# Twenty-First-Century Teacher Competencies and Trends in Teacher Training

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Many studies have expressed the central position teachers have in successful education. Teachers' personal and professional characteristics are critical for students' learning, harmonious communication skills, and adaptation to the requirements of the age in which one lives, starting with self-adaptation. With digitalization accelerating and technology having become an important part of daily life these days, significant and rapid changes are experienced on social and global scales. Efforts to improve education systems and transform them with radical reforms in order to healthily respond to technology-centered rapid changes constitute the agendas of many countries from different economic levels. The organization of teacher education is a central issue in efforts to improve and strengthen education systems. Considering the importance education has both in ensuring society's adaptation to the changing conditions and in countries' efforts to reach local strategic goals, many studies are found on teachers' responsibilities and the skills they should have in order to fulfill these responsibilities.

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Expectations about teacher competencies have been important in every period of world history. The proficiency criteria created with different motivations have also been determinant regarding teachers' social status, responsibilities, and areas of authority. Societies' values, priorities, goals, and economic structure have been among the determining factors in perspectives on teachers and what is expected from education in every period of history. However, because digitalization these days has impacted these determinants, the issue of education in general and teachers in particular has to be addressed under new dimensions. Repositioning all individuals and institutions involved in the organization of education to take and reviewing educations' basic concepts and theories have become essential. As an important issue of the period when this study was written, the COVID-19 pandemic has been a period when all studies have analyzed digitalization in the field of education and the new functions education should have. Changes in many areas such as new forms of communication, the transformations in the classroom and the school, the diversity of educational resources, the flexibility of curricula, management styles, learner profiles, and parent profiles have led to discussions on how to develop and update teachers' skills. What makes a good teacher? What makes learning meaningful and relevant? Which learning methods and principles are critical for an employable generation to achieve the economic level wanted by society? What constitutes the main motivation for today's teacher competencies? What knowledge and skills teachers have and should have and in which educational atmosphere will they use their knowledge and skills are fundamental questions. Therefore, teachers can be said to be faced with an unusual proficiency scale, both for the healthy functioning of education and for the ability to manage the skills students are expected to have in the future.

While the new forms of relationships established in the twenty-first century have completely reconstructed education, teachers are also evaluated according to the competency standards formulated as twenty-first-century skills. The Organisation for Economic Co-operation and Development (OECD) views twenty-first-century skills as critical for keeping up with the new forms in the knowledge-based society and ensuring employability in the new economic order (OECD, 2009). Reform studies in education have become inevitable for responding to the new social and economic needs of society.

## Overcoming the Challenges of the Digital Revolution in Education Systems

The way the digital world presents information, particularly with the great impact artificial intelligence (AI) technologies have on all informational processes, has created a new learning environment. This learning environment, which points to a certain spatiality in the current education literature, has gained a new dimension in the digital world. This world represents unlimited, multilingual, multicultural truths defined with different motivations and has created new areas of discussion not only about the learning environment but also on critical issues such as the nature, sources, and truth of knowledge. While online learning processes have been vital for the continuation of education during the COVID-19 process and are an important practice for the future of learning environments, they are also a test process that has revealed new areas of discussion. By containing important clues about the physical conditions of tomorrow's school and classroom, this experience obviously will also be a pioneer in matters such as how to create and present education curricula.

The relationship information technologies establish with education is actually a reflection of the entire society on education. When dealing with education, today's learners prefer the new learning style known as digital learning. Therefore, knowledge management and the ability to problem-solve using computers have become mandatory for today's learners (OECD, 2016). New technologies have students residing in an area constructed with an unlimited variety of learning tools where they keep everything at their fingertips and are able to easily access different cultures, beliefs, and information. Students' ability to easily access unlimited information resources can be both an advantage and a disadvantage. It has the potential to turn into an area where students can increase their desire to learn and facilitate their learning or, when not managed properly, can be an area that exposes them to harmful content and causes them to fail at managing their time. Contrary to expectations, Internet addiction, having become a significant issue for adults, may adversely affect the opportunities of digital learning because, while some studies show families expect the Internet to increase their children's academic success and future job opportunities (Ortiz et al., 2011), other findings show youths to use technology for entertainment rather than school responsibilities (Becker, 2000). Teenagers use the Internet for games, chatting, and social networks; a significant increase in technology use has occurred

among young children as old as 8 (Schleicher, 2019). Among the subjects studied is the effect technology use has on students' imagination and learning skills. In particular, some studies have shown handwriting to be more effective in the development and productivity of the human brain than typing with a keyboard (Beringer, 2009; Bounds, 2010). As a result, the type of technology and its use can be said to determine its effects (Bavelier et al., 2010).

Social media accounts as the entertainment centers of technology are among the new learner profile's areas of difficulty. Spending more time on social media accounts can negatively affect students' social life, health, and academic success. Opposite these disadvantages are also found advantages such as encouraging independent learning, making learning fun, enabling students to plan their life by providing access to education without going to school, preparing students for the future, facilitating and encouraging learning together, and saving time accessing information (Aggarwal, 2000; Bhakta & Dutta, 2016). This process has turned into a challenge for students and made having teachers balance students use of technology inevitable as their primary goal.

The distance between theory and practice is seen to have narrowed in the learning process through new technologies. The theoretical structure of curricula will become open to practical areas by taking advantage of technology's opportunities. People and institutions will be able to transfer concepts and theories to the classroom with more accessible evidence beyond books and other written sources. Abstract topics that are difficult to grasp will become easier to understand and learning will become more enjoyable. Both national and international sharing will become possible. As new learning styles for students, these changes will also become sources of new teaching styles for teachers. These changes require teachers to be more prepared and more versatile than ever and will force them to plan their lessons on a national and international scale by collaborating more with students and colleagues in the learning-teaching process.

Social media is a powerful communication tool of the digital world and has significantly changes society in many ways. In particular, changes in language, culture, values, and lifestyle are areas of change that can be observed with the naked eye. Profiles with multiple followers, known as influencers in social media, can present themselves as role models offering identities, fashions, and lifestyles for young people and even adults (Alpaydın, 2018). For this reason, having representations of information, people, ideas, values, and facts on social media that the education

system wants to place in the world of students for raising awareness has become inevitable (Alpaydın, 2018). Teachers will need support in order to attract the attention of their students who listen to fun, lively, and colorful speakers through social media channels and to produce materials in a style and content appropriate to the students' jargon (Fullan & Langworthy, 2014).

Saying the knowledge-intensive economy is the main motivation for the education system reforms of the twenty-first century would not be wrong because education is an important investment tool in human capital. When considering the great importance human capital has for a society, the process we are in is one in which we have to meticulously analyze the type of educational understanding in which the future workforce should be trained. The educational policies designed today are critically important for sustainable and strong economic growth. In this respect, the general perspective in Turkey focuses on providing in-demand vocational skills and quality to this vocational training to prepare people for the labor market. Turkey's educational policies are seen to be shaped according to this perspective, and the demands from families develop in this direction (Taşdemir et al., 2019). The workforce of the future being an important determinant in education planning is inevitable. However, robots with artificial intelligence will obviously have a greater place in production in a knowledge-intensive economy. The process we are going through requires preparing for future professions that do not exist yet and also reveals that some existing professions will become useless over time. Taşdemir et al. (2019) stated that people will have difficulty working in the same sector or doing the same job for a long time in a period where creatively destructive processes and sectoral shifts will be experienced much more frequently. Therefore, raising a society with the skills and equipment is essential for ensuring its adaptation to these structural changes. Here, the main responsibility is generally given to education systems, particularly to teachers. Bozgeyikli (2019) stated that teachers should aim to provide their students with the ability to learn any skill quickly and effectively rather than specific professional knowledge.

Based on the studies conducted after individually discussing the basic motivations of twenty-first-century skills (Applied Education Systems [AES], 2019; Partnership for twenty-first-Century Learning [P21], 2015; Trilling & Fadel, 2009; Wagner, 2008), learners' twenty-first-century skills can be listed as follows (Fig. 1).

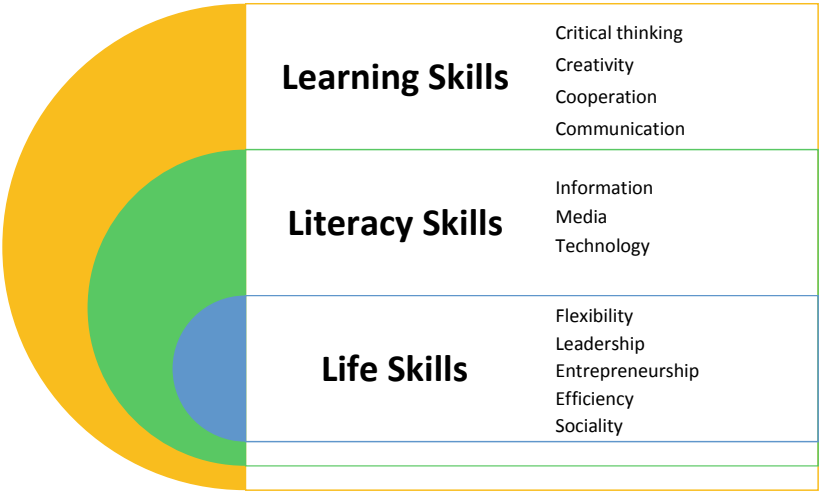


**Fig. 1** Twenty-first-century learner skills

As an opportunity of new technology, easy access to information can cause an information overload for learners who access too much information at once. The need obviously exists for new skills in accessing, evaluating, and organizing information in the digital environment. In order for learners to survive information overload, they must develop the capacity to make correct inferences, strong analyses, and accurate evaluations. Critical thinking skills are essential for this, allowing one to be able to evaluate issues from different perspectives and gain interdisciplinary learning ability (P21, 2015). While creativity expresses thinking outside the box and being open to innovations (Brookhart, 2010), collaboration means effectively working with others in harmony by creating a common goal and working harmoniously toward that goal (AES, 2019). Communication as a learning skill refers to speaking with others about ideas, solutions, questions, and problems clearly and understandably. Both OECD' 2030 Learning Compass and the Council of Europe's Recommendation CM/REC (2018) highlight learning and higher level thinking, socio-emotional skills, and creativeness. The OECD 2030 Learning Compass identifies these competencies as key to meeting the hardships of a unsteady, uncertain, and complicated world that uses

digital mediums and artificial intelligence (Council of Europe, 2013; OECD, 2018).

Information, media, and technological literacy are critical for students' to be able to distinguish reality from fiction, access correct information, and reach necessary and useful information.

Life skills are important for students' academic development, social life, and personality development and include flexibility in adapting to changing conditions; not making change an obstacle; setting goals, establishing a team in line with these goals, and collaborating with the team; being entrepreneurial in making projects, strategies, and plans on one's own; being efficient in completing work on time; meeting with others around common goals or benefits; and forming networks (AES, 2019).

Schools are central in learners acquiring twenty-first-century skills. Both families and students need school support regarding adapting to change, efficiently and effectively using technology, and preparing for the future because families' technological literacy and ability to receive and organize information may be insufficient. However, the fact that access to technology still requires a certain level of welfare is another limitation. When schools cannot provide sufficient support in this sense, the inequality gap in the society may widen. In general, school and teacher performance will be effective in reducing inequalities and highlighting the advantages of technology use (Gottschalk, 2019).

## Twenty-First-Century Teacher Qualifications

Concepts such as information processing, reasoning, questioning, critical thinking, and problem solving in relation to twenty-first-century skills include some familiar skills that have been at the center of school learning for many years while the basic framework of teacher competencies is determined by the characteristics of qualified teachers and what competencies they need (European Commission, 2013). Changes in social life, economy, and educational environments are compelling motivations for what qualifications teachers should have.

Many studies are found to specifically have tried limiting the competencies twenty-first-century teachers should have (Darling-Hammond, 2006; Landmann, 2013). Importantly, many of these studies have confirmed the point of convergence between teacher education and the needs of schools to often lay in teachers' competences (Day, 2002; Landmann, 2013). The global reality fraught with social and technological changes forces one to

rethink schools' role in the future and which skills twenty-first-century teachers should possess.

The impact of information and communication technologies is remarkable in terms of twenty-first-century skills. When teachers have better problem-solving skills in environments with good technological opportunities, students also have better problem-solving skills and performance in math (OECD, 2019a). The focus has always been on the powerful effects teachers' competencies have on student achievement. The effects from teachers explain 75% of the effect school has on student achievement (Rivkin et al., 2005). Therefore, teachers' effective use of new technology in the classroom will also effect both students' skill development and turn disadvantage into advantage by producing alternatives for students with longer more challenging learning processes.

Being a good learner is among the most basic needs a teacher should have. This is the prerequisite for students' learning, creativeness, and openness to development and change. Having teachers strengthen their teaching practices, monitor innovations in their field, and share these effectively with their students is critical in terms of having students adapt to areas of change such as the above-mentioned changing social life, new student profile, changing educational environment, and new economic order.

Various studies have been carried out globally by institutions and countries' ministries of education on twenty-first-century teacher skills. The European Commission (2005) stated within the framework of European Qualifications in its report "Common European Principles for Teacher Competences and Qualifications" that education and training contribute to the economic and cultural aspects of the information society and therefore should be seen within their social contexts. According to the report, teachers should be able to (Table 1).

The European Commission draws attention to the fact that pre-service training will not be sufficient for teachers to gain the qualifications stated here and that teachers must acquire a professional lifelong learning habit aimed at professional development. In this direction, the European Commission shared the following recommendations with policy makers and practitioners:

**Table 1** "Common European Principles for Teacher Competences and Qualifications" that education and training contribute to the economic and cultural aspects of the information society

| | |
|---|---|
| Work with other people | They work in a profession that must be based on social inclusion values and nurture the potential of every student. They need to be knowledgeable about people's growth and development and show self-confidence while relating to other people. They should be able to work with students as individuals and encourage them in becoming wholly engaged and active constituents of society. They must also be able to work in ways that increase the collective intelligence of students and collaborate with colleagues to improve their own learning and teaching |
| Work with technology | Teachers should be able to manage various types of knowledge. Their training and vocational development should qualify them for accessing, analyzing, verifying, reflecting on, and communicating information as well as for using technology effectively where appropriate. Their pedagogical skills should allow them to create and manage learning environments and maintain the intellectual freedom of choice in the education process. Their confidence in applying information and communication technologies (ICT) should enable them to incorporate it efficaciously into learning and teaching. They need to be able to mentor and assist students in networks where knowledge can be discovered and created. They should have a good understanding of subject knowledge and view learning as a lifelong journey. Their practical and academic skills should also enable them to understand from their own experience and match a large variety of teaching and learning strategies with students' necessities |
| Work with society | Teachers should facilitate the integration of students into the communities in which they live and encourage students to take responsibility globally as EU citizens. Teachers should encourage them to respect different cultures, be open to cooperation, and observing common values. For this, it is important for teachers to understand the reasons for social adaptation and exclusion. Teachers are expected to have a strong collaborative tendency in order for social harmony and education with all its elements to work efficiently. Their experience and mastery should also enable them to provide quality assurance systems |

*Source* European Commission (2005)

1. The teacher must be equipped.
    - It is important that teachers have graduated from a higher education institution or equivalent. It is critical that those who become teachers in the field of basic vocational education are qualified and have the necessary teaching skills.
    - To secure their place in the European higher education arena and to increase opportunities for career advancement and mobility within the profession, teacher education programs should be offered in all three cycles of higher education.
    - Practices based on evidence and research should be encouraged for the development of new knowledge about education and training.
2. The teaching profession should be viewed as a process that includes initial teacher education, starting in a job position, and maintaining professional development.
    - Aiming to ensure the continuous development of teachers, subject-based and pedagogical education-oriented activities for lifelong learning should be planned. The content of initial and continuing professional development programs should reflect the importance of interdisciplinary and collaborative approaches to learning.
3. Mobility in the teaching profession should be encouraged.
    - Mobility projects for teachers are an integral part of initial and continuing professional development programs. Mobility should be facilitated and encouraged for all teachers.
    - It is important that initial and continuing professional development programs are supported by European cooperation knowledge and experience so that teachers can respect and value cultural diversity and train their students to be EU citizens and responsible for all humanity.
    - Opportunities to study European languages, including the use of specialist vocabulary, should be available and encouraged during initial teacher education and in continuing professional development programs.

- It should increase trust and transparency in teacher qualifications in order to increase the possibility of mutual recognition and mobility in Europe.

4. Teachers should work in partnership with other stakeholders.

    - Cooperation between institutions where teachers will be employed and higher education institutions that train teachers should be increased. In order for the education process to be carried out effectively and efficiently, the development of innovation networks on a global and local scale should be encouraged.

Teacher competencies indicated in research on measuring and teaching twenty-first-century skills that twenty-first-century teachers should have are shared in four groups:

1. Ways of Thinking

    - Creativity and innovation
    - Critical thinking, problem solving, decision making
    - Learning to learn

2. Working Tools

    - Information literacy
    - Information and communication technologies literacy

3. Ways of Working

    - Contact
    - Collaboration/teamwork

4. Life in the World

    - Local and global citizenship
    - Life and career
    - Personal and social responsibilities

Teachers' thinking skills, relationship with knowledge, problem-solving skills, and innovative attitude are seen as necessary competencies for teachers to be able to develop strategies in accordance with students'

situations and learning environment and for meaningful learning to take place. Since teaching is characterized by ambiguity, teachers need adaptable mastery, such as the capability to adapt their plans and practices to fulfill students' learning requirements (Hatano & Oura, 2003; Vogt & Rogalla, 2009). Using information literacy and information communication technologies correctly within the scope of working tools is important for accessing and organizing information as well as distinguishing the right information and being a producer of information in the unlimited world that information communication technologies provide in accessing information.

Communication skills form an important part of teachers' skill sets, and their being inclined toward cooperation/teamwork is critical for them to be able to perform the requirements of the profession. Strong awareness of the impact the stakeholders in the learning field have on meaningful learning emphasizes the importance of gaining the habit of working collaboratively in proportion to a teacher's communication skills. The ability of the learning atmosphere to offer safe, flexible, innovative, and rich content is closely related to how good a team leader a teacher is. Therefore, having teachers cover all roles by fully understanding and distributing the potential of the whole team starting with themself is important (Caena, 2017).

Having teachers maintain their professional development is very important both for increasing educational performance and effectiveness as well as for increasing teachers' commitment, identity, and job satisfaction. Teachers also need to be able to keep up with scientific, pedagogical, and technological developments in their world; to closely follow the needs of a society in constant change; to seek the best for their world; and to view serving society as a responsibility.

Studies on twenty-first-century teacher competencies (Darling-Hammond & Bransford, 2005; Feiman-Nemser, 2001, 2008; Geijsel et al., 2009; González & Wagenaar, 2005; Hagger & McIntyre, 2006; Hatano & Oura, 2003; Kelly & Grenfell, 2004; Krauss et al., 2008; Mishra & Koehler, 2006; Williamson McDiarmid & Clevenger-Bright, 2008) have shown the main motivation of competencies to be increasing people's employability in the twenty-first-century economic structure. These studies show promoting technology-supported learning in a knowledge-intensive economic structure to be a priority for teachers.

International measurement tools (e.g., Programme for International Student Assessment [PISA], Teaching and Learning International Survey

[TALIS]) and studies such as the Bologna Process and the European Higher Education Area, as well as societies being more demanding about education, encourage policy makers and practitioners all over the world to improve the quality of education. In particular, the establishment of international competence frameworks by institutions such as the European Commission and OECD, and the emphasis on the critical role teachers have in educational success have brought teacher education reforms to the agenda.

## The Effects of Twenty-First-Century Teacher Competencies on Teacher Education

Increasing employability in competitive economic structures that can adapt to the changing world, equipping countries' workforces with global competitiveness, and the foreseen requirements of future professions have forced countries to reform teacher education. The literature on various models of teacher education in different parts of the world provides content on the reforms and policies being pursued in the field of teacher education. Examples of policies are found in the literature such as teacher recruitment, recruitment procedures, and school-university cooperation (Akiba, 2013; Bruno-Jofré & Johnston, 2014; Darling-Hammond & Lieberman, 2012; Darling-Hammond & Rothman, 2015; Livingston & Flores, 2017; O'Donoghue & Whitehead, 2008).

Current debates on education have brought significant changes to the nature of the teaching profession. Technological pedagogical knowledge has also been added to discussions on content knowledge and pedagogical knowledge (Baumert et al., 2010; Shulman, 1987). The framework of technological pedagogical content knowledge (TPCK) argues effective technology integration for teaching specific content or topics to require understanding and negotiating the relationships among technology, pedagogy, and content (American Association of Colleges for Teacher Education, 2010).

The influence of international organizations and publications has been significant in the discussions on updating teacher training. Organizations draw attention to the problems experienced in world education systems through annual reports and also publish policy reports on how to deal with these problems. As one of these institutions, OECD (2019a) proposed an education model in a report on teacher education. The document shared information on the steps and content suggestions for

pre-service and in-service teacher trainings and presented suggestions on the structure and functioning of the institutions. OECD proposed organizing teacher training on two main axes (i.e., pre-service and in-service training processes). The steps of pre-service education consist of initially selecting teacher education, development through initial teacher education, and introduction to teaching. OECD recommended making the profession attractive to candidates when they initially select teaching as an education and choosing the most suitable candidates among those selecting the profession. After the pre-service teacher is included in the process, preparatory programs must be presented in a high-quality manner so as to equip them with the things they need to know and do during the initial teacher education. The third step of the pre-service training is the certification and recruitment of new teachers during the introduction to teaching. OECD emphasized the need for higher education reform to support new teachers in the first years of their profession as one of the two important steps of in-service training. The second important step is professional development.

Today, OECD's teacher education model shares common features with the models drawn up by many countries for teacher education strategy documents and has been adapted to the teacher education systems of Australia, Japan, Netherlands, Korea, Norway, and United States (OECD, 2019b).

Another study (European Commission/EACEA/Eurydice, 2021) showed the current situation of teachers in Europe handled within the framework of twenty-first-century skills. The report focused on teacher preparation, continuing professional development, and analyzing the current situation in Europe.

Requirements such as teachers' content knowledge, pedagogical knowledge, communication skills, information organization, and leadership in line with twenty-first-century teacher skills classifications mean teachers must have a high level of education. In the 2008 Report on Teacher Education in Europe, the European Trade Union Committee for Education (ETUCE) believed today's teachers should receive a master's degree in order to fulfill what is expected of them. After the 1970s in Finland, teachers' having a master's degree was adopted among teacher requirements except for preschool due to the understanding of teachers focusing on research, critical thinking, and scientific skills in teacher employment as a requirement for university-based education; preschool and kindergarten teachers are required to have a bachelor's degree

(Shalberg, 2010). Finnish teacher education is in line with the European Higher Education Area (2009) framework, which has been built under the continuous Bologna Process. Currently, Finnish universities offer a two-cycle degree program. The three-year compulsory undergraduate program is followed by the two-year graduate program. These two degrees are presented in multidisciplinary programs comprising of studies in at least two subjects. Studies are counted by credit units within the framework of the European Credit Transfer and Accumulation System (ECTS), which is used in 46 European countries. ECTS is built on the assumption that 60 credits measure the amount of work of a full-time student during an academic year, and each ECTS credit corresponds to approximately 25–30 study hours. Teacher training standards are 180 ECTS credits for a bachelor's degree, followed by 120 ECTS credits for a master's degree. Successful completion of a master's degree in teaching (including a bachelor's degree) usually follows five to seven-and-a-half years. Finnish teachers with master's degrees are entitled to engage in postgraduate studies to support their professional development. Many teachers make use of the occasion to pursue doctoral studies in education, often while at the same time teaching at school (European Commission, 2013).

A qualified teacher education requires theoretical and practical vocational education in addition to academic subjects. According to TALIS 2018 results, around 70% of all teachers in the EU reported having received training in all three basic elements (subject content, general and subject-related pedagogy, and classroom practice). Nevertheless, this rate was below 60% in Spain, France, and Italy. The new generation of teachers (under 35 years old) seem to benefit more from extensive teacher training in comparison with the general teacher population. In the EU, 75% of young teachers have completed formal education or training including all three basic elements (European Commission/EACEA/Eurydice, 2021). The teaching practice has been recognized as an integral part of the teacher education curriculum for preparing teachers based on the major reform initiatives to strengthen teacher education in China. The plan is to have pre-service teachers practice teaching for at least 18 weeks (equivalent to one semester) under the supervision of teachers selected for their strong understanding of duty and rich experience. Turkey has always given importance to practical experience in teacher education. In

Turkey, teacher candidates can go to schools as interns, make observations, and teach under the supervision of an experienced teacher for the sake of school experience, usually from 2nd grade onward.

Pre-service teacher education has similar characteristics around the world. Pre-service teachers learn the relevant discipline and follow courses in educational sciences and vocational education (Robinson & Mogliacci, 2019). The impact twenty-first-century skills have on teacher education can be traced in general terms through a country's policies. In particular, information and communication technologies are central in almost all countries. Policy makers and teachers are aware that education systems cannot keep up with or cope with the changes brought about by the digital revolution.

Strengthening teachers' digital skills through in-service training is available in almost every country's education strategy documents. TALIS 2018 revealed 93% of secondary-school teachers in EU countries to have participated in at least one type of professional development activity in the 12 months preceding the survey. Before COVID-19, teachers often followed a course/seminar in person, read professional literature, or attended an educational conference (European Commission/EACEA/Eurydice, 2021). When examining the three proficiency areas of the general teaching profession prepared by Turkey's Ministry of National Education (MoNE), they can be said to be largely compatible with international standards. Although no direct expression of competence for digital skills is found, MoNE has conducted an interdisciplinary project for teachers of mathematics, science, physics, chemistry, biology, Turkish, social sciences, and geography courses in the 2023 Education Vision Document that was shared with the public in October 2018. This document stated that face-to-face workshop training will be given in areas such as 3D design and smart devices (MoNE, 2018a). Developing content for improving digital skills and providing teacher training to increase teachers' digital skills are among the 2023 Education Vision targets. MoNE aims to use digital materials as the main teaching material, to associate digital materials with printed materials, and to provide support materials to teachers regarding their effective use. According to the 2023 Education Vision Document, leading teachers to develop digital learning materials will be supported and encouraged (MoNE, 2018a). The development of teachers' language and technology skills are found among the common goals of the last five years in MoNE's (2018b) in-service training programs. China pursues policies that rotate teachers

between urban and rural schools to overcome problems of quality disparities in teaching power. In order to ensure the quality of teaching, the practice of assigning assistant teacher educators at schools was designed (Li et al., 2019). China plans financial incentives to encourage the teaching profession, especially for rural people to be able to access quality education. In China, the state tries to correct the imbalance by taking measures to improve the quality of teachers in rural areas. The most striking of the large-scale in-service teacher training projects China has initiated is the National Education Project for Secondary and Primary School Teachers implemented in 2010 with significant funding from the central government. Two sub-projects were carried out within the scope of the project: one for training reform and innovation examples and the other for producing teachers equipped for rural schools. In total, 18 institutions and educational institutions have signed contracts to offer training courses ranging from 10 to 15 days for 27,000 school teachers in different status such as branch teachers and classroom supervisors. New Zealand organizes in-service programs focusing on core competencies in teacher education (European Commission, 2013).

Mobility is recognized as an important requirement in teacher training. According to a report from the European commission (European Commission/EACEA/Eurydice, 2021):

- In 2018, a minority of teachers (40.9%) in the EU went abroad at least one time in the course of their career, either as students, as teachers, or both.
- From 2013 to 2018, more teachers were able to experience transnational mobility. According to the available data, teacher mobility between European countries/regions increased by 16%.
- Compared to Reading, Social Studies, Science, and Mathematics teachers, foreign language teachers are the most active. However, approximately 30% of the foreign language teachers who participated in the survey have never gone abroad for professional purposes.
- Being mobile during study years is related to being mobile later on as a teacher. In all European countries included in the analysis, it was observed that teachers who were active during their initial teacher education tended to remain mobile later on.
- EU programs are an important source of funding for teachers' transnational mobility.

- Few countries, such as Western and Northern European countries, are able to implement national funding programs that support teachers to spend time abroad for professional development. It has been observed that participation in transnational mobility is higher in countries that organize programs that encourage teachers to go abroad for their professional development.
- Although there is a consensus that transnational mobility contributes to teachers' development of various competences and therefore should be encouraged, only a small proportion of teachers in Europe have gone abroad for professional purposes. In 2018, only 40.9% of teachers in the EU were mobilized at least once as a student, teacher, or as both student and teacher. In the Northern and Baltic countries of Czechia, Cyprus, Spain, the Netherlands, and Slovenia, teacher mobility is above the EU level. From 2013 to 2018, teacher transnational mobility increased in all 17 European countries for which data were available.

Within the scope of measures to increase teacher qualifications, the European Commission (2013) report mentions the filter system among the policies implemented by countries to increase teacher qualifications:

- Teacher candidates are subjected to national exams in countries such as Croatia and Slovenia.
- Interviews happen in Malta; orientation and/or consultancy practices occur in Austria.
- In the Netherlands, selective national accreditation processes ensure the competence and quality of new teachers.
- Belgium has two competence frameworks in teacher education: one for careers for experienced teachers and one for core competences for beginners. The main purpose of these qualifications frameworks is to provide a guide for professional development, improve quality, create a common language, and promote teachers' awareness of their responsibilities and professional self-development.
- In a teacher qualifications study in Turkey (MoNE, 2017), field knowledge and field education competencies were added to the general competencies instead of specifying a separate field competency for each teaching field, thus creating a single holistic text that includes the competencies for each teacher in their field. The general

competencies of the teaching profession were updated in this context and consist of three interrelated and complementary competency areas: professional knowledge, professional skills, and attitudes and values. These three areas cover 11 competencies and 64 indicators related to these competencies. Turkey has attempted many different applications in teacher education and has started implementing the interview system in the recruitment processes alongside the national selection exam. In the process of starting the job, candidates perform teaching practices.

– Teacher competencies in China are determined by 61 indicators listed under three dimensions: teacher ethics, content knowledge, and professional competence (Lo et al., 2013, p. 246).

Finland has two stages in the process of choosing a primary school teacher. In the first place, a group of nominees is selected according to the results of the proficiency test, the high school diploma awarded by the school, and the record of their extracurricular achievements. Secondly:

1. Nominees take an essay test from the Pedagogy books given to them.
2. Nominees participate in an observed clinical activity that mimics school scenarios where social interaction and communication skills play a role.
3. The best nominees are interviewed and asked to explain why they choose to be a teacher. These highly talented nominees complete a thorough teacher education program with sponsorship from the government (Shalberg, 2010). Strategies for collaborative and problem-based learning, reflective practice, and computer-assisted education are common to all Finnish universities.

## Results

This study deals with twenty-first-century teacher education and skills and has shown changes in contacting knowledge has changed teachers' positions and what is expected of them. The rapid access to unlimited information resources as an important benefit of digitalization and the changes in social life have impacted all societies. The people and institutions involved in organizing education have also been significantly affected by this change. Learning environments, schools, classrooms, student profiles, parent profiles, and school management have all been

affected by this change. As such, education systems reforms have focused on adapting technical facilities to education. Important responsibilities have befallen schools, in particular teachers, for adapting learners' profiles to the changing world and their employability in new business structures. In countries like Turkey where families have low access to technology and are limited in its use, schools and teachers should obviously also take on the responsibility for combating this inequality.

Teachers are expected to set time aside both for their own learning as well as for their students' learning by encouraging the effective use of technology with the aim of improving students' individual learning speeds. Not perceiving the relationship between education and technology to be limited to information exchange and acting by paying attention to the importance of safe and beneficial technology uses are among the important responsibilities teachers have in character development.

Having teachers take new learning environments into account is imperative when they organize and prepare their lessons. The new learning environment expresses one that is diverse in many aspects (i.e., multinational, multicultural, multi-component, multifaceted, and nourished by different value judgments) and no longer considers anything with a single function to be remarkable. In such an environment, the teacher should be aware of sharing the role of teaching with the digital world.

Considering teacher education from a realistic perspective is important in order to be able to reach the desired goal regarding teachers' changing position and the skills they should have. When examining the relevant literature, twenty-first-century skills appear as a guide in teacher education in almost all countries. Although saying that clear syllabuses exist in practice is difficult, the strategy documents are seen to have been created with a strong perspective on twenty-first-century skills. Information and communication technologies in particular have been the focus of these studies. The common feature in teacher education reform studies is a focus on any of the processes involving pre-service teaching, starting a job position, or in-service teaching. However, the teacher training system includes all pre-service, recruitment, and in-service processes. Having policy makers and practitioners consider the issue from this perspective is important. Determining qualification standards without a strong implementation should be noted as being meaningless, and having institutions act collaboratively both in determining teachers' skills and in organizing teacher training should be considered essential.

When training a qualified teacher, having teacher educators obtain at least a master's degree or doctorate, have experience in the field, have national and international mobility opportunities, and have positive salaries and work conditions is important. Attention has been drawn to issues such as providing continuous professional development opportunities for teachers who have started their profession, improving work conditions, and ensuring social acceptance of the importance of their profession. However, supporting new teachers in matters such as lightening their curriculum, participating in guidance programs, facilitating their access to necessary support resources, providing the opportunity to systematically link theory and practice, and consulting with their colleagues while providing that their wages are preserved is important. In teacher trainings, having mentors who are qualified and experienced specialist teachers should be encouraged both in pre-service and in in-service training.

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