new era, an age in which adaptation to change is the determining factor.

This transformation process has also led to serious changes in teachers' roles. Today's teachers are expected not only to convey knowledge but also to be researchers, reflective practitioners, and decision-makers grounded in practical knowledge. In

international literature, concepts such as the researching teacher, reflective practitioner, and practical wisdom have become core elements defining the quality of the teaching profession. These concepts are considered momentous indicators for training teachers who can adapt to the speed of change, think flexibly, and are entrepreneurial, innovative, and data-driven in decision-making.

Studies on teacher competencies in Türkiye hold an important place in the development of National Education policies. A teacher competency framework was prepared in collaboration between the Council of Higher Education (Yükseköğretim Kurumu, YÖK) and the World Bank in the late 1980s and late 1990s. This framework is regarded as one of the first institutional initiatives to establish standards for the teaching profession in Türkiye.

In 2002 and 2006, the Ministry of National Education (MoNE) published new framework reports, stating that it was responsible for defining teacher competencies. These reports not only defined the areas of competency but also included performance indicators to measure them. It is seen that 233 performance indicators were determined within the 2006 performance competency framework. In this respect, the Ministry conducted an important study to develop measurable and evaluable aspects of the teaching profession.

However, by 2017, various difficulties arose in implementing and measuring these 233 performance indicators. To overcome the problems, a new teacher competency framework was developed, comprising three main areas, sub-areas, and 65 competency indicators. Given the approximately 10 years that have passed, it is clear that this framework needs to be updated. Within the scope of the updated studies, the existing indicators need to be aligned with the requirements of the age, and the measurement and evaluation processes need to be restructured.

The Ministry of National Education's studies on 21st-century skills are also noteworthy. Specifically, the Research Report on 21st Century Skills and Values (MoNE, 2023d), is a comprehensive document that holistically addresses both a value-based approach and the cognitive and social skills required at this stage. This work constituted an important example of contemporary educational approaches, finding a place at the policy level in Türkiye.

When international comparisons are looked closely, it is observed that all prominent 21st-century skills in countries such as the United States and Singapore are included in the Ministry of National Education's policy documents. It has been determined that these skills are also reflected in the *Maarif Model* (The Century of Türkiye Education Model), which began implementation in the 2024–2025 academic year. This situation demonstrates that Türkiye's education policies are being shaped in alignment with contemporary trends.

One of the most referenced international frameworks, the P21 (Partnership for 21st Century Learning) model defines 21st-century skills across core areas such as critical thinking, creativity, communication, and collaboration (Table 5). Similarly, the **OECD Education 2030 Framework** emphasizes the cognitive, emotional, and ethical competencies that individuals need to adapt to future societal and economic requirements. When Türkiye's MoNE 2023 Education Vision and the Century of Türkiye Education Model are delved into, it becomes clear that these international indicators are primarily integrated into local policy documents. Within this context, Türkiye's policy orientation regarding teacher competencies and 21st-century skills aligns with international standards.

Table 5. Comparative Analysis of 21st Century Skills Frameworks

Skill Domain	P21 Framework	OECD Framework	MoNE 2023 Report Model
Thinking Skills	Critical Thinking and Problem Solving, Creativity and Innovation	Critical Thinking, Creativity, Problem Solving	Higher-Order Thinking Skills (Creative, Critical, Problem-Solving, Reflective, Analytical Thinking, Metacognition)
Communication & Collaboration	Communication, Collaboration	Communication, Collaboration	Language and Communication Skills (Active Listening, Negotiation); Social and Emotional Skills (Collaborative Work)
Digital Competencies	Information, Media and ICT Literacy	Digital Literacy	Literacy Skills (Information and Communication Technologies, Media, Data and Visual Literacy)
Personal & Social Competencies	Flexibility, Adaptability, Initiative, Self-Direction, Social and Cross-Cultural Skills, Leadership	Responsibility, Empathy, Self-control	Social and Emotional Skills (Empathy, Resilience, Conflict Resolution); Self-Skills (Self-Efficacy, Self-Regulation, Perseverance, Leadership)
Citizenship & Responsibility	Global Awareness, Civic Literacy	Global Competence	Literacy Skills (Citizenship, Environmental Literacy); Self-Skills (Taking Responsibility)
Learning Competency	(Present implicitly)	Learning to Learn	Learning Skills (Learning to Learn, Active Learning); Self-Skills (Curiosity, Motivation)

However, some fundamental problems are encountered similarly both in Türkiye and at the international level. Among these problems, the determination and updating of performance indicators for measuring and applying teacher competencies and the evidence-based, scientific, and objective execution of measurement processes are the chief ones. While defining 21st-century skills and competencies is important, the critical challenge is how these skills will be measured and how measurement results will be translated into policy processes. Furthermore, the competencies of the individuals, institutions, and organizations conducting the performance evaluation constitute a separate problem. National and international research indicates deficiencies in the competency levels of experts evaluating educational programs developed within the framework of teacher competencies and 21st-century skills. This situation negatively affects the validity and reliability of the evaluation processes, thereby limiting the effectiveness of policy implementation. For these reasons, it is essential that the processes for measuring and evaluating teacher competencies are based on scientific data, indicators are regularly updated, and the professional development of the experts involved in the evaluation mechanisms is supported. Sustainable quality improvement in education will be possible not only through the preparation of policy documents but also through the scientific, systematic, and practice-centred realization of these documents.

Teacher development should be viewed not merely as a bureaucratic requirement, but rather as an integral part of professional identity and an internalized responsibility.

The objective, holistic determination of the relationship among school performance, student achievement, and teacher qualifications has been a subject of debate for many years. Suggestions at the national level, such as the abolition of higher education entrance exams and the proliferation of portfolio-based assessments, are frequently raised, but implementing these proposals sustainably faces various difficulties. This situation necessitates the restructuring of education evaluation systems to be more balanced, multidimensional, and evidence-based.

In this context, one of the most significant risks encountered in evaluating student performance is the mechanization and bureaucratization of the process. The presence of more than 230 performance indicators within the teacher competency framework prepared in 2006 led to measurement and evaluation processes becoming overly formalistic. A similar situation is observed in the accreditation processes of higher education institutions. Quality assurance systems have generally been found to create bureaucratic burdens that result in wasted time and effort, instead of achieving the intended level of efficiency. Therefore, processes aimed at improving educational quality must be designed with effectiveness and flexibility in mind, rather than expanding bureaucratic mechanisms. Many European countries have developed policies in recent years to reduce bureaucracy in quality audit processes. Adopting a similar approach in Türkiye would help alleviate the administrative burden on both teachers and institutions.

Another critical issue is the necessity for teacher performance evaluation systems to be designed in a practical manner that does not increase teachers' professional workload. Evaluation processes must support teacher development, be feedback-oriented, and be motivating. Linking evaluation results to internship, continuous professional development, and career advancement steps is also a fundamental issue discussed internationally. The measurement of teacher competencies must be treated not only as an evaluation activity but also as a process that serves as a guiding framework for structuring professional development plans. However, ambiguities persist regarding how competencies will be linked to entry into the profession, appointment, promotion, and career advancement processes.

The establishment of competency-based licensing or certification systems encourages teachers to engage in lifelong learning activities. In this regard, micro-credential and micro-certificate programs offer powerful tools. However, systematically integrating the skills acquired by teachers through these programs into their career development remains a challenge.

The fact that teacher competencies are not solely measurable through tests raises new questions about who will be involved in the evaluation process and which criteria will be used. At this juncture, the Ministry of National Education (MoNE) must clarify its policies

concerning the sanctions and improvement mechanisms to be implemented for teachers whose competencies fall below the minimum level.

Overall, significant progress has been made in Türkiye in terms of policy documents and strategic reports. However, similar to many other countries, various difficulties are encountered during the implementation phase. A common denominator across successful examples is teachers' professional autonomy in their professional development processes. Teacher development should not be viewed merely as a bureaucratic requirement, but rather as an integral part of professional identity and an internalized responsibility. Sustainable success in education is directly linked to the teachers' ability to direct their own learning processes and strengthen their professional autonomy.

An examination of the Singaporean and Finnish models shows that the prevailing core understanding in the teaching profession is the perception of self-improvement as a moral obligation. In these countries, professional development is accepted not as a bureaucratic necessity but as a natural extension of the ethical and moral foundations of teaching. This approach enables teachers, as lifelong learners, to continuously renew themselves and internalize their commitment to their profession. Furthermore, the social prestige of the teaching profession, salary levels, and institutional support mechanisms provided to teachers are carefully addressed in these countries. Economically and professionally supporting teachers strengthens the profession's status and encourages qualified individuals to choose teaching as a career.

Moreover, the concept of the "teacher-as-researcher" holds a significant place in the education systems of these countries. This concept emphasizes that teachers should be individuals who are able to critically evaluate educational practices, develop learning processes grounded in research, and make evidence-based professional decisions. The Finnish model stands out as one of the most distinctive in institutionalizing this understanding, strengthening the professional quality of the teaching profession.

In this context, the Erasmus Teacher Academies, supported by the European Union, can be considered a convincing example. The primary goal of the Erasmus Teacher Academies is to enable teachers to establish their own teacher academies in collaboration with their respective universities through Erasmus+ projects and to develop programs within the framework of 21st-century skills during this process (Table 6). These implementations represent an approach that differs from traditional teacher training models. The Academies specifically aim to restructure the skills necessary for sustainable development within the framework of digital transformation, the Green Deal, and spatial awareness for teachers. STEM (Science, Technology, Engineering, Math) applications are another example within this scope. Additionally, the STEAM Academy model has incorporated the concept of entrepreneurship alongside science, technology, engineering, arts, and mathematics. This approach encourages teachers and pre-service teachers to be more active in entrepreneurship and to develop innovative educational practices by establishing their own ventures.

Similarly, The National Education Academy in Türkiye has the potential to enable teachers to run academies and certificate programs through their own national and international networks. Such structures enhance professional solidarity among teachers and reinforce the culture of lifelong learning.

Under the light of these international models, a case study can be presented on the Big

Table 6. Alternative Models & Good Practice Examples: Erasmus Teacher Academies

Academy/Project Name	Focus Areas and Core Approaches
GEO-Academy	Developing teachers' digital, green, and spatial (GIS, RS, etc.) skills for Sustainable Development
NBS Academy	Integrating NatureBased Solutions (NBS) into sustainability education
ContinueUp	Ensuring continuity between pre-service and in-service teacher training through digital tools
ACADEMIA	Utilizing creative teaching methods such as Montessori, drama, and gamification in differentiated classrooms
TEAM	Reshaping music teacher education around digitalization, intercultural learning, and sustainability
ACIIS	Employing drama techniques and digital drama tools to support inclusive education
SciLMi	Developing students' scientific information evaluation skills (meta-scientific literacy) in the age of information pollution

Note: Adapted from Erasmus Teacher Academies

Data and Artificial Intelligence-Based School Assessment and Excellence in Education approach, developed under the leadership of the International Association of Educators (IAE). Big data analytics will assume a central role in education, defining systemic structures and formulating future policies. In this context, skills such as information processing, computational thinking, and problem-solving must be analyzed systematically. The emphasis on these skills in international assessment exams, like OECD's PISA, further underscores the significance of this issue.

Another solution suggestion is an international, longitudinal project based on artificial intelligence and big data analytics, involving six countries. The School Assessment and Excellence in Education Project, carried out by the International Association for Educational Research (INASED), aims to create one of the world's most comprehensive databases in this domain. The research is being conducted in collaboration with experts from the OECD and the field of artificial intelligence to compare the resulting longitudinal data with data from standard tests, such as the OECD PISA. If significant international correlations can be established through these comparisons, it will be possible to create a critical reference set for large-scale data analysis in the field of education.

The main objective of the project is to conduct objective analyses of the success levels of schools, teachers, and students through the utilization of big data. Crucially, these analyses take into account the schools' socioeconomic context, demonstrating particular sensitivity to ensure that existing inequalities are not perpetuated. Central to the study is the pivotal question of how big data can be leveraged to strengthen equity in education and effectively reduce opportunity gaps.

The project is structured into three distinct phases (Table 7). Phase I involves

Table 7. Big Data in Evidence-Based School Evaluation: Developing an Internal School Evaluation Model.

Phase I (Year I)	• Implementation of Internal School Evaluation by using Big Data Research Platform • Implementation of External School Evaluation by using Big Data Research Platform
Phase II (Year 2)	• Providing schools with evidence generated from Big Data Research in Phase I • Generating local knowledge from stakeholders' practical experience • Conducting evidence-informed school self-evaluation
Phase III (Year 3)	• Developing a School Excellence Model in collaboration with research team • Implementing School Excellence Model

Source: Eryaman, 2021

the development of an Artificial Intelligence-based software. Through this platform, schools are required to submit evidence for 462 parameters in the pilot application and 116 in the general implementation. The goal is to facilitate schools in developing evidence-based educational practices and contributing meaningfully to policy-making processes. After schools submit their evidence to the system, the data is initially evaluated by external experts, and will subsequently be automatically scrutinized using AI-assisted analyses. Throughout this stage, incomplete or inadequate data are revised, taking into account the quality of the evidence. This rigorous process is designed to be an assessment system where only quality/scientific evidence is deemed valid.

In Phase II, the systematically collected data is analyzed, and comparative feedback is provided to the participating schools. This feedback is presented at local, national, and international levels, effectively identifying the schools' specific strengths and areas for improvement. The final phase (Phase III) requires schools to develop their own models of excellence. This outcome enables schools to define their areas of development through an evidence-based approach and structure their internal continuous improvement processes.

The foundational principle of this approach is the understanding that a rigid, bureaucratic system must be avoided. Instead, the focus should be on conducting macro-level big data analyses to furnish schools with meaningful data. Schools are then expected to internalize this data, enabling them to create their own policy documents and build excellence models. This strategy aims to establish an interactive ecosystem characterized by both top-down and bottom-up dynamics.

The study outlines a three-year evaluation cycle. An initial assessment of the schools' current status will be conducted at the end of the first period, with a subsequent re-evaluation process scheduled for the third year. Within this cycle, under the 'Excellence in Education' heading, nine core items related to teachers are addressed. Additionally, supplementary criteria for teacher performance are evaluated under the themes of 21st-century skills, research, development, and innovation.

The developed online software platform helps schools test their internal evaluation model. The internal evaluation process

The Office for Standards in Education, Children's Services and Skills (Ofsted) is an independent public body in England that inspects education and care services for children and learners of all ages. Established in 1992 to inspect schools, its remit was expanded in 2007 to include children's social care. Its core role is to conduct inspections in cycles of 3-4 years to assess compliance with standards and to report its findings to Parliament (Hood et al., 2019).

within the project has been finalized, and the transition to the external evaluation phase is planned for 2026. Following the completion of the three-year cycle, the second phase of artificial intelligence integration is targeted for implementation. The intended Artificial Intelligence (AI) integration aims to provide teachers with personalized coaching and real-time feedback. This system is designed to offer teachers opportunities for self-assessment, goal setting, and continuous in-service training. This proactive approach is expected to help educators adapt to the rapid pace of change. In the contemporary environment, where policy frameworks are evolving swiftly, teachers must grasp these shifts promptly and translate them into classroom practice.

Within this framework, AI is anticipated to play an important role in teacher training. There is a compelling need to update teacher competencies and enhance awareness about digital citizenship, ethical responsibility, and academic integrity. Furthermore, big data literacy has become an integral component of modern education systems. Indeed, similar initiatives are gaining momentum worldwide, signaling the global proliferation of awareness of data-driven transformation in education.

The transformation of the Faculties of Education is of paramount importance at this juncture. The proposed integrated curriculum approach advocates integrating concepts such as artificial intelligence (AI) and big data analytics across all courses, rather than maintaining isolated subject instruction. The establishment of AI-supported learning platforms within practical training processes will strengthen the professional competencies of prospective teachers. Concurrently, the primary objective must be to cultivate educators who can cope with conditions characterized by chaos, uncertainty, and rapid change, demonstrating flexible thinking, entrepreneurship, and innovation.

In this context, the concept of practical wisdom assumes a significant role. Practical wisdom is regarded as an approach that enables teachers to integrate the ethical, cognitive, and emotional dimensions in their professional decision-making. Defined by Aristotle as *phronesis*, practical wisdom is the faculty to determine the most correct and beneficial course of action in complex, uncertain, and context-specific situations, while upholding ethical values. In the age of AI and data analytics, practical wisdom is more critical than ever.

Micro-credential programs are vital tools that support teachers' participation in lifelong learning. Analogous structures, such as the Erasmus Teacher Academies, could facilitate the establishment of micro-credential programs, with Faculties of Education assuming an active role in this process. Furthermore, it is essential for teachers to form their own communities of practice, and for the Ministry of National Education to support them. Developing cultural exchange programs will help teachers gain experience from diverse educational systems.

To advance a sustainable vision for education, a Supreme Council for Educational Research, Policy, Accreditation, and Strategic Planning, affiliated with the Presidency, is proposed. This Council and its subordinate commissions must operate as independent, scientific bodies, free from political influence. Similar to models such as the UK's *Ofsted*, a data-driven and merit-based inspection and evaluation system could be established in Türkiye, accountable to either the Parliament or the Office of the Presidency.

The activities of the supreme councils and commissions within the Ministry should be subject to external evaluation through reports prepared by scientific non-governmental organizations (NGOs), think-tanks, and education faculties. The institutions and organizations involved in this external evaluation process should be provided with financial and institutional support, aligning with objective and scientific criteria determined by legal regulations.

The settlement of this structure is projected to achieve the following strategic goals:

1. Evidence-Based Policy and Institutional Memory: Evidence-based approaches, with scientific research at the center of educational practices, will shape educational policies. The efficacy of these policies will be continuously monitored through analyses of big data, thereby building a sustainable institutional memory supported by artificial intelligence (AI).

2. Big Data-Based Performance Assessment: National data will be analyzed alongside international data from organizations such as the OECD and the IEA, leveraging AI support. These analyses will facilitate the creation of scientifically evidence-based excellence models and objective performance assessments for all educational stakeholders (administrators, teachers, and students).

3. Process-Based Evaluation and Alternative Approaches to Centralized Examinations: The creation of big data and AI-supported performance files for all educational and school stakeholders will provide a process-based evaluation infrastructure for human resources applications, including placement, appointment, promotion, and school achievement. The process-based big data and AI-supported reports generated can be used to evaluate students' transitions to high school and university. This model will make possible the development of a more equitable and process-oriented system capable of replacing the current centralized examination systems, which are primarily based on multiple-choice tests.

4. Transparency and Accountability: Parents, students, and teachers will be regularly informed regarding the system's operation. Educational policies and outcomes will be presented in a transparent, accessible, and easily understandable manner to all segments of society. Schools, institutional administrators, and all other stakeholders will be held accountable for achieving the determined objectives. Performance evaluations will be conducted regularly based on objective criteria, and they will be publicly disseminated. Furthermore, this model will allow for the objective analysis of the relationship between student achievement and development, and teacher performance.

Recommendations

In today's education system, updating teacher competencies in line with the requirements of the era is of critical importance. Therefore, priority should be given to raising teachers' awareness, particularly in the areas of digital citizenship, ethical responsibility, and academic integrity.

Pedagogical innovation and entrepreneurial competencies need to be reassessed. Structuring the curriculum in an integrated manner necessitates not only moving beyond the isolated delivery of courses but also embedding artificial intelligence and big data analytics components across all subjects.

The education system should aim to prepare teachers who are capable of coping with chaos, complexity, and rapid change, and who can think flexibly while demonstrating entrepreneurial and innovative capacities.

To support teachers' professional development, the widespread implementation of micro-credential programs is recommended. In this process, structures similar to the Erasmus Teacher Academies should play an active role.

Teachers should be encouraged to establish their own communities of practice, and the Ministry of National Education (MoNE) should provide institutional-level support for these communities.

At the same time, cultural exchange programs should be developed, and international cooperation networks should be strengthened.

In order to establish a sustainable future vision for education, a Supreme Council for Education Research, Policy, Accreditation, and Strategic Planning affiliated with the Presidency should be established in Türkiye. Under this Council, independent and scientifically grounded commissions should be formed, and the principle that education policies be guided by continuity and merit-based governance should be adopted.

Similar to the Ofsted model in England, the Supreme Council should establish a data-driven and merit-based inspection system, which is accountable to either the Parliament or the Presidency, in Türkiye.

In monitoring teacher competencies, models based on artificial intelligence-supported big data analytics should be employed.

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Transformation of Teaching in the Digital Era: Next-Generation Pedagogy and Competencies

The unchanging fundamental paradigm in education is built on the objective of raising individuals suited to each specific era. While literacy was considered a core competency in industrial societies, this set of competencies has expanded in the digital age to include informatics, creativity, and lifelong learning skills. Today, individuals are expected not only to consume information but also to produce, share, and infer from it. Educational institutions, positioned at the center of this transformation, are no longer static transmitters of knowledge; they are now conceptualized as learning, innovative ecosystems that raise individuals aligned with technology. The imperative to enhance the quality of educational processes, particularly in the face of rapidly changing student demographics characterized by diverse learning profiles, necessitates continuous updating of teachers' pedagogical and digital competencies.

The digital transformation process is a cornerstone of modern education systems. Currently, this process is characterized by a rapid and highly efficient digital shift. Besides, the key to development and social transformation rests on the qualified teachers. In this context, the question of how teachers will adapt to the transformation process becomes critical, which makes these digital competencies an inseparable part of the teaching profession. Today, a qualified teacher is defined as a teacher equipped not only with subject-matter knowledge but also with pedagogical, technological, and personal development skills. The concept of "techno-pedagogical competency" in the relevant literature (Koehler & Mishra, 2009) stands out as a contemporary proficiency that teachers must possess. Techno-pedagogical competency refers to the practical and coherent integration of technology with pedagogical goals in teaching and learning processes. Teachers are expected to position technology in the classroom not merely as a tool but as an element that supports learning.

In recent years, comprehensive frameworks and online platforms for teachers' digital competencies have been developed, offering opportunities for teachers to update their skills by accessing digital competency

packages through these systems. These platforms support teachers in adapting to the changing educational environment and sustainably developing the skills required by the digital age. Efforts are also being made in our country to equip teachers with these competencies. One of the most important steps taken in this direction is the **Digital Ecosystem for Teacher Training Project**, carried out in collaboration with the MoNE and UNICEF (UNICEF Türkiye, 2023). As part of the project, a comprehensive meeting was held in Ankara, in cooperation with UNICEF and the Ministry of National Education, focusing on the development of digital teacher competencies. The project defines a comprehensive digital competency framework consisting of 17 competency areas and 380 indicators. The process was shaped by a series of workshops attended by academics, teachers, and experts from various branches. Each workshop incorporated the views of participants from different branches and experience levels, thereby developing a participatory, needs-based model for teachers' digital competencies. One of the project outputs, the Digital Competency Package, comprises 10 modules designed to enhance teachers' digital skills. These modules are purposed to strengthen teachers' digital competencies when followed systematically.

In preparing the framework, the European Union's Digital Competence Framework (DigComp) served as a reference (European Commission, 2023b). Accordingly, digital competence is built on five core components: information and data literacy, communication, digital content creation, safety, and problem-solving. This approach offers a roadmap that aligns with international standards, enabling teachers to adapt to the requirements of the digital age. Another structure, developed by the UK-based organization Joint Information **Systems Community (JISC)**, addresses digital literacy across seven dimensions. Among these dimensions, there is also media literacy, in addition to digital literacy itself.

This model structurally overlaps with the digital competency package implemented by the Ministry of National Education (MoNE) in Türkiye. Furthermore, the **International Society for Technology in Education (ISTE)**, an international non-governmental organization based in the United States, has developed separate digital competency standards for teachers, students, and educational coaches (Table 8). In these standards, qualities like being a facilitator and designer are emphasized for teachers. And for students, the goal is to raise individuals who are knowledge constructors, innovators, and creative communicators. This approach demonstrates that the concept of productivity/creativity holds a central position in contemporary educational understanding. For teachers, the emphasis is placed on being an individual who knows how to learn (ISTE, 2021).

For teachers, digital competencies signify being better equipped and more successful in academic life, and the ability to select appropriate technologies for teaching-learning processes and to utilize them effectively and efficiently. The rapidly changing digital ecosystem requires individuals to acquire new technological skills continually. The momentum of digital transformation is clearly evidenced in the shift from the tools and environments of the past to the AI-supported systems of the present. Currently, generative artificial intelligence applications like ChatGPT have moved beyond mere technological tools and become structural elements that fundamentally transform how we access, produce, and communicate information.

The first institutional step in the field of Artificial Intelligence (AI) in Türkiye was taken with the launch of the undergraduate program in Artificial Intelligence Engineering by

Table 8. ISTE Digital Citizenship Competencies

Balanced	Students participate in a healthy variety of online activities and know how to prioritize their time between virtual and physical activities.
Informed	Students evaluate the accuracy, perspective and validity of digital media, and develop critical skills for curating information from digital sources.
Inclusive	Students are open to hearing and recognizing multiple viewpoints, and engaging with others online with respect and empathy.
Engaged	Students use technology and digital channels to solve problems and be a force for good in their families and communities.
Alert	Students are aware of their digital actions and know how to be safe and create safe spaces for others online.

Source: International Society for Technology in Education (ISTE)

Hacettepe University in 2019. Following the graduation of its first cohort in 2023, numerous universities have established similar programs in this domain. Consistent with the heightened awareness regarding cybersecurity and AI literacy, the Council of Higher Education *(Yükseköğretim Kurulu, YÖK)* announced the implementation of new programs across 80 different universities focusing on these themes. Concurrently, universities are developing their own internal guidelines to encourage the ethical and effective use of AI among academic staff and students. Strategic documents, specifically *The Presidential Digital Transformation Office's National Artificial Intelligence Strategy 2021-2025* (CBDDO, 2021), the Ministry of National Education's Artificial Intelligence in Education Policy Document and Action Plan (2025-2029) (MoNE, 2025a), and the Council of Higher Education's Ethics Guide of Generative Artificial Intelligence Use in the Scientific Research and Publication Process (YÖK, 2024) collectively present a comprehensive roadmap for the sustainable integration of digital transformation within the education system. Similar strategies are also being applied in countries, such as the United States and the United Kingdom.

All these efforts underscore the significance of new literacy and digital skill forms. These competencies, often referred to as 21st-century skills, have become fundamental components of contemporary education. Skills such as critical thinking, communication, collaboration, creativity, digital awareness, and problem-solving are considered indispensable for both students and teachers. Therefore, the digital transformation process is not merely a technical shift but also one that redefines teachers' professional identity. Generally, 21st Century Skills can be grouped into learning and innovation skills, digital literacy skills, and career and life skills. This structure facilitates the comprehension of the subject and enables teachers to approach educational processes more consciously.

In recent years, the concept that first comes to mind when discussing digital technology is artificial intelligence. It is possible to distinguish between two terms related to AI. One of these terms is AI technologies, which refers to the entire technical and theoretical infrastructure made possible by artificial intelligence. These involve broader concepts such as algorithms, data processing methods, and learning approaches, as well as the hardware on which they can be implemented. Conversely, AI tools typically refer to applications or software designed for specific tasks that are generally user-friendly for the

end-user. Today, these two terms are often used interchangeably, as AI tools cannot exist without utilizing the technologies in question.

On the other hand, contemporary concerns about the future are also emerging, particularly given the rapid advancements in AI technologies. However, it is challenging to make definitive predictions about what will happen in learning and teaching processes in an unpredictable future. The pace of digital transformation requires individuals and educators to adapt. Therefore, while the process cannot be halted, continuous efforts toward adaptation and learning are crucial to avoid falling behind.

Having become a fundamental element of life, social media has today refashioned from an information sharing platform into an environment where misinformation is rapidly disseminated. This situation can be evaluated as a transition from the information age to the misinformation age. Adults, children, and youth engage with social media for various purposes. These environments directly influence how individuals acquire knowledge. Consequently, social media literacy is a significant component of the digital age.

The utilization of artificial intelligence in education gained visibility, particularly following the launch of ChatGPT in 2022. However, the historical foundations of AI extend much further back. Following a period of stagnation in the 1980s, known as the AI Winter, advancements in the field have accelerated over the last two decades. Since 2017, developments in subfields such as deep learning, machine learning, natural language processing, and robotics have propelled AI to the center of educational applications. Today, AI is considered not merely a technical innovation but a paradigm that redefines processes related to instructional design, assessment, and learning analytics.

Artificial intelligence technologies are increasingly integrated into education as powerful tools that support processes of thinking, production, and decision-making. They demonstrate high effectiveness across many cognitive processes, such as concept development (idea generation), content summarization, text synthesis, linguistic support,

literature review, and software debugging. In current life, applications such as biometric facial recognition systems on mobile platforms, virtual voice assistants, geolocation applications, social network algorithms, and behavioral analysis-based email suggestion systems are frequently encountered. Particularly in the context of brainstorming (collective thinking), entertainment, and information acquisition, AI offers unique capabilities and advantages that set it apart from other online platforms.

AI tools can also be used effectively in teaching and learning. For instance, AI tools are able to enhance instruction quality by improving personalized learning, e-learning systems, and learning analytics within teaching and learning processes (Yiğit, 2025). These systems, which can be tailored to students' individual needs, support teachers' pedagogical decision-making and improve learning outcomes. Furthermore, by acting as a source of inspiration for school assignments and encouraging the emergence of new ideas, AI has become an innovative tool that supports creative learning processes for both teachers and students. AI-powered applications stand out as innovative platforms that personalize learning processes and deepen user interaction. While Microsoft's CoPilot application aims not only to provide support but also to become an active part of the process, platforms like Google Calendar, Khan Academy, and Duolingo dynamically guide learning through AI-based systems. At the application level, Google's Notebook LM platform is an AI tool that provides teachers with convenience in content creation, text editing, and presentation voice-over. Such systems help save time and energy for teachers during material development, thereby supporting innovative instructional practices.

The interactive process inherent in the use of artificial intelligence clearly demonstrates the transformative power of human-machine interaction in learning technologies, as human input feeds into and ensures the continuous development of AI systems. This dynamic necessitates that issues such as data security, ethical awareness, and digital privacy become priorities in educational settings. The use of AI systems in legal, medical, and scientific decision-making processes requires the utmost attention and strict adherence to ethical protocols. Furthermore, it must be acknowledged that potential data security and privacy breaches may occur when users' personal data is input into AI systems. Concurrently, applications such as recommendation systems, which operate in the background using AI, can be viewed as structures potentially susceptible to societal steering or manipulation. Moreover, user interactions, such as reCAPTCHA verification processes (the "I am not a robot" confirmation or visual selections), serve as an unwitting data source for training the system's fundamental models. This phenomenon is a critical part of the data collection methodologies underpinning AI, and necessitates a comprehensive evaluation of digital security. Another critical situation -AI hallucination- refers to the generation of non-existent information or sources by AI, thereby increasing the risk of misinformation. While eliminating these errors is technically unfeasible, this risk can be mitigated through

Prompt engineering, refers to the process of enabling large language models to perform more effectively in specific and customized tasks. This process involves analyzing errors in model outputs, identifying missing or misleading elements in existing prompts, and systematically examining the model's decision-making mechanisms in order to communicate tasks in a clear, coherent, and accurate manner (Ye et al., 2023).

practical *prompt engineering*, in short, by asking the right questions. Framing questions not merely as single sentences but in a manner that incorporates different variables ensures the acquisition of more accurate information.

Any activity conducted in digital environments is considered a digital footprint, reflecting users' online behavior. In the near future, it is plausible that individuals may be required to present not only judicial records but also digital record entries. However, the legal frameworks governing how artificial intelligence tools collect and store data remain unclear. Therefore, users' responsibility to protect their personal data, act consciously in their sharing, and observe ethical boundaries is critically essential. AI technologies should be used not out of fear or anxiety, but with conscious, measured awareness, and teachers should evaluate these tools as supplementary aids that facilitate instructional processes and enhance efficiency.

These developments confront individuals with a new concept termed literacy in the age of artificial intelligence. AI literacy requires individuals to understand these technologies, know how they operate, recognize their potentials and risks, and utilize them with a conscious, critical approach. Therefore, the core stages are those: learning *with* AI, learning from AI, and learning how AI works. In this context, AI literacy is a fundamental competency of the era, centered on the teacher, which ensures that individuals are trained not merely as users of technology but as individuals who question, criticize, and produce within ethical boundaries. The OECD's AI Literacy Framework emphasizes that AI awareness should be integrated into curricula from an early age. Consisting of four dimensions (Design, Interaction, Production, and Governance), this framework addresses AI literacy not just as a single subject but as an integral component of lifelong learning.

The importance of using AI cautiously and responsibly increases due to the potential emergence of a digital record system, similar to a criminal record, in the near future.

In terms of teacher training policies, several key reports illuminate the analysis of the current situation and the determination of future strategies. These include the **Education Monitoring Reports** published by The Research Center for Education Policy (EPAM), Türk Eğitim Derneği (The Turkish Education Association (TEDMEM)) Education Evaluation Reports, Eğitim Reformu Girişimi (the Education Reform Initiative (ERG)) Education Monitoring Reports, and the OECD's Education at a Glance studies. Furthermore, documents such as the European Union's Digital Education Action Plan and the World Economic Forum's Future of Jobs Report are instrumental in guiding the preparation of both teachers and students for the professions of the future. Parallel to this, systems like Public Education Centers Information Network (HEMBA), which offer digital literacy packages accessible to all users in Türkiye along with open digital platforms developed by the Ministry of National Education (MoNE), contribute to enhancing teachers' digital literacy skills and fostering sustainable learning habits in this domain (MoNE, 2023c).

As educators strive to raise the successful adults of tomorrow, relying on the educational systems of the past is demonstrably

Table 9. AI Competency Framework for Students: Preparing for Responsible and Creative Citizenship in the AI Era

Human-Centred Mindset	Ethics of AI	AI System Design	Techniques & Applications
I recognize that AI is created by people and affects human lives.	I know AI can raise issues of fairness, bias, and rights.	I can define a problem for AI and know what it takes to build a useful system.	I understand how AI uses data and algorithms.
I take responsibility for how I use AI and who it impacts.	I make sure I use AI safely, ethically, and fairly.	I can plan, design, and build simple AI systems that reflect ethical and technical thinking.	I can build or use AI tools thoughtfully and critically.
I shape the future of AI with empathy, curiosity & social purpose.	I design or evaluate AI to be ethical from the start, including all voices.	I improve and evaluate AI systems based on testing, feedback, and impact on people and society.	I create or improve AI tools with real-world impact and ethical awareness.

Source: Miao & Lao, 2024

inadequate. This perspective should not be viewed as a denigration of the past but rather as a necessity for keeping pace with the speed of transformation. A quote attributed to a former U.S. Secretary of Education highlights this: "We are currently preparing students for jobs that don't yet exist, using technologies that haven't been invented, in order to solve problems we don't even know are problems yet." In particular, the frequently voiced claim in recent years that 'technology will take people's jobs' does not accurately reflect the nature of the digital transformation. Technology does not eliminate professions; instead, it transforms them, elevating those who effectively use it. The same principle applies to the teaching profession: Technology will not replace the teacher; instead, the teacher who consciously uses technology will replace the one who does not. Similarly, statements suggesting that there will soon be no need to learn foreign languages due to the proliferation of AI are unrealistic. Such claims overlook the fact that AI is fundamentally a supportive tool. Language acquisition is not merely a technical skill but also a process of cultural appropriation, and thus remains human-centric. Preserving this principle is vital for preventing potentially serious systemic errors.

Consequently, in the age of artificial intelligence, teachers are required to adapt to the digital transformation, use technology ethically and consciously, and adopt a lifelong learning approach. Educators with digital literacy skills will pioneer the design of innovative learning environments that meet the demands of the current era. This empowers students to be competently guided regarding the risks and opportunities arising from the digital ecosystem. Harnessing the transformative power of technology in education is a fundamental prerequisite for establishing more productive, flexible, and sustainable teaching processes.

Recommendations

- Teachers should be transformed into designers who integrate technology with pedagogical goals and should be supported through continuous professional development programs.
- Teachers and students should be able to understand, use, question, and critically evaluate artificial intelligence tools.
- In the use of artificial intelligence, competencies related to effective prompt writing, information verification, and digital citizenship should be developed, besides awareness of data security and privacy issues.
- Digital teacher competency frameworks developed by the Ministry of National Education and relevant institutions should be regularly followed by all teachers and actively implemented in practice. In this scope, appropriate monitoring and evaluation mechanisms should be put in place.
- In the process of developing and enhancing teachers' digital competencies, alignment with national and international standards should be ensured.
- Teachers' adaptation to digital transformation should be continuously monitored and supported through education policies, strategic documents, and digital advisory systems.
- Teachers should learn to use technology not merely as a tool but as an element that supports learning, and they should guide students accordingly.
- Artificial intelligence tools can be used, particularly to accelerate work processes and increase efficiency. However, given the possibility that AI tools may generate inaccurate and/or misleading information, potential risks related to data security and ethical use should be taken into account, and necessary precautions should be adopted accordingly.

CONCLUSION

The V. Istanbul Education Conference, held with the theme “Vision and Transformation in Teacher Education”, clearly articulated the need to re-examine teacher training processes in line with the accelerating pace of global transformation. The shared emphasis among the speakers was that teaching is a multifaceted profession requiring both a high degree of expertise and a strong commitment to values. Within this framework, the idea was strongly advanced that the teacher is not merely an actor who implements the curriculum, but a curriculum creator capable of harmonizing the possibilities of the digital age with pedagogical awareness, moral maturity, the design of learning environments, and the guidance of students’ intellectual and ethical development. Speakers also underlined that the teacher must not only be an information conveyor but a multidimensional learning leader, who are able to grasp the complex structure of the digital age, sustain a value-based educational philosophy, and guide students’ cognitive and emotional development.

International speakers highlighted that the teacher’s role has become increasingly complex, particularly in our age of intensifying crises. Wars, disasters, post-pandemic social fragility, and widening educational inequalities compel teachers to take on greater responsibility, both academically and emotionally. This necessitates that teacher education processes be supported with content which strengthens emotional resilience, ethical decision-making skills, and the competency to maintain a stable stance under challenging conditions. Furthermore, as digitalization accelerates, teachers are increasingly seen as requiring more profound expertise in data literacy, digital ethics, privacy, and secure technology usage. Prof. Cheryl Craig’s observation that teaching has become a unique but shadowed profession is particularly noteworthy. While teachers forge meaningful relationships that profoundly affect students’ lives, they often lose their professional autonomy due to structural pressures, low social status, excessive standardization, increasing expectations, and rising workloads. The fundamental approach proposed at this juncture is to grant teachers the flexibility to adapt the curriculum to the context, actively involve them in decision-making, and reduce mechanical practices that restrict classroom creativity. The teacher must integrate their own personality, accumulated knowledge, and intuition into the instructional processes.

The high workload and, conversely, the low social prestige and economic compensation of the teaching profession appear to be accelerating attrition globally. When compounded by prolonged uncertainty caused by crises, digital fatigue, and emotional burnout, the problem becomes even more complex. In this regard, Prof. Ling's concept of resilience and the holistic approach that necessitates redesigning the aim of education are particularly striking. This suggests applying a holistic understanding that aims to re-establish the balance among academic achievement and human development, technological progress and social connection, and performance-driven goals and well-being. An approach that reduces teachers to mere instructional technicians must be avoided; instead, professional knowledge must be interwoven with moral virtues. Furthermore, the development of a structured system to support teachers’ continuous professional development is critical to professional satisfaction. An institutional culture focused on trust and valuing teachers must be established to support them throughout their careers; strong professional development opportunities must be offered, and teachers must be made feel valuable. Here, the principles of the 4 Life Model articulated by Prof. Ling -life-long, life-deep, life-wide

and life-wise- can serve a guiding function.

The transformation occurring in teacher education in Türkiye was addressed at the conference through the lens of education faculties and The National Education Academy. The recent structural transformation in teacher education necessitates a re-evaluation of the mission of education faculties. In this context, Prof. Alpaydın's suggestions are momentous: increasing cooperation between the Council of Higher Education (Yükseköğretim Kurumu, YÖK) and the Ministry of National Education (MoNE); developing alternative career pathways for education faculty graduates, considering the potential future contraction in teacher employment to direct them not only towards teaching but also towards the entire educational ecosystem and other sectors; offering programs that enhance the skill diversity of graduates; and utilizing the human resources and infrastructure of education faculties more effectively in areas such as educational policy development, program design improvement, academic research, and pedagogical innovation. Arıcı's observation that The National Education Academies are not an alternative to education faculties, but rather aim to raise teacher quality and enhance implementation capacity through collaboration with education faculties and other relevant stakeholders appears to be consistent with this view. These two assessments are essential for demonstrating the intention and possibility of practical cooperation between education faculties and The National Education Academy.

The need for a data-driven approach in teacher education was another prominent focus of the conference. Prof. Eryaman's suggestions that integrate components of artificial intelligence and big data analytics into all courses and utilize AI-supported big data analysis models to monitor teacher competencies are highly relevant. The observed deficiency in monitoring teacher competencies in Türkiye particularly impedes the healthy support of in-service teachers through professional development, creating a significant burden in terms of effort, time, and cost. Being able to track the process by increasing data sources and data variety, and evaluating this data through AI, presents a significant opportunity in this regard. Linked to this topic, Prof. Seferoğlu drew the audience's attention to techno-pedagogical competencies as a key focus in teacher education. The emphasis is crucial: new-generation pedagogy imposes significant responsibilities on teachers in areas like digital ethics, privacy, data security, online behavior, and digital citizenship; teachers must acquire the skills to understand, use, question, and evaluate AI tools with a critical perspective; and teacher education programs must necessarily address technology not merely as a tool but as an ecosystem that produces values and responsibility.

In conclusion, the conference demonstrated that teacher education must be restructured in a balanced manner among global experiences, national priorities, and the demands of the digital age. A holistic understanding of teaching which centres on teacher autonomy, quality, and well-being; strengthens the theory-practice integration; increases digital and ethical awareness dominated by a value-based and wisdom-focused perspective; and incorporates data-driven and AI-focused monitoring mechanisms that stand out as the common outcome of the suggestions put forth by all speakers. Policies developed with this perspective will bring a new vision to Türkiye's teacher education system and lay the foundation for a sustainable, innovative, and high-quality educational model.

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Speakers

Dr. Ömer Faruk Yelkenci

Ministry of National Education | Deputy Minister

Having graduated from Istanbul University's Department of History, he earned his Master degree in Educational Administration at Yeditepe University and his doctorate at Marmara University. His distinguished career at the Ministry of National Education includes serving as Director General of Private Education Institutions (2014-2016) and Istanbul Provincial Director of National Education (2016-2018). Notably, he led the national strategic transformation of private tutoring centers. After serving as an Advisor to the Rector at Ankara Hacı Bayram Veli University (2018-2022), he was assigned to Deputy Minister of National Education in 2023, and currently maintains this office.

Prof. Eyüp Debik

Yıldız Technical University | Rector

Having graduated from Istanbul Technical University (ITU) with a degree in Environmental Engineering, Prof. Debik completed his Master's and PhD at Yıldız Technical University (YTU). Specializing in water and wastewater treatment, Prof. Debik conducted research as a visiting professor at Iowa State University from 2002 to 2004. He began his academic career at YTU in 2000 and was promoted to the professor in 2015. Throughout his tenure, he has held various administrative roles, including Vice Department Head, Advisor to the Rector, Director of the Vocational School, and Chairman of the Board of Technology Transfer Office at Yıldız Technical University. He has authored numerous national and international projects, publications, and patents. In 2024, he was appointed as the Rector of Yıldız Technical University.

Prof. Cheryl Craig

Texas A&M University | Professor & Houston Endowment Endowed Chair of Urban Education, Department of Teaching, Learning and Culture

She is the Head of the Department of Teaching and Teacher Education within the Department of Teaching, Learning, and Culture at Texas A&M University, where she also holds the Houston Endowment Endowed Chair in Urban Education. She is the Founding Director of the Collaborations for Innovation in Teacher Education (CITE). Her research focuses on the intersection of teaching, teacher education, and curriculum, with a specialized emphasis on narrative inquiry as a research methodology. By collaborating with educators in disadvantaged schools, she examines the profound effects of educational reforms on teacher knowledge, identity, and practice. Prof. Craig serves as the Co-Editor-in-Chief of the Journal of Teacher Education and the Editor-in-Chief of the journal Teachers and Teaching. Since 2019, she has been serving as the President of International Study Association on Teachers and Teaching (ISATT). Being an elected Fellow of the American Educational Research Association (AERA), she is recognized as one of the pre-eminent scholars in the field of teacher education.

Prof. Low Ee Ling

Nanyang Technological University | Dean of the National Institute of Education

Professor of Education (President's Chair) and the Dean of Academic Affairs at the National Institute of Education (NIE), Nanyang Technological University, Singapore. Being a prominent academic leader who has shaped the evolution of teacher education in Singapore, she previously served as the Dean of Teacher Education. Internationally recognized for her expertise, she has served on committees for the OECD Education 2030 and the World Education Forum and has participated as an expert in teacher education reviews across various countries. Professor Low has made significant contributions to Singapore's teacher education policies, including the influential TE21 (Teacher Education for the 21st Century) model. In 2022, she was elected as a Fellow of the International Academy of Education. Her research interests involve applied linguistics, teacher education, and educational change.

Prof. Yusuf Alpaydın

Presidency of the Republic, Board of Education and Training Policies | Board Member, Marmara University, Faculty of Education | Dean

He earned his Bachelor's degree in Guidance and Psychological Counselling and his Master degree in Adult Education from Boğaziçi University. He received his PhD from Istanbul University with a dissertation focused on the relationship between higher education and the labor market. After serving as a school counsellor in institutions affiliated with the Ministry of National Education, he joined the faculty of Educational Administration at Marmara University in 2014. Between 2018 and 2019, he conducted research as a visiting scholar at the University of Oxford. In 2025, he was appointed as a member of the Presidential Education and Instruction Policies Council and as the Dean of the Faculty of Education at Marmara University.

Prof. Ali Fuat Arıcı

MoNE | President of The National Education Academy

He completed his undergraduate studies at Süleyman Demirel University, Burdur Faculty of Education. He earned his Master's degree in 2001 and his PhD in 2005 from Ataturk University, attaining the rank of Associate Professor in 2011 and Professor in 2017. He conducted academic research at Kent State University in 2013 and 2024. He began his career as a teacher, and later served at Dumlupınar University and Yıldız Technical University. Throughout his administrative career, he has held positions such as Head of Department, Director of Vocational School, Director of Graduate School, and Dean of the Faculty of Education. He is the founder and editor of Yıldız Journal of Social Sciences and Turkish Journal of Education. In 2025, he was assigned as the President of the National Academy of Education.

Prof. Mustafa Yunus Eryaman

Çanakkale University, Faculty of Education | Faculty Member

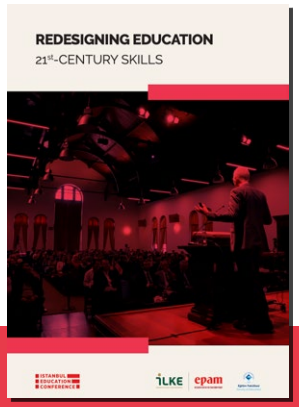
He completed his bachelor degree at Gazi University, followed by a Master's degree at the University of Missouri and a PhD at the University of Illinois. In 2007, he began his academic career as a faculty member at Çanakkale Onsekiz Mart University, where he held various administrative roles, including Head of Department, Vice Dean, Member of the University Senate, and Advisor to the Rector. He has served as a project evaluation expert for the European Commission and held faculty positions at London Metropolitan University and the University of Hamburg. From 2020 to 2022, he served as the President of the World Education Research Association (WERA). He is the editor of International Journal of Progressive Education. Currently, he serves as the Chairman of the Board of the International Association of Educators (INASED), an international educational organization based in Chicago, USA.

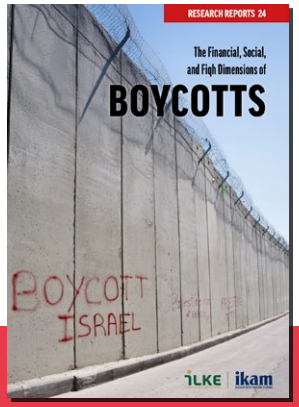
Prof. Süleyman Sadi Seferoğlu

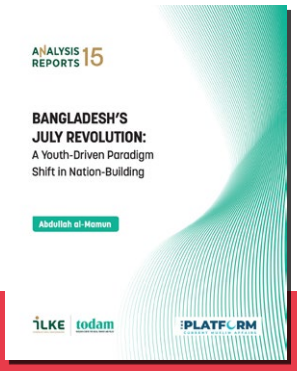
Hacettepe University, Faculty of Education | Faculty Member

He completed his undergraduate studies in the Department of Radio-Television and Educational Sciences at Gazi University. He earned both his Master's and doctoral degrees (PhD) from Columbia University. Following his doctorate, he served as a researcher at the National Center for Restructuring Education, Schools, and Teaching (NCREST) at Columbia University, where he conducted studies on the use of information technologies in education. He is currently a faculty member in the Department of Computer Education and Instructional Technology (CEIT) at Hacettepe University, Faculty of Education. Prof. Seferoğlu has authored numerous national and international books, articles, and conference papers on topics including the use of technology in education, teacher competencies, online and mobile learning, digital security and addiction, technology policies, and teacher education.

Publications







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