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# L'educació com a futur

ST **M** Col·legi
Sant Miquel
dels Sants

la meva
escola
fa 160 anys!

# MIRADES. L'EDUCACIÓ COM A FUTUR

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# MIRADES. L'EDUCACIÓ COM A FUTUR

Retrospectives, sinceres, optimistes, honestes, compromeses, apassionades, humanes, prudents, creatives, crítiques, ingènues, experimentals, properes, complexes, atrevides, reflexives i vitals. Mirades és un compendi de diverses maneres de veure l'educació des de diferents punts de vista i indrets del món. Mirades que parteixen de la individualitat, però que adquireixen un sentit global quan les posem en comú i les fem dialogar.

En ocasió del 160è aniversari de la seva fundació, el Col·legi Sant Miquel dels Sants recull en aquest llibre un conjunt de mirades sobre educació. Mirades institucionals, mirades de la comunitat i mirades de persones especialitzades en educació que reflexionen sobre el seu futur, cadascú en la seva llengua. És per això que l'hem titulat Mirades, amb l'enriquiment del plural, perquè estem segurs que el futur encara serà més divers. I hi hem afegit en el títol "L'educació com a futur" perquè estem convençuts que l'educació millora el món.

Centrades en l'educació i amb el món com a marc, les mirades d'aquest llibre combinen la perspectiva local amb la internacional. D'aquí que en aquesta publicació hi han col·laborat especialistes d'Universitats i Centres d'Investigació de Catalunya, Galícia, Espanya, Itàlia, Argentina, Dinamarca, Finlàndia, Estats Units i Turquia. A tots ells, i a les seves institucions, els agraïm la seva amable col·laboració, així com ens complau poder-hi reproduir també l'opinió d'alumnat, de famílies, de docents i de persones de la nostra escola sobre el que esperen de l'educació.

Tenim l'esperança i el compromís de fer un món millor. Sabem que l'esperança arrela en la voluntat de cadascun de nosaltres, en la confiança en els altres i en el treball de tots plegats.

## MIRADES (LOOKS) – EDUCATION AS THE FUTURE

Retrospective, sincere, optimistic, honest, committed, passionate, human, cautious, creative, critical, ingenuous, experimental, close, complex, daring, reflexive and vital. Mirades or Looks is a collection of ways of seeing education from different perspectives and places in the world. These are looks or opinions that originate from the individual but which acquire a global sense when we put them all together and they interact.

To celebrate the 160th anniversary of its foundation, Col·legi Sant Miquel dels Sants has put together in this book a collection of opinions on education. These are institutional opinions, opinions from the community and opinions from people who are specialised in education, that reflect on its future, each one in their own language. That's the reason we have called it Mirades, with the richness of the plural, because we are sure that the future will be even more diverse. ´Education as the future` has been added to the title because we are convinced that education makes the world a better place.

Centred on education and the world as a whole, the opinions in this book combine local and international perspectives. Specialists in education from universities and centres of investigation in Catalonia, Galicia, Spain, Italy, Argentina, Denmark, Finland, the United States and Turkey have all collaborated in the creation of this book. To all of them and their respective institutions, we are extremely grateful for their kind-hearted involvement, and are honoured that we can also convey the opinions of students, families, teachers and others connected to the school on what they expect from education.

All this being said, we have hope and the commitment to create a better world. We know this hope is based on the willingness of every one of us, in the confidence we have in others and in hard collective work.

# ÍNDEX

**Technology-Enhanced Learning Environments (TELE)**

# A PARADIGM CHANGE IN TEACHER EDUCATION

**Olgun Sadik**

Middle East Technical University, Turkey

The Industrial Revolution fundamentally altered how we lived and worked, marking a significant turning point in history. As factories and mass production expanded, there was an increasing demand for a more educated and trained workforce. Public education was initially expensive and primarily aimed at preparing a small group of people with the necessary knowledge and skills to work in factories and other industrial settings. During this time, the usage of textbooks and lectures increased, and teachers started utilizing practical teaching methods. Schools became an essential part of life, and the number of educated children was an important measure of the quality of a country's population. However, the focus of education was instruction. It aimed to make the delivery of content simpler and faster for people to obtain the knowledge and information to serve the Industrial Revolution's needs. Teachers and books were the primary sources of information. All the students were expected to learn the same thing at the same time. The education system sorted out the slower students and supported the successful ones. Measurement of progress was based on the achievement of predefined objectives and time rather than learning. Most students were left behind (and still behind).

With the advent of new digital technologies, the 21st century changed the needs and priorities in life. Internet and social media, with the availability of mobile devices, changed how we communicate and how we access and share information. We started talking about artificial intelligence and intelligent systems that can perform many tasks that we do manually. Recent changes in the early 21st century allowed the automation of various tasks, majorly impacting all production industries. Human labor requirements declined, allowing businesses to create more goods and services in less time (Schwab, 2017).

Quines són les tres coses que m'il·lusionen del meu futur?

**Poder viure en una societat sense conflictes socials.**

Zhiqiang. estudiant

These developments require new skills to be ready for the fast changes in this technological revolution. Instead of having conceptual knowledge and being prepared to do repetitive tasks, the new era requires students to produce creative and ethical solutions to complex problems in collaboration with other students. Students must use their potential, study real-life problems in interdisciplinary learning environments, work effectively in teams, develop empathy skills, apply ethical practices, and quickly adapt to changing situations (Benkler, 2019).

These skills required a new system of education that changes the focus from instruction to learning and learning environment design that gives kids a hands-on opportunity to learn about STEAM disciplines (science, technology, engineering, art, and math). To meet this need, various new approaches and environments were designed in the early 2000s. Some examples of new learning environments are FabLabs, Makerspaces, Innovation Labs, and Design Studios. The common feature of these environments is that they allow students to use various technologies and can be defined as *technology-enhanced learning environments* (TELE). They are becoming more popular learning settings widely available in public and private organizations. Public libraries, schools, and non-profit organizations offer spaces for children to gain various skills, including crafting to programming, allowing them to fail, innovate, create, and develop a wide range of 21st-century skills. The aim is project-based, hands-on experimentation and learning. They provide a range of tools (e.g., electronic materials, 3D printers, laser cutters, hand tools, art materials, textiles, and more) for designing new ideas and developing new products while gaining the necessary skills. Technology-enhanced learning environments have the potential to make an impact on what we see as education and how we should prepare our children for the future.

**Theoretical foundations**

The idea of project-based, experiential, active, hands-on learning is not a new approach in education. Not all but some of the leading advocates of this approach can be listed as Jean Piaget, John Dewey, Paulo Freire, and Seymour Papert. Swiss researcher Jean Piaget is renowned for his studies in developmental psychology, cognitive theory, and evolutionary epistemo-

Quines són les tres coses de la meva feina que em satisfan més?

## La relació que s'estableix amb les persones, companys i sobretot amb els nens i nenes.

Irene. docent

logy (Papert, 1999). He respected children's way of knowing and argued that education should be customized to each student's needs and capabilities (Lefa, 2014). Piaget supports that children learn better in a learning environment where they are engaged in the learning process and interact with the environment in a hands-on way (Lefa). American educational reformer and philosopher John Dewey is recognized for his ideas in the field of progressive education (Waks, 2013). Similar to Piaget, Dewey argued that traditional education systems that aimed to meet the industrial Revolution needs failed to meet students' real-life learning needs, focusing too much on rote learning and memorization. Dewey (1963) suggested a "progressive education model" in that students actively participate in their own learning experience, explore the material, and solve problems meaningful in their lives. Brazilian educator and philosopher Paulo Freire is well known for his contributions to critical pedagogy. Freire (1985) defined traditional education as a "banking model of education" and defined a teacher as someone who deposits information into students' minds like a bank account. He critiqued this approach and defended "problem-posing education," where students were encouraged to criticize, question teachers, and challenge assumptions. Papert (1991) is a contemporary theorist and computer scientist who proposed constructionism as a theory for technology-enhanced learning environments. According to constructionism, learning is an embodied process where students actively construct meaning using material rather than receiving information from teachers. Papert believed in making for learning. He proposed that learning can be best achieved when children use computers and other technologies to solve problems through design and development. Papert emphasized the importance of children sharing their projects with other people that they find meaningful.

All these great minds and others (e.g., Reigeluth and Duffy (2014)) emphasized a need for a paradigm change in education. With advancements in technology and the popularity of technology-enhanced learning environments, it would be possible to change how we educate our children. Students can use these learning environments, which often have various hands-on and digital tools and materials, to plan, develop, and build real-life projects. Students who learn best via practical, experiential tasks may find this learning form helpful. Technology-enhanced learning environments have the potential to catalyze a paradigm change in education (Peppler et al., 2016).

Quines són les tres coses que més m'agraden de l'escola?

**M'agrada escriure i dibuixar.**

Marçal.
elpetitmiquel

A paradigm change is a significant change in how something is seen or addressed. A paradigm change in the context of education would entail a fundamental change in how education is approached, such as a move from a conventional method to a more contemporary, student-centered approach. This could entail adjustments to the curriculum, instructional techniques, assessment methods, and more. A paradigm change in education would be a dramatic change in the entire educational system (Reigeluth & Duffy, 2014). The traditional teaching method is no longer adequate to meet students' needs in 21st-century learning environments, necessitating a paradigm change in education. The information and skills kids need to succeed are changing along with the world, which is changing quickly. Memorization and rote learning are prioritized in the traditional educational model, which does not effectively prepare children for the issues they will encounter in their daily life today          (Mayer, 2002). Teaching kids the abilities to be creative, solve problems, and think critically would be the focus of a paradigm change in education.

**An example of a Technology-Enhanced Learning Environment Project in Public Schools**

A technology-enhanced learning environment for innovation is a space that allows children to play and fail. It should be designed to be flexible and adaptable to interdisciplinary learning experiences and should be an integral part of the school culture (Mersand, 2021). As an example of this kind of paradigm-changing catalyst, Turkey's Ministry of National Education (MNE) announced the Design Skills Labs (DSL) project in 2017 as part of the country's 2023 Education Vision plan (MNE, 2018). By the end of 2022, around 9,000 schools had DSLs. DSLs are learning environments where learners can practice their knowledge and skills in various fields as they design, create, and make things, using problem-solving and critical thinking skills with various media (MNE, 2022). DSLs are places where students' experiences are the primary motivator.

Students are expected to apply what they have learned to real-life situations and to practice what they have learned through creative production processes. Science, art, culture, sports, and life skills are all expected to

Quines són les tres coses de la meva feina que em satisfan més?
**Aprendre de l'alumnat a la vegada que ensenyes.**
Héctor, docent

*Figure 1*
A high school's Design and Skill Lab from Ankara, Türkiye (MNE, 2022, p. 24)

be connected in these spaces. DSLs provide learners with the following multiple domains at the elementary and middle school levels (MNE, 2022), including the Wood and Metal Lab, the Drama and Critical Thinking Lab, the STEM Lab, the Visual Arts Studio, the Music Studio, the Sports Areas, the Life Skills Lab, the Software Design Lab, the Nature, and Animal Caring Lab. Similarly, there is only one lab designed for high school students that is more interdisciplinary and holistic, called the Science and Arts Lab, where art and science are connected in one space. The Ministry of National Education funded schools that wanted to create the space and conducted teacher professional development workshops in different domains. In addition, the Ministry created guiding books for teachers, students, and administrators.

Quines són les tres coses que espero de l'educació?

**Fer les persones més grans i amb ganes d'aprendre sempre. Fer-les més fortes, amb criteris clars i valors. Fer-les lliures i poder decidir com ser felices.**

Marta. mare

**Some challenges and importance of teachers in the change**

I was involved in the project and saw it as a catalyst for a paradigm shift in Türkiye's education system. It was uniquely located in public schools and created a movement for student-centered, project-based learning enriched with various technologies. K-12 students worked in DSLs and participated in national technology competitions from these places. However, after more than five years, the project did not make a significant impact at the macro level due to several challenges within the system. One challenge was the national curriculum, which did not allow room for change. In addition, teachers in Türkiye have a significant teaching load of up to 40 hours weekly. These made it so difficult for teachers to find time for project-based activities for their students. Other challenges included administrators and parents who saw success as scores on exams rather than skill development. In the Information Age, education systems need to create new measures of success that emphasize and promote skill development. Moreover, teacher knowledge, skills, and resistance to change significantly hindered the project's impact.

**Change of teacher role and education in 21st Century**

While some educators may be eager to test new ideas and approaches and make the time, others might be more resistant to change. Many teachers will likely need assistance and professional development to be fully ready for such a paradigm change in education. This can include training in cutting-edge teaching techniques, gaining access to materials and resources, and having opportunities to work with other educators and specialists. Whether a paradigm change in education is ultimately successful will depend on how willing teachers are to accept change and how well they are prepared for it. Integrating technology-enhanced learning environments in public schools should start with teacher education. We need to reconsider preservice teacher education. Traditional teacher education programs often include coursework in child development, instructional tactics, and classroom management. However, we need to ensure that future teachers are well-equipped to handle the new demands of the job and provide their students with a high-quality education. To prepare them, technology-enhanced learning environments should be incorporated into the preservice

Quines són les tres coses de la meva feina que em satisfan més?
## L'espontaneïtat dels infants.
Carles. docent

teacher education curriculum. Teacher educators should design activities and develop projects that encourage future teachers to explore the material, develop projects, improve their STEAM skills, and create electronic portfolios demonstrating their skills.

In an effort to create this opportunity for future teachers, I was part of a team of researchers who built a technology-enhanced learning space for teacher education at Inonu University's School of Education in Turkey. The space included eight labs:

1. Computer lab
2. Design lab
3. Electronics and Robotics Lab
4. Virtual Reality Lab
5. Entrepreneurship Lab
6. Woodwork Lab
7. Video and Audio Studio
8. Play, Collaboration, and Socialization Area

Most of these labs were separated by large glass doors that could be moved to create more expansive spaces for interdisciplinary projects. An essential part of the space was the Play and Socialization area, where future teachers could meet their colleagues, play with electronic game consoles, play board games, and socialize with one another. Students from other departments (e.g., engineering, arts and sciences, law) would come to the space and work with future teachers, providing a good opportunity for collaboration between students from different departments.

My colleague and I conducted a research study with in-service teachers to understand their needs in DSLs (Demirata & Sadik, 2021). Our goal was to identify teachers' needs to be successful in technology-enhanced learning environments and inform teacher education programs to prepare future teachers. In-service teachers shared the following primary needs:

1. a certain level of English language proficiency,
2. experience in STEM fields,
3. technical knowledge and skills,

Quines són les tres coses que m'il·lusionen del meu futur?
**No renunciar a la creativitat com a característica humana davant de la irrupció de les noves tecnologies.**
Uma, estudiant

4. making data-driven decisions to assess students' development in technology-enhanced learning environments,
5. working collectively and receiving feedback from colleagues



*Figure 2*: Photos from a technology-enhanced learning space for pre-service teachers

Based on the interview and survey data we collected, to prepare future teachers for technology-enhanced learning environments, we need to make sure that they all have a certain level of proficiency in English to access and understand available resources online and improve their necessary knowledge and skills. Knowledge of STEM areas and technical skills are essential competencies that need to be developed. Future teachers need to be given technology literacy (using the Internet effectively) skills and advanced technical knowledge, including basic computer programming and 3D modeling. Using hand tools and safety in these environments are also crucial for this preparation. Assessment in open-ended projects is another area for improvement. It is essential for future teachers to experience, design, and implement project-based assessment strategies in these spaces.

Quines són les tres coses de la meva feina que em satisfan més?
**Sentir-te jove a l'estar envoltat de jovent.**
Héctor. docent

Finally, collaboration and social skills were critical in technology-enhanced learning environments. Therefore, when we designed the space at Inonu University, we created multiple spaces for pre-service teachers to collaborate, socialize and play.

**Conclusion**

In this brief chapter, I aimed to make a case to promote making in learning through innovation, considering individual needs, encouraging diversity, and allowing children to be active in their learning process and have ownership of their learning. In addition, I wanted to present an example learning environment to foster change. Furthermore, I tried to explain teachers' importance, new roles, and needs in 21st-century learning settings. This approach is not futuristic; it is what education should aim for. I believe our children deserve a better childhood, a childhood that allows them to pursue their interests and makes them happy and healthy.

Quines són les tres coses que m'il·lusionen del meu futur?
**M'il·lusiona viure en una societat més tolerant, en la qual tothom sigui conscient de les seves pròpies limitacions i diferències amb la resta, i això no doni peu a la discriminació, odi cap a l'altre o cap a un mateix.**
Bruna. estudiant

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Quines són les tres coses que espero de l'educació?

## Saber mantenir l'interès per l'estudi de les matèries científiques.

Elisabet. mare

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# Education as the future

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