CHAPTER 14

RECONSTRUCTING THE TURKISH EDUCATION SYSTEM WITH AN AI-SUPPORTED LIFELONG LEARNING MODEL AND SCHOOLS OF THE FUTURE

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ABSTRACT: This paper presents a comprehensive conceptual model aimed at reforming the Turkish education system by strategically integrating artificial intelligence (AI) into lifelong learning processes. Recognizing the limitations of the current centralized, exam-oriented structure, the proposed framework emphasizes adaptability, inclusivity, and personalization as guiding principles. The model systematically identifies learner profiles by assessing demographic, cognitive, emotional, and socio-economic characteristics, enabling accurate determination of personalized educational needs. AI-driven analytics and guidance mechanisms then recommend adaptive learning pathways that align individual strengths, interests, and aspirations with formal, informal, and non-formal education opportunities. Beyond personalized learning, the model incorporates a lifelong education philosophy in which skill acquisition, competency-based instruction, and dynamic certification replace rigid, time-bound schooling. Competency documentation is embedded in digital portfolios that track progress and validate qualifications regardless of where or when skills are obtained, promoting efficiency, preventing redundancy, and fostering continuous development. Furthermore, the framework envisions transforming traditional schools into future-oriented learning hubs—flexible, technology-rich environments functioning as community-based innovation centers. These redesigned institutions integrate advanced digital infrastructure, AI-guided learning coaches, and interdisciplinary project-based experiences to prepare learners for the complex demands of the 21st century. The paper also

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addresses policy and systemic considerations, including teacher preparation for AI-enhanced contexts, equitable infrastructure development, and the ethical use of AI in education. Ultimately, the model aims to create a robust, future-ready learning ecosystem that advances both individual potential and national socio-economic competitiveness while fostering a culture of continuous, competency-based, and inclusive education.

Keywords: Artificial intelligence in education, Lifelong learning, Competency-based assessment, Personalized learning, Future Schools

1. INTRODUCTION

The rapid development of artificial intelligence (AI) and digital technologies over the last two decades has brought about a profound transformation in nearly every aspect of modern life, and education is no exception. As societies enter the fourth industrial revolution, expectations for learners and educators have shifted dramatically, with an increasing demand for adaptable, personalized, and future-oriented learning experiences. Traditional education systems—largely designed to meet the needs of the industrial age—are now struggling to cope with the dynamic and often unpredictable demands of the 21st century, where knowledge becomes obsolete faster than ever before (Ayeni et al., 2024; Bayly-Castaneda, Ramirez-Montoya, & Morita-Alexander, 2024).

In the case of Türkiye, the education system remains highly centralized, curriculum-heavy, and predominantly exam-driven, relying on a one-size-fits-all approach that leaves limited room for individual learning differences. This rigid structure often fails to recognize and respond to the diverse profiles, strengths, and aspirations of learners. International assessments and reports (UNESCO, 2023; OECD, 2025; European Commission, 2024) have repeatedly emphasized the urgency of moving toward flexible, technology-enhanced frameworks that place the learner at the center of the process.

AI-powered educational tools offer unprecedented opportunities to map learner profiles in detail, diagnose skill gaps, and design personalized pathways that extend across formal, informal, and non-formal learning environments (Saleem, Aziz, Iqbal, & Abbas, 2025; Polat, 2025). Beyond enhancing individual learning outcomes, AI also has the potential to bridge the gap between education and labor market needs by aligning competencies with emerging job requirements (Maity & Deroy, 2024; Laak & Aru, 2024).

However, in many education systems—particularly those with rigid and centrally controlled curricula—there is still a lack of integrated models that connect AI-based personalization directly to national policy and long-term development goals.

Against this backdrop, the present study introduces an AI-supported lifelong learning model specifically designed for Türkiye. The model incorporates personalized learner profiling, dynamic digital portfolios, and unified learning pathways that link formal, informal, and non-formal education into a single, coherent system. By integrating personalized guidance, competency-based learning environments, and inclusive lifelong learning opportunities, this framework aims to ensure that all individuals—regardless of age, location, or socio-economic status—can continuously develop their skills and adapt to the evolving demands of society and the economy.

2. THE NEED FOR RESTRUCTURING THE TURKISH EDUCATION SYSTEM

The need to restructure Türkiye's education system arises from two factors: (1) global changes and their educational impacts, and (2) existing systemic deficiencies.

2.1. Reflections of global change on education systems

The need to restructure Türkiye's education system is shaped not only by its internal structural limitations but also by the sweeping forces of global change that are reshaping education systems worldwide. In the 21st century, no national education framework can remain isolated from the broader shifts in society, economy, and technology. The key driving forces behind this transformation are summarized in Figure 1 and can be broadly categorized into three interconnected domains: (1) changing individual needs, (2) advances in science and technology, and (3) evolving labor market demands.

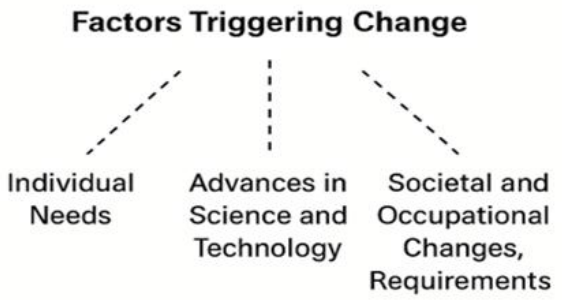

Figure 1. Factors Triggering Change - Created by Authors

First, changing individual needs reflect the growing diversity of learner profiles. Modern societies are increasingly characterized by cultural pluralism, demographic shifts, and varied life trajectories. Learners now seek not only academic knowledge but also competencies that align with their personal aspirations, lifestyles, and career goals. This shift calls for flexible, learner-centered systems that replace one-size-fits-all approaches with individualized pathways, ensuring that education becomes relevant to the learner's lived experiences (Ayeni et al., 2024).

Second, advances in science and technology—particularly in AI, mobile computing, online platforms, and immersive tools—are redefining how people access and process knowledge. Innovations in AI-driven learning analytics, virtual reality (VR), and augmented reality (AR) have blurred the boundaries between formal schooling and independent learning. The COVID-19 pandemic accelerated the normalization of location- and time-independent learning, proving that high-quality education can occur beyond the traditional classroom (Bayly-Castaneda et al., 2024; Saleem et al., 2025; Polat, 2025). These developments demand that education systems adopt adaptive models capable of integrating new tools rapidly.

Third, evolving labor market demands require learners not only to possess technical expertise but also to develop resilience, adaptability, and lifelong learning habits. In a volatile global economy, professions and required skill sets change faster than conventional curricula can be updated. Preparing

learners for a specific job is no longer sufficient; education must cultivate the capacity to continuously learn, unlearn, and relearn (Maity & Deroy, 2024).

Alongside these forces, educational philosophy itself has shifted toward human-centered, meaning-oriented approaches (Laak & Aru, 2024; OECD, 2025). Curriculum design is moving away from rigid centralization toward greater flexibility (UNESCO, 2023), while 21st-century competencies—critical thinking, collaboration, adaptability—are now seen as essential foundations for personal and societal success (Ahn, 2024). Schools increasingly function as learning communities where teachers act as facilitators rather than mere transmitters of information (Van Lehn, 2022). Connectivist approaches emphasize the importance of timely digital access to knowledge (Kop, 2008), and lifelong learning paradigms underscore the need for flexible certification and process-focused assessment (du Plooy, Seng, & Chigona, 2024; Wang et al., 2024).

Contemporary trends such as constructivism, multiple intelligences, active learning, holistic education, multiculturalism, personalized learning, peer learning, and learning contracts all align with the needs of the digital age. Moreover, innovative models—including Montessori, Waldorf, Reggio Emilia, STEM, Understanding by Design (UbD), and AI-supported schools—offer diverse examples of how education can adapt to future challenges (Aljabreen, 2020; Guerrero et al., 2024; Lillard et al., 2025).

In summary, global change exerts constant pressure on education systems to evolve. For Türkiye, aligning with these global trajectories is not optional but essential to ensure competitiveness, equity, and sustainability in the decades ahead.

2.2 Current shortcomings of the Turkish education system

Despite several reform initiatives over the past decades, Türkiye's education system continues to face deep-rooted structural deficiencies that limit its ability to respond effectively to contemporary challenges. These shortcomings have been documented in numerous national and international reports (UNESCO, 2020; OECD, 2022; World Bank, 2023) and can be grouped into several interrelated categories.

2.2.1. Exam-oriented structure

The system relies heavily on high-stakes, centralized examinations, which encourage rote memorization rather than the development of higher-order thinking skills. This approach fosters a culture in which success is narrowly defined by test performance, sidelining creativity, problem-solving, and critical analysis (Aksoy, 2023; Kitchen et al., 2019; OECD, 2022). Students often prepare for years for a single exam that may not reflect their actual competencies or potential, creating stress and reducing intrinsic motivation for learning.

2.2.2. Mismatch with labor market needs

Many of the skills emphasized in the current curricula are misaligned with the requirements of the contemporary labor market. Graduates frequently enter the workforce without the competencies most in demand, such as digital literacy, adaptive thinking, and interdisciplinary problem-solving (OECD, 2017; ILO, 2023). This mismatch contributes to youth unemployment and underemployment, as well as to employers' dissatisfaction with the available talent pool.

2.2.3. Neglect of individual differences

The one-size-fits-all curriculum fails to accommodate diverse learning styles, abilities, and interests. Gifted students are insufficiently challenged, while those needing additional support often fall behind due to the lack of individualized learning plans (Ayanoğlu & Akbaşlı, 2023). As a result, talent potential across the country remains underutilized.

2.2.4. Overloaded curricula

The excessive amount of content, much of which lacks direct relevance to daily life or professional practice, leads to inefficiency and cognitive overload. Teachers are pressured to "cover" the syllabus rather than focus on deep learning and skill development (European Commission, 2025).

2.2.5. Ineffective assessment methods

Current assessment practices prioritize summative, exam-based evaluations over formative, process- and competency-based approaches. This limits opportunities to track individual progress, provide timely feedback, and adjust instruction accordingly (OECD, 2020).

2.2.6. Insufficient 21st-century skills training

Skills such as problem-solving, collaboration, and digital competence are inadequately embedded in the curriculum. While policy documents emphasize their importance, classroom implementation remains inconsistent and often superficial (MoNE, 2023; Özer & Tekin Bozkurt, 2024).

2.2.7. Overcrowded classrooms

Large class sizes, particularly in urban centers, hinder personalized instruction and classroom management. In overcrowded environments, teachers struggle to differentiate instruction, and students receive less individual attention (MoNE, 2022; World Bank, 2023).

2.2.8. Centralized governance

Strong central control over curricula, staffing, and resource allocation reduces school autonomy and innovation capacity. Local needs and community contexts are often overlooked in decision-making (OECD, 2020; Turan & Şişman, 2013).

2.2.9. Teacher quality and professional development issues

While there are many dedicated educators, there remains a shortage of teachers trained in modern pedagogies, digital literacy, and inclusive education. Limited access to ongoing professional development further restricts innovation in the classroom (Darling-Hammond et al., 2020).

2.2.10. Weak counseling and guidance services

Academic and career counseling is underdeveloped, often reduced to administrative functions rather than proactive, individualized guidance. Students make critical education and career choices without sufficient support (Nazlı, 2006; Yeşilyaprak, 2019).

2.2.11. Limited technology integration

Despite widespread recognition of the potential of AI and other digital tools, integration into teaching and learning remains inconsistent. Many schools lack the infrastructure, training, or vision to fully utilize technology for personalized learning (World Bank, 2023).

2.2.12. Educational inequality

Regional and socio-economic disparities persist in access to quality education. Rural areas often face shortages of qualified teachers, inadequate facilities, and fewer extracurricular opportunities, exacerbating the achievement gap (Özdemir, 2016).

3. Proposed model for AI-supported lifelong learning in the Turkish education system

To address the current challenges of the Turkish education system and respond effectively to the demands of the contemporary world, an AI-driven, lifelong learning-oriented model is proposed. The core components and operational structure of this model are presented in Figure 2.

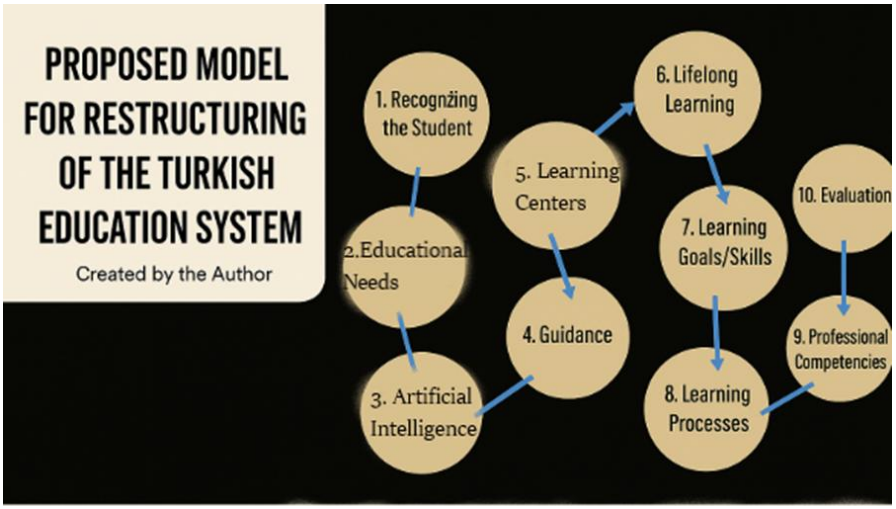

Figure 2. Proposed Model for the Restructuring of the Turkish Education System - Created by Authors

The diagram illustrates how students can be directed to appropriate learning centers based on their interests and needs through artificial intelligence.

The model consists of 10 main components: Student Profiling, Educational Needs, Artificial Intelligence, Guidance, Learning Centers, Lifelong Learning, Learning Objectives/Skills, Learning Processes, Vocational Competencies, and Evaluation.

3.1. Student profiling

Student profiling should be the most fundamental starting point of the educational process (UNESCO, 2020). Just as a hospital does not proceed with treatment before conducting a comprehensive diagnosis—through blood tests, MRIs, ECGs, and genetic screenings—the education system should not direct students without first thoroughly understanding them. Similarly, in education, the process must begin with a holistic understanding of each student.

This profiling involves identifying the individual's demographic, cognitive, emotional, social, and economic characteristics in detail; determining their learning styles, types of intelligence, areas of interest and talent, academic motivation level, and self-efficacy perception (Crouch, 2021).

For this purpose, various measurement tools can be used, such as intelligence tests (IQ), multiple intelligence inventories, personality tests, communication skill scales, problem-solving and critical thinking assessments, stress and life satisfaction scales, and academic achievement profiles. All of this student-related data should be systematically recorded from birth and updated at each educational stage (Yang & Wong, 2024). Similar to how Turkey stores health data in the e-Nabız system, a digital portfolio system should be created for education, preserving all developmental records digitally from preschool to high school graduation, accessible to the next teacher or counselor.

This approach enables holistic tracking of the student's development and allows guidance decisions to be made based on scientific data. Thus, instead of relying on centralized exams, multidimensional diagnostic data provides a solid foundation for directing students toward their interests and abilities. This process prevents individuals from wasting time on unnecessary knowledge and skills, allowing them to receive education aligned with their potential. True guidance services can only be achieved through this comprehensive profiling process.

3.2. Determining educational needs

This approach is supported by numerous findings demonstrating that personalized learning has lasting effects in education. Recognizing the student

is the first and most critical step in the educational process; however, it is not sufficient on its own to unlock an individual's potential. After profiling the student, it is essential to determine the unique educational needs of each individual. This step involves identifying the gap between the person's current characteristics and the desired competencies required by society and their potential profession. (Aurora Institute, 2021; Grant, 2002; (Maity & Deroy, 2024)

Educational needs refer to a systematic process that reveals an individual's strengths and weaknesses and identifies areas for improvement. For example, if a doctor must possess 80 essential competencies and a student currently has only 5 of these, then the remaining 75 must be acquired. Another student may already possess 70 competencies, requiring only the remaining 10 to be completed. This personalized need analysis is based on the fact that every student has different requirements; therefore, the education system should be shaped according to individual needs.

This approach prevents students from being exposed to unnecessary behaviors or knowledge that neither contribute to their future career paths nor have urgent societal relevance. Instead, it envisions a customized educational process tailored to the individual's characteristics, interests, life perspective, and talents. This ensures that the student remains engaged with the education system and develops their potential to the fullest, serving as a key mechanism for effective guidance.

For instance, knowledge and skills in the field of electricity are not equally necessary for everyone. Some students may be directed toward becoming electrical engineers based on strategic national needs; others may become technicians or technologists. Some may only need basic electrical knowledge (e.g., understanding positive and negative wiring, fixing small current issues, replacing fuses) required in daily life. Therefore, exposing everyone to the same level of specialist knowledge leads to wasted time and effort and negatively affects motivation.

In this context, determining educational needs requires a multidimensional structure that considers not only cognitive differences but also talents, motivational factors, professional expectations, and future goals. This increases efficiency at both the individual and societal levels, avoiding

unnecessary repetition and loss of motivation (Asriadi, Hadi, Istiyono, & Retnawati, 2023).

Educational needs are not limited to students within the formal education system; they also encompass the lifelong development needs of all members of society. Activities to improve the quality of life for the elderly, programs to enhance the productivity and professional competence of workers, and skill training to enable unemployed individuals to join the workforce are also part of lifelong educational needs. Thus, the education system transforms into a dynamic structure that contributes not only to academic achievement but also to lifelong learning for individuals.

At this point, digital technologies such as artificial intelligence and learning analytics enable real-time analysis of individual competencies, automatic identification of gaps, and the development of personalized education plans. In restructuring the Turkish education system, the process of determining educational needs should be integrated with AI-supported data analytics, adopting flexible and dynamic models that support individual learning journeys. Figure 3. illustrates the identification of educational needs in a schematic form.

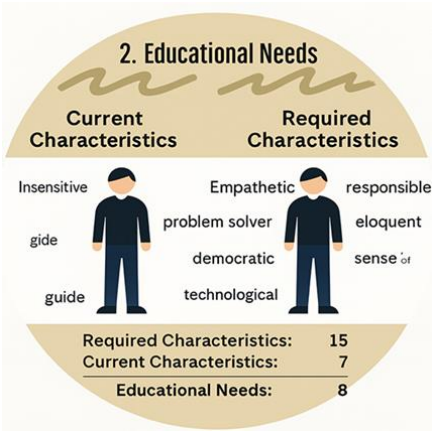

Figure 3. Determining Educational Needs - Created by Authors

This infographic illustrates the holistic structure of learning centers by presenting formal and non-formal educational settings together.

3.3. AI-based education program and avatar application

At the core of the proposed model lies an adaptive, data-driven, AI-based education program. This system functions similarly to a traditional guidance counselor or life coach, yet it offers far more comprehensive guidance through advanced data analytics and natural language processing capabilities. The program gets to know the student; by engaging in natural language conversations, it analyzes their interests, sources of motivation, and learning needs, providing personalized recommendations tailored to individual requirements (UNESCO, 2023).

Large language models such as ChatGPT, Bard, or Bing can be integrated into this structure, transforming it into an adaptive coaching system that supports the student's personalized learning journey. In this way, the system not only assesses the student's current knowledge level but also analyzes cognitive skills, learning pace, emotional responses, and behavioral indicators to deliver a customized learning experience (Gligorea, 2023).

This AI-based system can operate as an application on technological devices such as computers, tablets, smartphones, or smartwatches. If necessary, it can interact with the user through a personalized "avatar," serving as a digital reflection of the individual to personalize the educational process. This avatar can speak in the student's own voice, simulate their behavioral responses, and function as a virtual learning coach

The system continuously records and analyzes all data related to the student's learning process—such as the activities they participate in, their problem-solving approaches, and their preferred learning methods—and dynamically updates itself based on every newly acquired attribute, tracking the individual's developmental profile in real time (Yang & Wong, 2024). In this process, not only academic outputs but also interests and talents, learning motivation, and potential career orientations can be evaluated in a data-driven manner.

Thus, the system identifies the individual's interests, needs, current knowledge and skill levels, competencies, and cognitive profiles, providing the most appropriate guidance based on scientific data. This approach can not only operate on an individual scale but also analyze aggregated data at school,

regional, and national levels, offering data-driven decision support for educational policies (Singh, 2024).

In conclusion, the AI-based education program and avatar application have the potential to scale personalized learning, providing each student with a personal learning coach. This model can offer a flexible and dynamic solution that supports individualized learning paths in the restructuring of the Turkish education system.

3.4. Guidance: AI-supported educational navigation

One of the most significant functions of the AI-based education system is guiding individuals toward personalized learning pathways according to their interests, needs, expectations, and talents. This guidance goes beyond traditional counseling, acting as a data-driven "learning navigation" tool. The system analyzes the individual's educational needs, identifies the most suitable learning centers, digital resources, or expert mentors, and presents the most efficient option to the learner (Kettunen & Sampson, 2019; Sampson et al., 2020; UNESCO, 2023).

This guidance mechanism works like a navigation tool: based on the individual's current position, learning history, goals, and potential, it recommends the closest and most appropriate learning opportunities. For example, a person who has never cooked before may suddenly need to prepare meals after losing their spouse. Through interactions, the AI system detects this need and then suggests the nearest cooking course, providing details about its duration, content, and learning outcomes. Once completed, this skill is recorded in the individual's digital learning profile, and an achievement like "can cook" is added to their e-government learning portfolio.

Similarly, an individual who regularly needs to administer injections to an elderly relative but struggles to visit healthcare facilities can have this need analyzed by the system. It then recommends a nearby short-term healthcare training course. After completing it, the individual gains the skill of "administering injections," which is added to their digital identity. In this way, not only is an individual problem solved, but the societal burden on healthcare services is also reduced.

The guidance system also supports professional development and career planning. For instance, a doctor may discover during AI-assisted consultations that a new aesthetic surgery technique is not yet widely known and that learning it could bring both scientific and economic benefits. The system would direct this doctor to the nearest advanced course and provide the necessary resources for mastering the new technique.

This model can be extended not only to individuals in formal education but also to all segments of society—students, workers, retirees, and homemakers. Existing expert pools such as vocational schools, universities, and lifelong learning centers can be matched with individuals through AI-guided recommendations. The system integrates all available educational resources and experts within a digital ecosystem, enabling rapid responses to individual needs (Bulathwela et al., 2019; Perez-Ortiz et al., 2021; Rojas & Chiappe, 2024).

Moreover, this guidance is not limited to school-based counselors; it can be accessed voluntarily via computers, tablets, smartphones, or smartwatches, even through a personalized avatar. The avatar knows the individual's past learning data, health status, interests, and motivations, and provides guidance suggestions through natural conversations. Whether or not to attend remains entirely the individual's free choice; however, since the recommendations are based on scientific data, participation brings significant short- and long-term benefits.

AI-supported guidance balances individual preferences with societal and professional needs, prevents resource waste, makes lifelong learning processes scalable, and builds a learning culture that reaches all segments of society.

3.5. Learning centers and the digital ecosystem

The current education system puts all students on the same bus, taking them to music, art, math, or physics classes without considering their interests, talents, or needs. This works like a shopping mall model where every individual is directed to the same store: like sending someone who came for minced meat to a men's clothing shop, or someone who came for glasses to a coffee shop. As a result, the majority of students are exposed to information

in subjects they do not need, while only a small minority truly engage in meaningful learning and skill acquisition.

However, learning centers can be transformed into a flexible structure similar to a shopping mall. Just as a person entering a mall chooses stores based on their needs, a person entering a learning center should choose their learning journey based on their interests, needs, and goals. A student who needs music can be directed to guitar, piano, or bağlama courses; a student who needs sports can choose swimming, table tennis, or boxing; a person with a passion for art can be guided to ebru (marbling), painting, or photography courses. This type of guidance increases motivation, enabling learning to happen much faster and more permanently. For example, a learner with genuine interest and need can master English not in 20 years but in 6 months with proper guidance and the right environment.

The structure of learning centers can also be likened to the hospital model. Just as someone visiting a hospital is directed straight to the appropriate doctor, in learning centers, individuals should be directed to the right instructor based on their needs. Moreover, each instructor at the center should only teach their area of expertise: a pianist should only teach piano, a guitarist only guitar, a swimming coach only swimming. Instead of the current school model where "a teacher knows everything," a branch-based specialization model, like stores in a mall, should be adopted.

This model is not entirely new; it is a redesigned version of the existing non-formal education infrastructure. Public education centers, vocational training centers, vocational high schools, and universities already have a vast pool of experts. For example, training in welding, sewing, internet use, health skills, and handicrafts is already provided. An AI-supported guidance system can match these existing resources with individual needs, making them far more efficient and targeted (European Commission, 2015; MoNE, 2023).

Learning centers can serve not only children and young people but all segments of society—students, workers, retirees. For example, a retiree may use the center to learn flower care, a working professional to learn a newly emerging technique in their field, or a parent to take a childcare course. (European Commission, 2015). In this way, lifelong learning becomes as easy and natural as buying what you need from a local store.

This structure should be built on a basic education + optional learning model. Basic education, including preschool, should span 8 years and provide essential competencies that the whole society needs to share (communication, problem-solving, character education, environmental awareness, basic health skills, etc.). High school and above should become optional based on individual interests and talents. Thus, society becomes strong in core shared qualities, while individuals differentiate according to their potential.

Every skill acquired in learning centers is digitally recorded in an e-government-based learning profile. Just like a game character's inventory expands in a video game, individuals enhance their lifelong "equipment." For example, a person who completes a three-day guitar course would have "can play guitar" added to their profile; someone who completes a short healthcare training course would have "can perform basic injections" recorded. These records are unique to the individual, like a fingerprint, and serve as references throughout their professional life.

In conclusion, learning centers and the digital ecosystem create an open, flexible, personalized, and lifelong accessible educational network for all segments of society. Through AI guidance, the right individual is matched with the right expert and the right center, increasing both personal satisfaction and societal productivity.

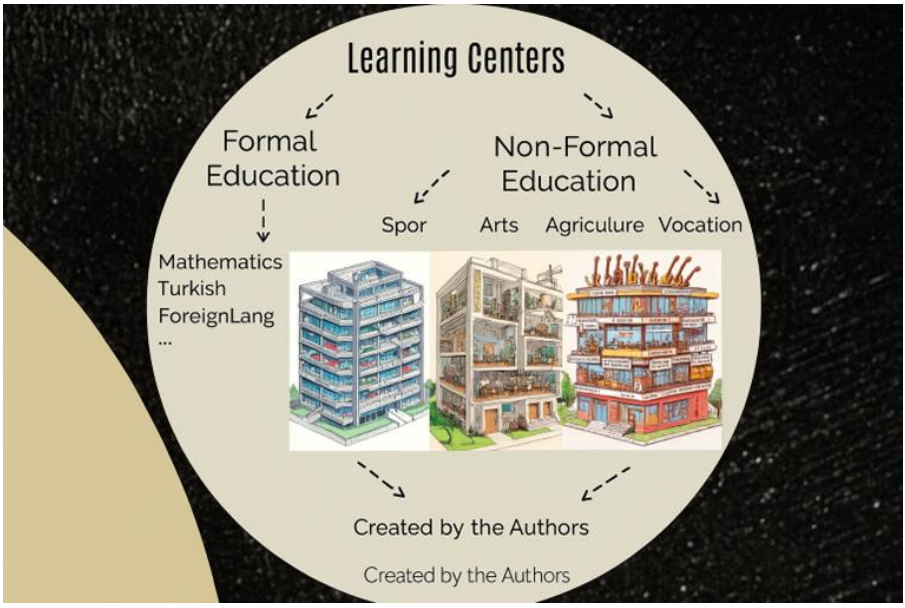

Figure 4. General Structure of Learning Centers- Created by Authors

The figure 4. illustrates a lifelong learning model in which an individual can participate in the learning process from birth to advanced age.

3.6. Lifelong learning system

At the core of the proposed model lies the lifelong learning approach. Education is not designed as an activity confined to childhood and youth but as a continuous process that spans from birth to advanced age (0–80+). In this approach, formal education stages such as preschool, primary, middle, high school, undergraduate, graduate, and doctoral levels are integrated with non-formal education (in-service training, public education centers, vocational courses) and post-service education programs to form a cohesive ecosystem.

The primary goal of this system is to provide strong foundational education for all members of society and then offer a flexible learning network where individuals can develop themselves according to their interests, talents, and needs. For this reason, compulsory education is redefined as eight years of basic education, including preschool. During this process, all individuals acquire essential core competencies necessary for life, such as character

education, communication, problem-solving, creativity, environmental awareness, and basic health skills.

Education beyond high school becomes optional, depending on the individual's interests and career orientation. Thus, instead of being forced into the same mandatory path, individuals can choose a direction that aligns with their potential. This model prevents individuals from graduating high school without any skills due to poor guidance and contributes to reviving critical professions for social production, such as agriculture, animal husbandry, and handicrafts.

The lifelong learning system designs the individual's learning journey as a gradual and needs-oriented developmental chain (Northeastern University, 2020; UNESCO Institute for Lifelong Learning, 2022). For example, someone who wants to gain basic knowledge in electricity can first learn the essential electrical information needed for daily life; later, if they wish to pursue it as a profession, they can advance to levels such as electrical mastery, technician, teaching, engineering, or academic expertise. When guidance is based on the individual's interests, talents, and needs, both productivity increases and personal job satisfaction improves.

This approach begins in early childhood. Preschool and the first years of primary education should be built on an activity-based structure appropriate to the nature of the child. The goal is not only to teach reading and writing technically but also to instill a love for reading, spark curiosity, and foster intrinsic motivation for voluntary learning. In this way, the individual gains an inner motivation to continue learning throughout their life according to their interests.

The lifelong learning system is designed to be accessible not only for students but also for all segments of society—workers, retirees, and homemakers. A retiree can improve their quality of life by attending a flower care or hobby art course; a working professional can learn a new emerging technology or method to advance their career; a parent can gain practical knowledge such as childcare or basic health skills to make daily life easier. Educational needs become as easy and accessible as buying a product from a local store.

This process integrates with learning centers and the digital ecosystem. The AI-supported guidance system analyzes an individual's learning needs, directs them to the most suitable training, and digitally records every new skill gained in the individual's personal learning profile. Just like a video game character's inventory expands, the individual enhances their own lifelong "equipment." For example, a person who completes a three-day guitar course would have "can play guitar" added to their profile, while someone who completes a short healthcare training course would have "can perform basic injections" recorded as a documented competency.

This holistic structure creates a balance that maximizes not only individual happiness but also societal benefit. While the individual discovers their potential, the society's production capacity and welfare level increase. In career choices, it is no longer obligation but interest and talent that determine the path; individuals acquire professions they enjoy, excel at, and that contribute to society (Learning and Work Institute, 2025; OECD, 2021).

In conclusion, through the lifelong learning system, the Turkish education system will move beyond the confines of formal schooling, transforming into a dynamic and sustainable learning ecosystem that responds to the needs of everyone from birth to advanced age. Figure 5 presents the General Structure of the Reconstructed Turkish Education System.

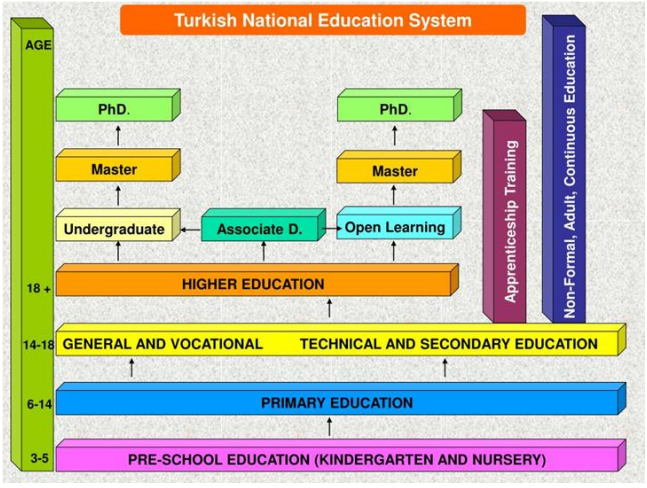

Figure 5. Diagram of the General Structure of the Reconstructed Turkish Education System - Created by Authors

This overall diagram illustrates how the components of basic education, optional learning, and lifelong learning are integrated within the new AI-supported system.

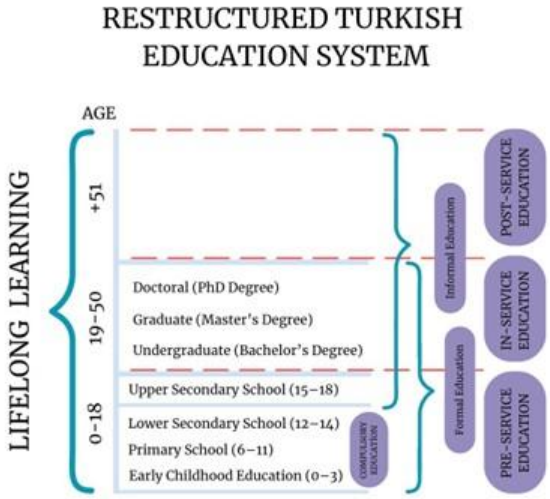

Figure 6. Diagram of the General Structure of the Restructured Turkish Education System (created by authors).

This diagram presents the general framework of the restructured Turkish Education System. It illustrates how formal, informal, and lifelong learning processes are integrated within the AI-orchestrated model through three main domains: pre-service, in-service, and post-service education. Educational stages are organized according to age groups (0–18, 19–50, and 51+), encompassing early childhood, primary, lower secondary, upper secondary, undergraduate, graduate, and doctoral levels. The model aims to ensure continuous participation in learning throughout an individual's lifespan, promoting sustainability and inclusivity across all ages, levels, and learning contexts.

3.7. Learning goals and skills

In the proposed model, educational goals and the skills to be acquired are clearly defined. The aim is to transform the individual from a passive element of a system that merely loads information into an active, productive, and

responsible subject of the learning process. There are three key factors for achieving the objectives.

3.7.1. Focusing on Skills in Basic Education. During the 8 years of compulsory basic education, learning centers should only provide the fundamental skills that all members of society must possess. The curriculum should be simplified by 90%, reducing the information load and focusing on 21st-century competencies (OECD, 2018; UNESCO, 2020; UNESCO, 2023; UNESCO, 2024).These core skills include:

- Learning how to learn and the ability to learn quickly,
- Flexibility to unlearn and replace outdated knowledge,
- Curiosity, perseverance, and emotional intelligence,
- Initiative, ownership, and collaboration,
- Cognitive entrepreneurship and creating jobs rather than seeking them,
- Proficiency in native and foreign languages,
- Critical thinking and problem-solving,
- Scientific, digital, and information literacy,
- Environmental consciousness,
- Creativity and adherence to humanistic values (OECD, 2025; UNESCO, 2020).

These foundational skills form a lifelong infrastructure that supports individual well-being and social productivity. Basic education thus ensures a strong character base and effective communication and reasoning skills for all individuals (Romero, 2023).

3.7.2. Integration of Formal, Informal, and Non-Formal Education. Achieving learning goals necessitates the integration of formal (structured), informal (everyday), and non-formal (community-based) education. The AI-supported program analyzes each individual's interests, cognitive traits, readiness, and learning needs to direct them to appropriate learning centers (OECD, 2018; UNESCO, 2022).

In this system, learners are no longer passive recipients but designers of their learning journey. A child can be directed to music training; a retiree may cultivate flowers; a professional might acquire new technical skills — all driven by personal motivation and choice.This approach detaches education from rigid classroom boundaries and redefines it as a continuous, accessible, and personalized process (Bayly-Castaneda, Ramirez-Montoya, & Morita-Alexander, 2024).

3.7.3. Abolishment of Exams and Competency-Based Certification. The model proposes eliminating central exams like LGS and YGS. Instead, high schools and universities can admit learners based on documented competencies, not memorized exam results. What matters is whether individuals possess all modules or skillsets required for a profession, regardless of where or when they acquired them.

This enables earlier entry into the workforce or vocational specialization. Removing mandatory high school enables productivity at a younger age and supports value generation across society.

The competency-based certification system is integrated into the learner's digital profile. The AI-supported infrastructure records all acquired skills in an e-government-based system, allowing individuals to build a unique learning fingerprint over time (OECD, 2021; UNESCO, 2021).

In conclusion, this model restructures learning goals to emphasize lifelong competencies over rote content. By integrating all forms of education, removing outdated exams, and focusing on skill-based guidance, the system becomes inclusive, dynamic, and future-ready.

3.8. Learning processes

In the process of basic education and the teaching of core skills to individuals, learning processes must be transformed into a skill-oriented, flexible, and technologically supported structure. Learning should no longer be a process in which the individual is merely exposed to information; instead, it should be based on active participation, collaboration, personalization, and experiential learning (Dede & Richards, 2020; OECD, 2018; Romero, 2023; UNESCO, 2023). Within this framework, the proposed learning processes prioritize the following principles:

- Skill Orientation: Learning should focus on developing skills that individuals will use in real life rather than rote memorization. For example, 21st-century skills such as problem-solving, communication, critical thinking, entrepreneurship, and environmental awareness should be at the center of learning processes.
- Digitalization and Next-Generation Technologies: Learning environments should be enriched with digital tools. Augmented reality (AR), virtual reality (VR), AI-based learning coaches, and simulations should provide real-life experiences to learners. For example, laboratory experiments in science lessons can be conducted in VR environments; virtual tours of the past can be used in history lessons.
- Active Learning and Collaboration: Students should not only be passive listeners but active participants who research, discuss, and produce. Group projects, problem-based learning, and experiential learning processes support both social and cognitive development.
- Personalization: Every individual has different learning styles, paces, interests, and abilities. With the help of digital learning platforms and AI-supported analyses, personalized learning paths can be designed. For instance, a student struggling with mathematics can be offered alternative support modules, while another advanced student can explore enriched content.
- Environmental and Nature Awareness: Learning processes should not only focus on the individual's cognitive development but also on strengthening their relationship with nature, society, and the environment. Learning activities intertwined with nature should be designed to foster ecological sensitivity and social responsibility.

In this model, the role of the teacher changes radically. The teacher is no longer a figure who directly transmits knowledge but a guide and facilitator who teaches students how to learn, helps them access learning resources, and supports the learning process. The teacher's most fundamental task is to equip individuals with the ability to learn how to learn and to make their learning journey sustainable.

Together with AI-supported learning coaches, the teacher can analyze the learner's data, identify missing skills, and provide guidance to address these gaps. In this way, learning processes become both personalized and collaborative, encouraging cooperation in group learning environments (Cukurova, 2024; Li, Zheng, Chen, Huang, & Zhang, 2023).

This holistic approach makes learning more effective, lasting, and directly related to real life. Learning processes are not limited to the school period; they lay the foundation for a lifelong habit of continuous learning.

3.9. Professional competencies

At the core of the proposed model lies the principle of guiding each individual toward a profession that aligns with their interests, talents, and abilities. The education system aims not merely to prepare individuals to have "any job," but to enable them to acquire all the competencies necessary to perform their profession productively and with passion, almost as if it were a hobby.

Working in a profession that matches one's potential is critically important for both personal happiness and societal productivity. A profession should not only be a source of income but also a means for self-fulfillment and contributing to society. To achieve this, an individual's character, interests, and talents should be accurately analyzed, and appropriate learning modules and skill sets should be offered (OECD, 2025; Robinson & Aronica, 2013).

Since the 1990s, as part of the European Union harmonization process aimed at supporting free movement, all professions in Türkiye have been defined, and their standards have been documented within Professional Qualification Frameworks. These frameworks clearly specify the knowledge, skills, and competencies required for each profession (CEDEFOP, 2020; Mesleki Yeterlilik Kurumu, 2015).

In this model, whether individuals are interested in professional, semi-professional, or non-professional (hobby-level) occupations, they can acquire the necessary competencies for any profession through learning centers. For example, there are established standard qualifications for professions such as:

industrial advertiser, metal cutter, woven fabric designer, x-ray supervisor, Fragrance specialist, art director.

The modules required for these professions are suggested by the AI-supported guidance system based on the individual's profile. This way, individuals discover their potential while also identifying and completing any missing competencies necessary for their chosen profession.

This system not only helps working individuals advance their careers but also enables retirees to gain new hobbies, homemakers to acquire practical skills, and young people to gain competencies early and enter the workforce sooner. For example, a retiree may pursue flower design or ceramic art; a working professional may learn new techniques to advance their career; a young person may develop vocational skills and join the workforce at an earlier age.

Every professional competency an individual acquires is recorded in their digital learning profile, and once all modules required for a profession are completed, it is officially certified. Thus, what matters is not where or when the individual acquired these skills but whether they fully possess the competencies required by the profession. This approach turns vocational guidance and career development into a lifelong process, enabling individuals to sustain a productive, qualified, and socially valuable professional life.

3.10. Assessment

In the proposed model, the assessment process is structured not around rote memorization and traditional exams but rather focused on skills and clearly defined professional competencies. The goal is to understand to what extent individuals have acquired the knowledge, skills, and competencies that they can use in real-life situations.

Three main dimensions stand out in the assessment process:

- Higher-Order Evaluation Skills: It is not only about whether the individual possesses knowledge but also about how they use, interpret, and apply it to new situations. Higher-order cognitive skills such as critical thinking, problem-solving, and creative production are at the core of this process (OECD, 2025; Robinson & Aronica, 2013).

- Performance Assessments: Every skill acquired in learning centers is evaluated through practical performance measurements. For example, if a student has learned to play the guitar, they demonstrate it by performing on stage; if a healthcare worker has learned basic injection skills, they prove their competence by applying it in realistic simulations (Gulikers et al., 2004; OECD, 2020; UNESCO, 2023; UNESCO, 2024).
- Process Evaluation: Learning is not assessed solely based on outcomes; the individual's effort, motivation, collaboration, and rate of progress during the learning process are also analyzed. In this way, how the individual learns and their ability to "learn how to learn" are included in the assessment (Black & Wiliam, 2009; OECD, 2019; UNESCO, 2023).

As a result of all these evaluations, the competencies and qualifications gained are documented and certified digitally. The obtained documents are not just static paper diplomas but dynamic portfolios that showcase all the skills the individual possesses.This portfolio system is linked to the individual's national ID number and securely stored within the e-Government system. Thus, the individual's educational history, work experiences, hobbies, professional competencies, and all lifelong achievements are collected on a single digital platform.With this system:

- Centralized exams such as LGS and YKS will be eliminated,
- Employment processes will be conducted based on individuals' actual competencies and documented skills,
- Diplomas alone will lose their former significance; what will matter are the individual's tangible competencies.

Hence, to demonstrate expertise in a profession or field, individuals will no longer need to go through years of compulsory education. Instead, by completing all required modules and skills for a given profession, they will be able to directly obtain a competency certificate.This approach enables individuals to become productive much faster while simultaneously raising the overall competency level of society (OECD, 2025; UNESCO, 2024).

4. Discussion and policy implications

In the context of educational reform, integrating artificial intelligence (AI) into lifelong learning systems offers both significant opportunities and critical challenges. The findings of this study highlight the necessity of a multi-layered strategy that balances technological innovation with equitable access to learning opportunities (MoNE, 2022; OECD, 2022; Schleicher, 2023). Policy frameworks must explicitly address the digital divide by ensuring universal access to high-quality infrastructure and internet connectivity. Teacher professional development programs should be redesigned to embed AI literacy, equipping educators to guide learners effectively in adaptive and technology-enhanced environments (Aksoy, 2023).

Curricular reforms are central to this transformation. National curricula should be streamlined and reorganized into modular, competency-based pathways that can be dynamically personalized through AI-driven recommendations. This approach reflects global best practices in high-performing education systems, such as Finland's emphasis on teacher autonomy and Singapore's SkillsFuture initiative, where adaptability and flexibility have been shown to increase learner engagement and achievement (European Commission/EACEA/Eurydice, 2025; OECD, 2023). Equally important is the establishment of robust data governance and privacy regulations to protect learner information while enabling data-driven educational improvement.

The proposed model also carries far-reaching legislative and institutional implications. Beyond curricular changes, it calls for amendments to constitutional provisions, national laws, and ministerial regulations to enable effective implementation. This includes making early childhood education compulsory, revising teacher deployment and appointment policies, and redefining the organizational structure of the Ministry of National Education to better support lifelong learning pathways (European Commission, 2015; OECD, 2019). Teacher assignments should align with newly created community-based learning centers—designed similarly to adaptive public hubs—equipped according to local needs and staffed based on subject expertise. Such models are already in practice in countries like Japan, where community schools integrate formal and non-formal learning opportunities for all age groups (UNESCO, 2022).

Another key element is the reorganization of compulsory education. Reducing the duration from the current 12 years to 8 years, while simultaneously expanding flexible re-entry options through both formal and non-formal channels, would create a more responsive and personalized system (UNESCO, 2023; World Bank, 2023). This restructuring should be accompanied by a significant reduction in unnecessary curriculum content and the redesign of lesson schedules to emphasize essential competencies and 21st-century skills. Countries such as Estonia have implemented similar competency-based curricula, resulting in improved problem-solving and digital literacy rates (OECD, 2023).

A critical aspect of this transformation is the strengthening of teacher education and career-long professional learning. Training programs should place greater emphasis on subject specialization, digital pedagogy, and adaptive assessment strategies. Teachers should act as facilitators and mentors, guiding learners through personalized pathways rather than delivering uniform content (Ifenthaler, 2024). Continuous upskilling, supported by AI-powered analytics, can help educators adapt quickly to emerging technologies and evolving learner needs.

From a societal perspective, this model also addresses equity concerns. By ensuring that all learners—regardless of age, location, or socioeconomic background—have access to diverse learning opportunities, it promotes social cohesion and economic resilience (OECD, 2023; UNESCO, 2022). Embedding lifelong learning principles into national policy can help mitigate skill gaps, foster innovation, and support sustainable development goals.

Finally, successful implementation will require strong political commitment, cross-sector collaboration, and transparent governance. Policymakers should establish advisory councils comprising educators, technologists, and community stakeholders to ensure that AI integration remains aligned with ethical, pedagogical, and societal values. Pilot programs, supported by continuous monitoring and independent evaluation, can help identify barriers before nationwide rollout. If executed with transparency, inclusivity, and sustainability, these reforms have the potential to transform the Turkish education system into a future-ready, lifelong learning ecosystem capable of addressing both national priorities and global educational challenges.

5. Conclusion

This study proposes a comprehensive AI-supported lifelong learning model designed to restructure the Turkish education system in alignment with global trends, technological advancements, and the diverse needs of learners. By integrating adaptive learner profiling, flexible learning centers, and competency-based digital assessment, the model addresses critical shortcomings of the current exam-oriented, rigid, and centrally standardized framework (MoNE, 2022; OECD, 2022; UNESCO, 2023).

The proposed approach emphasizes inclusivity, equity, and flexibility, ensuring that every individual—regardless of age, socioeconomic background, or geographic location—can access personalized learning pathways (OECD, 2023; UNESCO, 2022). Through AI-driven guidance, learners are matched with suitable experts, resources, and environments, enabling them to acquire relevant 21st-century competencies more effectively than traditional systems allow.

Furthermore, the model aligns with international best practices observed in high-performing education systems, where adaptability, teacher autonomy, and skill-focused curricula contribute to higher learner engagement and long-term societal benefits (European Commission, 2023; Schleicher, 2023). By embedding these principles into national policy, Türkiye can foster a culture of lifelong learning that strengthens its human capital and enhances global competitiveness.

In conclusion, the successful adoption of this model requires strong political will, cross-sector collaboration, and sustained investment in digital infrastructure. If implemented effectively, it has the potential to transform the education system into a dynamic, learner-centered, and future-proof ecosystem that not only meets but anticipates the challenges and opportunities of the rapidly evolving 21st century.

6. Limitations and future work

While the proposed AI-supported lifelong learning model presents a promising framework for transforming the Turkish education system, several limitations should be acknowledged. First, the model's successful implementation relies heavily on the availability of robust digital

infrastructure, stable internet connectivity, and adequate funding. In regions with limited resources, particularly rural and socioeconomically disadvantaged areas, the absence of these prerequisites may hinder equitable access (OECD, 2023; UNESCO, 2022).

Second, the transition from an exam-oriented, standardized structure to a flexible, competency-based system requires significant changes in teacher education and professional development. Not all educators may possess the digital literacy or adaptive pedagogical skills necessary to operate effectively within AI-enhanced learning environments. Continuous upskilling programs and targeted training initiatives will therefore be essential (Ifenthaler, 2024; European Commission/EACEA/Eurydice, 2025).

A third limitation involves data governance and ethical considerations. The model depends on extensive learner profiling, which raises concerns about data privacy, security, and potential biases in AI algorithms. Comprehensive policy measures, transparent oversight, and alignment with international data protection standards are critical to ensuring trust and safeguarding learner rights (UNESCO, 2023; Holmes et al., 2022).

Future research should focus on pilot implementations in diverse educational contexts to assess feasibility, scalability, and cost-effectiveness. Longitudinal studies examining the long-term impacts on learner outcomes, workforce readiness, and societal equity would provide valuable evidence to refine the model. Comparative analyses with other high-performing education systems can also help adapt the model to local cultural and institutional realities.

In conclusion, while these limitations present notable challenges, they also serve as opportunities for targeted policy interventions and iterative model improvement. Addressing them proactively will enhance the likelihood of successful adoption and sustainable impact.

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