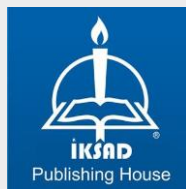


COMPARISON OF EDUCATIONAL SYSTEMS
IN TERMS OF SCIENCE TEACHER TRAINING:

TÜRKİYE AND SLOVENIA

ASLI ŞENSOY

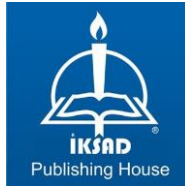


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Dr. Aslı ŞENSOY

DOI: <https://dx.doi.org/10.5281/zenodo.16942752>

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TÜRKİYE TR: +90 342 606 06 75
USA: +1 631 685 0 853
E mail: iksadyayinevi@gmail.com
www.iksadyayinevi.com

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Iksad Publications – 2025©

ISBN: 978-625-378-297-9
Cover Design: Dilek AYDEMİR
August / 2025
Ankara / Türkiye
Size: 16x24cm

Ph.D. Aslı Şensoy, is an academician at Tokat Gaziosmanpaşa University. In her doctoral research, she examined the effects of inquiry-based learning in science education and has conducted studies on teacher education and science teaching. Additionally, she has participated as an instructor and researcher in various national and international projects aimed at improving science education and teacher training processes. During the 2011-2012 academic year, she pursued a one-year master's education at the Faculty of Education at the University of Ljubljana, Slovenia, as part of the Erasmus+ program. In 2022, she returned to the same faculty to teach, gaining firsthand experience with different instructional approaches both as a student and as an academic. This book compares the teacher training systems of Türkiye and Slovenia, analyzing the teacher training systems of both countries and offering recommendations for effective teacher education.

Preface

Teachers' training reflects the country's socio-economic, political, and social circumstances. At the same time, how teachers are trained affects their professional skills, the teaching methods they use, and the learning success of students. Therefore, comparing teacher training systems in different countries provides essential insights into education at national and international levels. Comparative education studies help shape national policies and practices by learning from other education systems. While Slovenia has taken essential steps to comply with the education standards of the European Union, Türkiye has also attempted to comply with global education trends and increase the quality of education. Although Slovenia and Türkiye differ in their geographical locations, cultural structures, and history, both countries are trying to develop their education systems and improve teacher training processes. Comparative examination of teacher training systems will positively improve the teacher training process. Therefore, this study provides a framework for comparing teacher training systems between Türkiye and Slovenia.

For this reason, comparative education is introduced in the *first chapter* to provide a foundational understanding of the subject. This section defines comparative education by examining its key concepts, methodologies, and scope. In addition to offering some definitions, the section delves into a brief history of

comparative education studies, tracing their origins and evolution. The historical context highlights the development of comparative education as an academic field and its growing importance in analyzing educational systems across different countries. Furthermore, the section explores the potential benefits of comparative education to both the literature and the education systems worldwide. By drawing on comparisons between various educational structures, policies, and practices, comparative education can improve the effectiveness of teaching and learning while offering insights into how different systems can learn from one another. This approach enriches academic discourse and provides practical guidance for policymakers and educators seeking to enhance educational quality and equity.

The *second chapter* provides a concise overview of Türkiye, setting the context for understanding the country's education system. The chapter then delves into the Turkish Education System, explaining its structure and operations. This section outlines the various stages of education in Türkiye, from early childhood education to higher education, focusing on how the system functions at each level. It provides insight into the roles of different educational institutions, from primary to secondary schools, and the transitions between them. The chapter also highlights the organization and objectives of the education system before moving on to a discussion of teacher education. Through this explanation, readers can understand how the Turkish Education System is structured and how it prepares individuals before becoming teachers.

Brief information about Slovenia is given in the *third chapter*, providing essential background information to understand the country's context. Following this, the chapter explains the Slovenian Education System in detail. It outlines the general structure and functioning of the education system, describing its various stages, from early childhood education to higher education. The chapter delves into the system's organization, the roles of different educational institutions, and the progression through various educational levels. It also emphasizes how the system operates before students move on to teacher education. It offers readers an understanding of the framework that shapes the path toward becoming a teacher in Slovenia.

The *fourth chapter* focuses on Teacher Training in Türkiye in depth. It examines Türkiye's structural and content-related aspects of the teacher education processes. This chapter analyzes the educational frameworks, curricula, and specific training programs teacher candidates must complete in Türkiye. It discusses the various stages of teacher training, from entry requirements to graduation and employment. It highlights the pedagogical approaches, practical training components, and professional development opportunities available to future educators in Türkiye.

The *fifth chapter* focuses on Teacher Training in Slovenia in depth. It examines Slovenia's structural and content-related aspects of the teacher education processes. This chapter analyzes the educational frameworks, curricula, and specific training programs teacher candidates must complete in Slovenia. It discusses the various stages of teacher training, from entry requirements to graduation and employment. It highlights the pedagogical approaches, practical

training components, and professional development opportunities available to future educators in Slovenia.

In the last part, by offering a comparative perspective, the chapter aims to shed light on the similarities and differences in how teacher education is structured and implemented in these two nations. The *sixth part* examines the process of realizing teacher education in faculties, institutions, and organizations conducting higher education accreditation and quality processes, universities, faculty of education, departments, graduation and employment, and professional development. As a result of the comparison, good practices in the field of teacher education were determined, and suggestions for the future development of teacher education were presented. In this way, the book aims to contribute to developing more effective teacher education programs by providing information for education policymakers, educators, and researchers. In addition, it seeks to improve the overall success of the education systems in both countries by increasing the quality of teacher education.

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ACRONYMS

AGS	Academy Entrance Exam
AYT	Field Proficiency Test
ECTS	European Credit Transfer and Accumulation System
EHEA	European Higher Education Area
ICT	Information and Communication Technology
KPSS	Public Personnel Selection Exam
MEB	Ministry of National Education
NAKVIS	Quality Assurance Agency for Higher Education
NCC	National Curriculum Council
OECD	Organisation for Economic Co-operation and Development
ÖABT	Teaching Field Knowledge Test
PISA	Programme for International Student Assessment
SDGs	Sustainable Development Goals
SPOT	Slovenian Business Point
SQAA	Slovenian Higher Education Quality Assurance Agency
TIMMS	Trends in International Mathematics and Science Study

TYT	Basic Proficiency Test
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children’s Fund
YDT	Foreign Language Test
YKS	Higher Education Institutions Exam
YÖK	The Council of Higher Education
YÖKAK	Turkish Higher Education Quality Council

*“Öğretmenler; yeni nesli, Cumhuriyetin fedakâr
öğretmen ve eğitimcilerini, sizler yetiştireceksiniz ve
yeni nesil, sizin eseriniz olacaktır.”*

Mustafa Kemal Atatürk



CHAPTER 1: COMPARATIVE EDUCATION

Since the beginning of humanity on Earth, the effort to reach, understand, explain, and convey the truth has brought many branches of science into being. Early thinkers such as Thales, Anaximander, and Heraclitus took the first steps towards understanding the basic building blocks of the universe. On the other hand, Aristotle laid the foundations of scientific thought through observation and logic and conducted the first systematic studies in fields such as biology, astronomy, and physics. However, the full development of the scientific method gained momentum after the Middle Ages, with the Renaissance. Copernicus' rejection of the Earth-centered understanding of the universe and his introduction of the sun-centered model, Kepler's planetary movements, Galileo's observation of the movements of Jupiter's moons using the telescope, and other observations in astronomy, Newton's explanation of the laws of gravity, Einstein's theory of relativity are important turning points of the scientific revolution. Although it is stated that coincidental and engaging events, such as an apple falling on Newton's head, were involved in the emergence of the scientific revolution, these revolutions are the result of a rationalist mind and the practical application of scientific processes such as long observations, hypothesis formulation, and trial and error. The strong relationship between rationalism, a philosophical approach in which reasoning and logic are accepted as the primary sources in reaching knowledge, and scientific knowledge is also noteworthy in this context. Although producing scientific knowledge is based on discovering or constructing existing facts through observations and experiments, rationalist thought, and systematic analysis occurs at every stage. Therefore, scientific revolutions are the product of a profound and methodical intellectual effort that cannot be explained by coincidences alone.

Transferring scientific knowledge that emerges from rational reasoning using scientific process skills is as crucial for humanity as acquiring it. Knowledge transfer processes that are important for humanity can be interdisciplinary or interpersonal. The transfer of knowledge between people occurs when a teacher gives information to his students, or an expert provides information to others. Many approaches, methods, and techniques exist for transposing knowledge from a teacher to a student. For example, with an inquiry-based approach, teachers guide their students at various levels and provide an environment for students to access knowledge independently, which is also a type of transposition. This transposition emerges in classes by education systems (Chevallard, 1985).

Education is one of the most essential elements shaping societies' future. Every modern society has a particular system that is responsible for general educational affairs and is accountable to society. (Olivera, 1988). Teachers are central to this process because they have a crucial role in critical areas such as training qualified human resources, maintaining social peace and tranquillity, socializing individuals, and transferring cultural values (Özden, 1999). Teachers are the ones who will train qualified personnel required for the rapidly changing and developing labor market, ensure that information is learned, make them open to learning, and provide them with skills appropriate for their professions. Therefore, the quality of teachers affects many areas, such as development, welfare, economy, education, and technology. Thus, training qualified teachers is a critical issue for a country. So, considering education as such, teachers, philosophers, theologians, politicians, psychologists, sociologists, economists, etc. (Olivera, 1988).

Many branches of educational sciences handle perspectives in many dimensions to transpose scientific knowledge. Comparative education, one of the branches of education science and the theoretical framework of this book, has many definitions (Brickman, 1956). Comparative education is a discipline that examines countries' national education systems and considers political, social, cultural, and economic factors by United Nations Educational, Scientific and Cultural Organization (United Nations Educational, Scientific and Cultural Organization, 1952). Comparative education reveals similar educational problems worldwide but aims not to provide a solution proposal worldwide (King, 1979). Because educational systems should be specific to cultures and societies, comparative education examines the educational systems of different countries and seeks solutions to educational problems (Cramer & Browne, 1965). While conducting this examination, the countries' political, social, cultural, and economic situations are also considered to look at them from a broad perspective (Brickman, 1956; Brown, 1957). Therefore, comparative education is a discipline that examines the educational systems, policies, and practices in different countries and how these systems interact. Comparative education studies are expressed as a method of inquiry and a political solution that encourages possible educational reforms through scientific objectivity (Klerides, 2023). When the definitions in literature are discussed together, it can be understood that comparative education studies generally aim to consider many factors that may affect the education systems in countries, to look at existing situations from different perspectives, to explain how cultural diversity and local needs should be considered in educational design, and to offer solutions for the improvement of education.

The first person to use the term “Comparative Education” was Marc-Antonie Jullien with her work titled “Esquisse et Vues Préliminaires D’un Ouvrage Sur L’Éducation Comparée (Plan/Sketch and Preliminary Views for a Work on Comparative Education),” but since the work was in French, its inclusion in the literature was quite late. (Weidman & Nurshatayeva, 2018). Today, international organizations such as UNESCO, OECD, UNICEF, and Eurydice support the systematic globalization of comparative education studies. Thus, comparative education studies have gained even more importance, considering globalization, digitalization, and rapid changes in education. (Erdem, 2007). Research on the differences in education systems in developed and developing countries, educational inequalities, and innovative educational policy practices is increasing. According to the European Commission (2020) comparative education studies:

- *Developing educational policies* for national education systems by showing how different education policies work and which practices are successful, helping to develop more inclusive education policies,
- *Increasing the quality of education* by examining the successes of different education systems and the factors behind these successes and adapting these successes to one’s own country and culture,
- *Presenting equal opportunities in education* by revealing and analyzing the situation of equal opportunities in education in different economic, social, and cultural factors,
- Trying to understand how education systems are shaped in different cultures and how education is related to social structures and adapting education policies and good practices not only theoretically but also practically to the national level, both in *supporting social and cultural*

understanding and in being able to look from a global perspective, contributes to the literature.

Comparative education serves as a critical framework for understanding the diverse educational systems across the globe, highlighting the interplay between local contexts and broader educational trends. (Bray et al., 2014). Comparative education covers the analysis of different education systems within the country (internal comparisons) and the comparison of education systems between other countries (external comparisons) by identifying similarities and differences between different education systems. In comparative education, surveys, interviews, document analysis, and the results of global scale tests (such as PISA and TIMSS) can also be used (Bray et al., 2014). Thus, comparative education research contributes to innovative educational practices and supports innovation. International education collaborations contribute to increasing international projects and comparative education research. In addition, comparative education research is vital in shaping countries' education policies by examining similarities and differences in many dimensions and determining good practice examples.

When the definitions in literature are discussed together, it can be understood that comparative education studies generally aim to consider many factors that may affect the education systems in countries, to look at existing situations from different perspectives, to explain how cultural diversity and local needs should be considered in educational design, and to offer solutions for the improvement of education. Thus, comparative education studies have gained even more importance, considering globalization, digitalization, and rapid changes in education.



CHAPTER 2: TURKISH EDUCATION SYSTEM

2.1. Structure of Türkiye

Ankara is the capital of the Republic of Türkiye, which gained its independence with Mustafa Kemal Atatürk's declaration of the Republic on October 29, 1923. Türkiye is between Bulgaria, Greece, Georgia, Armenia, Azerbaijan, Iran, Iraq, and Syria. The official and educational language of Türkiye is Turkish. The Turkish state is a Republic. Its population is approximately eighty-five million. Türkiye, whose currency is the Turkish lira, continues its efforts to join the European Union rapidly.

The Turkish education system is organized by the Constitution of the Republic of Türkiye and the laws regulating education and training. (Yıldırım, 2010). The Turkish education system consists of two main sections, “formal education” and “non-formal education,” in a way that meets the educational needs of individuals and is integrated. (Erdem, 2007). Formal education is regular education provided under the roof of a school with programs prepared according to the purpose for individuals in a particular age group and at the same level. Therefore, all the education mentioned in this section covers formal education. The Ministry of National Education [MEB] of the Republic of Türkiye is responsible for planning and organizing education in Türkiye (MEB, 2024). The general purpose of the Turkish education system is to meet the educational needs of individuals, to remain loyal to Atatürk's principles and nationalism, to adopt national, moral, human, spiritual, and cultural values, to raise individuals who are equipped with love for their family, country, and nation, with high morality and who constantly improve themselves. (Zaim, 1988).

2.2. Turkish Education System Outline and General Structure

The Turkish Education System is outlined below in Figure 1 and Figure 2.

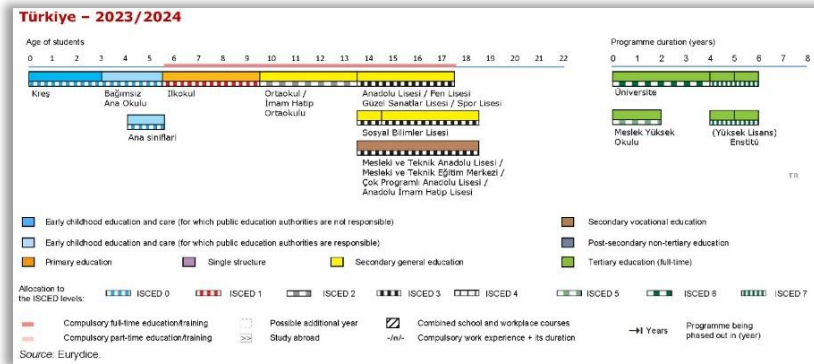


Figure 1. Place of students in the education system according to age in Türkiye (Eurydice, 2024)

The Turkish education system is outlined below:

- **Preschool Education (3-6 years):** Education is provided in kindergartens, nurseries, and daycare centres.
- **Primary Education (6-14 years):** A compulsory education lasts 8 years. It covers primary and secondary school levels. Education is received in schools that provide basic education.
- **Secondary Education (14-18 years):** Secondary education activities are conducted in two main branches: open high school and general high school. General secondary education takes place in high schools and includes different types of schools, such as Anatolian High Schools, Science High Schools, Fine Arts High Schools, Sports High Schools, and Sports High Schools. The purpose of education is to prepare students for university, to

provide them with professional knowledge and skills, and to contribute to their personal development. Secondary open education is for primary school graduates, along with individuals who, for various reasons, were unable to attend secondary school but are now given a chance to complete their secondary education through distance learning methods, make up this group. The system does not require a branch structure; no teachers are in this framework.

- Higher education in Türkiye is conducted in universities. It offers three primary levels of education: undergraduate, master's, and doctoral level. Higher education institutions aim to provide students with academic knowledge and skills and to conduct research and innovation. Students can choose from various programs that suit their interests and career goals. In addition, international collaborations and exchange programs play an essential role in the higher education process. This education stage allows students to gain in-depth knowledge in their areas of expertise and professional skills.

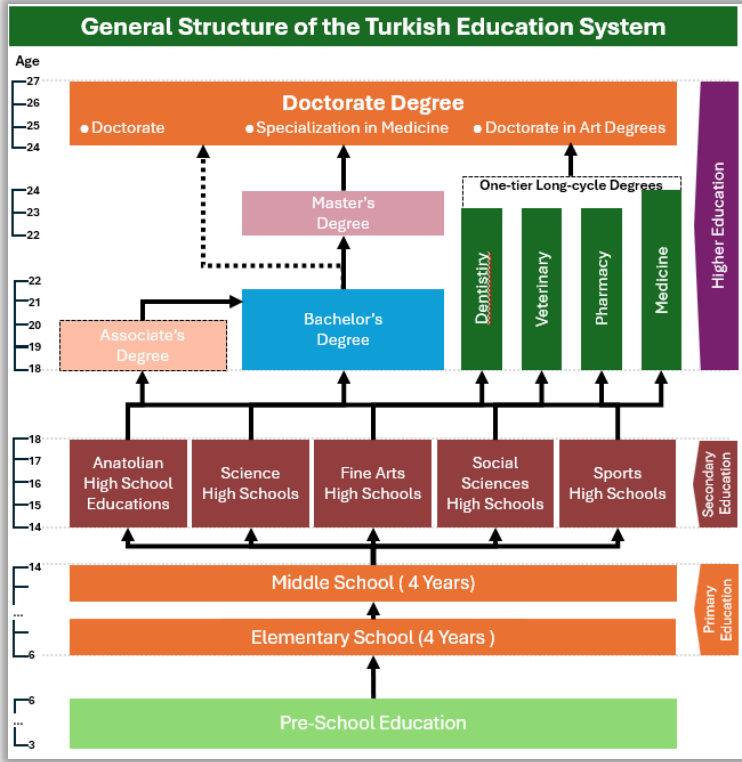


Figure 2. General Structure of the Turkish Education System

The educational stages in Figure 2 are explained in detail in the subheadings below.

2.2.1. Preschool Education

In Türkiye, preschool education refers to kindergarten and nursery class education. Preschool education optionally covers children between the ages of 2-6. Preschool education institutions can be established as independent kindergartens, practice classes affiliated with girls' vocational secondary schools, and kindergarten classes affiliated with other educational institutions. In the Turkish education

system, the primary purpose of preschool education is to back up pupils in not just physical but also mental and emotional development, to help them gain good habits, and to ensure that children speak Turkish correctly and beautifully and because of all this prepare them for primary school. This education process should be organized to support the child's motor, social, emotional, linguistic, and cognitive development and help the child gain self-care skills by aiming to develop children's feelings and behaviours such as respect, responsibility, cooperation, and sharing (Ministry of National Education, 2024).

2.2.2. Primary Education

Primary education in Türkiye is a compulsory education and training process that children start at 6 and last for 8 years. Primary education has two cycles (4+4); the first cycle is primary schools (grades 1-4), and the second cycle is middle schools (grades 5-8). The two-cycle was implemented in the 2012-2013 academic year. This process is when children gain essential knowledge and skills and support their social, cultural, and physical development. In addition to introductory courses such as Turkish, mathematics, science, and social studies, students take foreign language, physical education, and visual arts courses. This stage of education forms the basis of a student's academic and personal development. Primary education is compulsory for all students who have reached age 6. Public schools do not charge tuition fees. Primary education is eight years without interruption. Students are given a diploma when they finish school and are subject to an exam to enter secondary education (Ministry of National Education, 2024).

2.2.3. Secondary Education

Secondary education in Türkiye, as the second stage of compulsory schooling, covers an educational period for students between the ages of 14-18 after preschool and primary school. The secondary education level offers options suitable for students' talents and career goals and prepares them for higher education and professional life. Secondary schools in Türkiye offer students different options by offering various academic, vocational, and technical education opportunities. Secondary education institutions in Türkiye consist of five different types of schools: Anatolian High Schools, Science High Schools, Fine Arts High Schools, Social Sciences High Schools, and Sports High Schools. Science and Anatolian High Schools aim to contribute to students' development as scientists in science and mathematics, while Social Sciences High Schools aim to contribute to students' development as scientists in literature and social sciences. Fine Arts High Schools aim to train qualified individuals in this field by providing students with essential knowledge and skills in fine arts. In contrast, sports high schools aim to provide students with crucial knowledge and skills in physical education and sports, creating well-equipped human resources in this field. In the programs developed for these purposes, courses such as Turkish language and literature, mathematics, science, social sciences, and foreign language are prominent in Anatolian High Schools and Science High Schools; artistic courses are given in Fine Arts High Schools, social sciences courses in social sciences high schools, and physical education and sports courses are provided in sports high schools. In addition, elective courses are offered according to the student's interests in all schools (Ministry of National Education, 2024).

Anatolian High Schools

Anatolian High Schools that provide academic education offer a comprehensive curriculum to prepare students for university. These high schools focus on developing students' knowledge and skills with various courses. Anatolian High Schools are one of the preferred types of high schools, with their education usually lasting four years.

Science High Schools

Science High Schools are structured for students with special interests and talents in mathematics and science. While science and mathematics courses are focused on these schools, developing research and scientific thinking skills are also encouraged. Students who graduate from Science High Schools tend to pursue engineering, medicine, and science in higher education.

Fine Arts High Schools

Fine Arts High Schools educate students with skills in artistic fields such as painting, music, and sculpture. Art education in these schools is provided with introductory academic courses and allows students to develop their creative skills at a professional level. Graduates tend to pursue fine arts and performing arts in universities.

Social Sciences High Schools

Social Sciences High Schools were established for students interested in social sciences and humanities. These schools focus on social science courses such as history, geography, literature, and philosophy. Graduates of Social Sciences High Schools may pursue

higher education careers in fields such as law, political science, history, and sociology.

Sports High Schools

Sports High Schools were established to educate students with unique talents in physical education and sports. Special lessons and practical training are offered in these schools for sports education. Graduates can continue their education in sports academies or physical education and sports teaching and progress toward becoming professional athletes.

When any of the secondary schools mentioned above are completed, students are given a diploma, and those who want to continue university are subject to the Higher Education Institutions Exam (YKS). YKS is a national exam that allows students to be placed in universities. It consists of three sessions: Basic Proficiency Test (TYT), Field Proficiency Test (AYT), and Foreign Language Test (YDT). Candidates who have previously failed this exam can also take it.

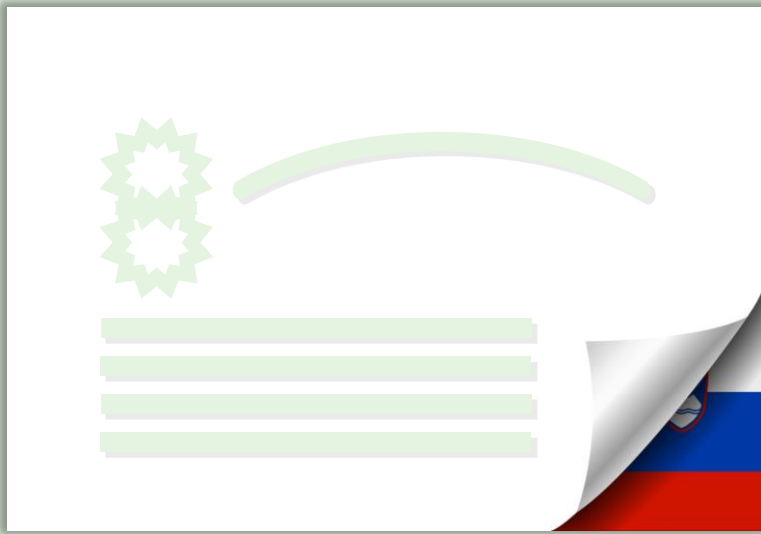
2.2.4. Higher Education

Higher education in Türkiye can be classified into two main groups: public universities and foundation universities. Education at universities is provided through institutes, faculties, conservatories, colleges, and vocational schools. While the government budget finances public universities, foundation universities are privately established and offer students paid education. Universities provide education at undergraduate, master, and doctoral levels. Students apply to the university through the Higher Education Institutions Exam (YKS) organized by the Republic of Türkiye Centre

for Assessment, Selection, and Placement (Ministry of National Education, 2024).

Higher education is organized in three cycles. *The first cycle* includes undergraduate professional and academic programs; *The second cycle* contains postgraduate master's programs (master's or integrated masters), and the *third cycle* includes postgraduate doctoral programs. Undergraduate programs held in faculties generally last 4 years; in some departments, this period can be 5 years (for example, medicine or dentistry). Students can make choices between different departments to specialize in a field. Master's and doctoral programs focus on research and areas of expertise. In these programs, students are offered the opportunity to conduct applied research and theoretical knowledge. In addition, universities usually provide education opportunities for international students, and some programs are taught in a foreign language.

Universities in Türkiye operate with a system prioritizing academic success, research, and societal contribution. Regarding international cooperation, Türkiye actively participates in international exchange programs such as Erasmus+ and supports the exchange of students and academic staff. Students may receive financial support such as scholarships and loans during their education, and they may also have internship opportunities to shape their careers in the business world.



CHAPTER 3: THE REPUBLIC OF SLOVENIA EDUCATION SYSTEM

3.1. Structure of Slovenia

The capital of the Republic of Slovenia, which declared its independence from Yugoslavia after World War II in 1991, is Ljubljana. Slovenia is between Germany, Croatia, and Italy (Eurydice, 2022). The official and educational language of Slovenia is Slovenian. The European Union recognized Slovenia in 1992 and joined the Eurozone in 2007. Social state laws, a democratic country, govern Slovenia. Moreover, the population is approximately two million. Slovenia's currency is the Euro. Slovenia joined the European Union on May 1, 2004, and the Organisation for Economic Co-operation and Development (OECD) in 2010 (European Commission, 2009a).

In Slovenia, the Ministry of Education, Science, and Sports (Ministrstvo za izobraževanje, znanost in šport) is responsible for planning and organizing education, which is one of the 19 ministries in Slovenia. (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024). The Ministry of Education and Sports determines the country's general education policy. Between 1996 and 1999, a comprehensive content change was made in implementing, monitoring, and evaluating the curriculum and syllabus. The reform defined the problems that needed to be solved in the curriculum. Some problems are related to the professional responsibility and autonomy of teachers and schools, the distribution of information about school subjects and curriculum overloading, the lack of teaching methods, the variety of techniques, and the quality of teacher training. The reform that was prepared to solve the problems led to the preparation of a new curriculum. The National Curriculum Council (NCC) was established in 1995. NCC played a role in

organizing the curriculum by determining the areas, programs, and subjects to prepare Slovenia's national curriculum and syllabus documents. Each committee established for the new curriculum included university and school experts and educational consultants. (Eurydice, 2024).

The Slovenian education system is well-organized, comprehensive, and has high standards. As part of the European Union, the Slovenian education system offers many opportunities for local and international students. Education in Slovenia is compulsory from age 6 until age 15 (Eurydice, 2022). This period includes primary school (free of charge in public schools) and basic education. The Slovenian government heavily subsidizes education. Primary and secondary education is free of charge, while scholarships and other financial support may be offered to eligible students for higher education.

The Slovenian education system's primary purpose is to ensure individuals' highest level of development regardless of their gender, religion, race, ethnic or national origin, and regardless of their physical and mental abilities or disabilities. (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024). The Slovenian education system, in which many regulations are made because of the issues that have been obtained. The Republic of Slovenia's education system is divided into four main groups: preschool, primary education (basic), upper secondary education (upper secondary), and university (higher and short-cycle higher vocational education).

3.2. The Republic of Slovenia Education System Outline and General Structure

The Slovenian education system is outlined below in Figure 3 and Figure 4.

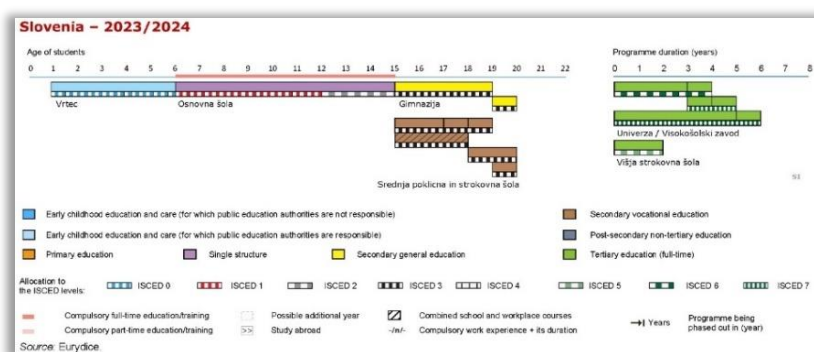


Figure 3. Place of students in the education system according to age in the Republic of Slovenia (Eurydice, 2024)

- **Pre-School Education (1-6 years):** Education is provided in autonomous public kindergarten institutes, in sections of primary schools, or private schools specially designed for kindergarten.
- **Basic Education (6-14 years):** covers the compulsory primary and secondary school levels. Education is received in schools that provide basic education.
- **Upper Secondary Education (15-18 Years):** The merger of several sections forms Upper Secondary Education (15-18 years). These are Short Vocational Education (120 ECTS) provided by vocational secondary schools, Vocational Education provided by technical and vocational secondary schools, Technical Education provided by technical secondary schools, Vocational and Technical Education provided by vocational and technical secondary schools, and four-year

general education (Gimnazija) provided by general secondary schools.

- Higher education is education provided by foundations or government universities. The first cycle covers undergraduate studies (180 – 240 ECTS), the second cycle covers master's degrees (60-120 ECTS), and the third cycle covers doctoral studies (180 ECTS) (Commission, 2009a). However, 120 ECTS course credits are given in the education provided by vocational schools. Regarding international cooperation, Slovenia actively participates in international exchange programs such as Erasmus+ and supports the exchange of students and academic staff. Education in Slovenia is mainly provided in Slovenian, but many programs are offered in English at universities. This makes Slovenia an attractive option for international students. Moreover, Slovenia often achieves good results in international tests (e.g., PISA), which shows the quality of its education system. The Slovenian education system offers a flexible, student-centered approach supporting students' academic and personal development. This system provides local and international students with the tools and opportunities to achieve their career goals.

Comparison of education systems in terms of science teacher training: Türkiye and Slovenia

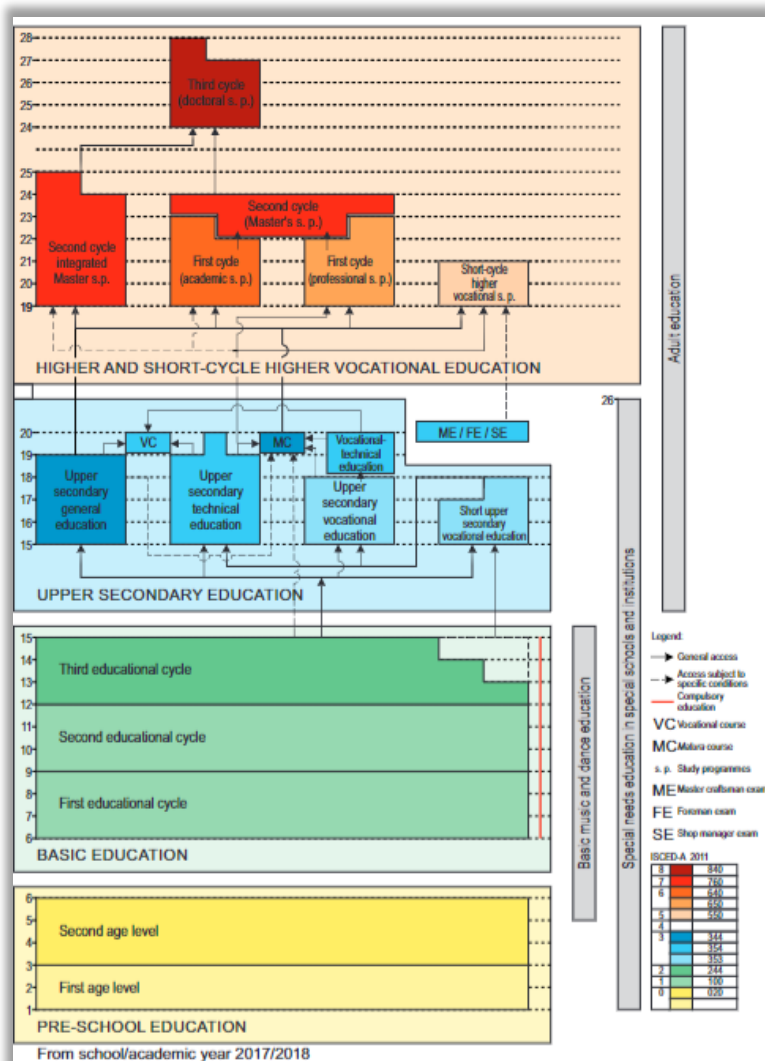


Figure 4. General structure of the education system in the Republic of Slovenia (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024)

The educational stages in Figure 4 are explained in detail in the subheadings below.

3.2.1. Preschool Education

Preschool (1-6 years) is an integrative part of the education system. Although not mandatory for all students, it contributes significantly to education (Valenčič-Zuljan et al., 2011). The instructors are people who have received special preschool education. Parents pay for the student's education, health, and nutrition; the costs vary according to the family's income level (European Commission, 2009; Eurydice, 2010).

The state provides preschool education in public kindergartens, preschool classes in primary schools, music schools, and adult education institutions (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024). Preschool education in Slovenia adopts an approach that supports children's social, emotional, physical, and mental development. The preschool curriculum is organized according to children's age groups and developmental characteristics. The primary purpose of preschool education is to provide versatile occasions for children to develop individual characteristics, talents, and success, considering the rules of each developmental period and the characters of each child. In addition, preschool education develops children's ability to understand themselves and other people; increases their capacity for success; participate in group work and accept individual differences; develops their capacity to define their feelings; act courageously towards emotional experiences and expressions; nourishes their curiosity; gains the spirit of inquiry; develops imagination, intuition and independent thinking; encourages language development for writing, reading, practical and creative language use; develops talent and

movement capacity; It aims to provide individual independence regarding the importance of personal cleanliness and health (World Data On Education, 2011).

In preschool education, game-based and exploratory activities are at the forefront. However, these activities can cover various educational areas to teach children some “lessons” through game-based and exploratory activities. (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024):

- **Language and Communication:** The activities develop children’s language skills, enrich their vocabulary, and support their communication ability. Through these activities, children can learn languages and communication.
- **Physical Development:** Physical activities develop children’s motor, coordination, and balance skills. Through the activities, children can physically grow.
- **Social and Emotional Development:** The activities are made to develop children’s social and emotional skills. Through these activities, children can learn empathy.
- **Art and Creativity:** The artistic activities are made to develop children’s creative expression skills and creativity.
- **Nature and Environmental Awareness:** The activities are conducted to develop children’s environmental awareness. Through these activities, children can learn about nature and create environmental awareness.
- **Mathematical Thinking:** Activities are conducted to introduce basic mathematical concepts such as simple numbers, shapes, and measurement.

The principles of preschool education in kindergartens are “Democracy, Pluralism, Autonomy, professionalism, and responsibility for staff, Equal opportunities for children and parents, respecting diversity among children, The right to choose and be different, Balancing the various aspects of the child’s physical and mental development.” (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024).

Preschool education in Slovenia adopts a child-centered approach designed to suit children’s interests and needs. It is essential to provide an environment for children to express themselves freely, be aware of their environment, explore nature, and learn certain subjects in preparation for school through activities in a rich and supportive environment during this period. The Slovenian education system aims to provide children with a solid foundation at an early age and prepare them for further education.

3.2.2. Basic (Compulsory) Education

At the end of the 1990s, basic education, which was eight years, consisted of two cycles of four years each. In 2003-2004, basic education was increased to nine years and divided into three cycles (3+3+3). The first cycle to implement a nine-year education was taken in 1999-2000 and completed in 2003-2004 (Eurydice, 2024). The three training cycles in the 2022 training program update are ongoing (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024).

According to their potential and interest, pupils receive knowledge and can develop their skills with lifelong learning in basic education in Slovenia. At this stage of education, the aim is to create a national identity by developing a sense of belonging to a single state without ignoring common cultural values. They learn to communicate with people using the Slovenian language and other languages. Sustainable development is an essential issue in basic education in Slovenia. Taking responsibility for their actions and their own and other people's health is considered in basic education in Slovenia (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024).

Children between the ages of 6 and 15 are required to attend primary schools. The primary education period is divided into three cycles according to the developmental stages of the children. The class teacher works with the kindergarten teacher in the first three cycles. The second teacher is effective for half of the teaching period. In the second cycle, the class is mixed, and subject teaching begins with expert teachers. In the last cycle, subject teaching is based on specialist branch teachers. Students take a national assessment at the end of the 6th and 9th grades. The subjects included in the 6th grade exam are three: mother tongue, mathematics, and foreign language (European Commission, 2009; European Commission, 2010; World Data On Education, 2011). In the exam at the end of the ninth grade, one more subject chosen by the minister is added. These exams aim to determine the level rather than the grading (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024). At the end of these exams, remedial classes are opened for students who need remedial education.

3.2.3. Upper Secondary Education

In Slovenia, pupils can continue non-compulsory secondary education after 9 years of basic (compulsory) education (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024). The secondary education process is a single cycle, ranging from 2 to 5 years (Figure 3). Secondary education offers students general or vocational education. While general upper secondary education lasts 4 years, vocational education programs can be longer and include apprenticeships (Figure 3). Except for schools that accept students through special aptitude tests, the level of the subjects in basic school education is essential for students' enrolment. The Ministry of Education publishes a joint call for enrolment in all programs at least six months before the beginning of the academic year. After enrolment is published, schools organize information days. During the information days, information is given about the following issues for the candidates who completed basic school:

- Educational options and requirements
- Qualifications and alternative professions
- Alternative prudential education pathways
- Admission necessities
- System and selection criteria in case of large enrolments
- Important dates and admission conditions
- Important information regarding admissions

If the number of applications to the school exceeds the number of students the school can accept, schools may impose registration restrictions with the minister's permission.

Secondary education is divided into two main groups: General Education and Vocational and Technical Education. For students to graduate, they must have successfully passed the General Matura or Vocational Matura exams. Detailed information about Secondary General Education and Secondary Vocational Education is provided in the subheadings below.

Secondary General Education

It is a four-year Gymnasium program of different types (Gymnasium, Classical Gymnasium, Technical Gymnasium, Economic Gymnasium, Art Gymnasium), and to receive General Matura at the end of the program, a 1-year Matura course. Students who graduate from these secondary schools continue to attend university. Gymnasium students must know two languages, and there are elective and compulsory courses. The courses are as follows (Ministry of Education, Science, and Sport of the Republic of Slovenia, 2024):

- **Compulsory four-year courses:** Slovenian (Italian/Hungarian), mathematics, first and second foreign language, history, and sports.
- **Compulsory courses:** Information science, psychology, chemistry, music, visual arts, geography, physics, philosophy, biology, and sociology.
- **Elective courses:** From the second to the fourth year, the number of elective classes increases yearly; in the last year, hours are devoted to preparation for the Matura exam.

In Classical Gymnasium and Economic Gymnasium, the hours of elective courses are determined only for the third and fourth years; in Art Gymnasium programs, the hours of elective courses are less than in other

Gymnasium programs. Students who graduate from Gymnasiums can continue to short-term higher vocational education programs, vocational higher education programs, academic higher education programs, and integrated master's degree programs. Gymnasiums address students between the ages of 15 and 18 with a four-year education. With this four-year education, students are prepared for their further university education. At the end of the Gymnasium, students take the final exam called Matura (European Commission, 2010). Students who pass this exam can proceed to all higher education levels. Students who fail the Matura exam or want to continue their education by taking Vocational-Technical Education and Technical Education take a one-year short vocational education course. Upon completing this course, students can enter the working class (Eurydice, 2010; European Commission, 2010).

Secondary Vocational Education

Providing pupils with theoretical knowledge and practical skills in a specific occupation, vocational, and technical education is a type of education in Slovenia that aims to provide students. By providing theory and application, this education is designed to prepare students for the world of work and to provide them with the necessary tools to advance in their careers. Pupils can pursue vocational and technical upper-secondary education through various programs (Eurydice, 2024). These programs are 2 years long short upper secondary vocational education and upper secondary vocational-technical education, 3 years long upper secondary vocational education, and 4 years long upper secondary technical education (Eurydice, 2024). Alums take the Vocational Matura exam at the end of the programs.

Alums can transfer to short-term higher vocational education programs, professional higher education programs, and academic higher education programs if they pass the General Matura additional exam. General Matura is a national exam administered by the “General Matura National Committee.” Candidates who have previously failed this exam can also take it. General Matura is for alums of Gymnasiums, an exterior exam that students take at the national level.

3.2.4. Higher Education

Universities provide higher education in Slovenia, which operates through a system that actively participates in the Bologna process and adheres to the goals of the European Union’s Lisbon Strategy (Valenčič-Zuljan et al., 2011). This system aims to establish a high-quality, diverse, and internationally comparable higher education system (Eurydice, 2022). The country’s participation in the Bologna Process ensures that students’ higher education degrees are recognized throughout Europe. The Bologna Process aims to create a European Higher Education Area and indicates a reform process. (Rugelj, 2006)

Higher education consists of two subsystems in Slovenia: short-cycle higher vocational and higher education (Figure 3 & Figure 4). Practice-oriented vocational programs have been developed to meet the economy’s needs for two years and provide pupils with professional qualifications in line with professional standards. Alums are trained to manage, plan, and control business processes. Higher education is organized in public and foundation universities and independent institutions. The main goals of higher education include quality. This quality of higher

education leads to being suitable for paid work and the alum being employable. This employment could make the alum mobile across Europe and the world, providing equitable access to diverse institutions and programs. (Eurydice, 2023).

Higher education is organized in three cycles. *The first cycle* includes undergraduate professional and academic programs; *The second cycle* contains postgraduate master's programs (master's or integrated masters), and the *third cycle* includes postgraduate doctoral programs. The study programs are conducted full-time, part-time, or by distance learning. Higher education programs last 2 to 6 years and are awarded ECTS (European Credit Transfer and Accumulation System) credit points according to the student workload. (Eurydice, 2023).



CHAPTER 4: SCIENCE TEACHER TRAINING IN TÜRKİYE

4.1. Teacher Training in Türkiye

Teacher training in Türkiye began to be modernized with the proclamation of the Republic. “Village Teacher Schools,” “Village Educator Courses,” and “Village Institutes,” which were established in the late Ottoman Empire and gained intensity with the establishment of the Republic, were established to develop the Turkish peasantry in Türkiye, a newly established country. (Türkmen, 2022). The fact that education and teacher training are so necessary in a newly established country shows the importance that the founder of the Republic, Gazi Mustafa Kemal Atatürk, gave to education and teachers. In the 1980s, teacher training institutions began operating under the Council of Higher Education (YÖK) of the Ministry of National Education (The Council of Higher Education, 2007). In 1982, two-year education institutes under the university’s roof were named “Education Colleges,” seven years later, the education period was increased to four years (Hesapçıoğlu, 2005). The four-year education institutes were named “Higher Teacher Training Schools, Faculty of Education” by the decision in 1982 (The Council of Higher Education, 2007).

Today, teacher education in Türkiye is provided in the education faculties of universities within the curriculum framework determined by the Council of Higher Education (YÖK). The Council of Higher Education regulates the framework of teacher training programs in Türkiye. It is a constitution with autonomy and public legal personality within the framework of the duties and authorities granted by Higher Education Law No. 2547. The Higher Education Quality Board is an institution that conducts external evaluations of

higher education institutions, conducts accreditation processes, and spreads the culture of quality.

4.2. Universities with Faculty of Education

As of 2024, there are 209 universities in Türkiye (The Council of Higher Education, 2024). Some universities in Türkiye provide teaching programs outside the faculties of education (such as the Faculty of Sports Sciences and the Faculty of Humanities and Social Sciences). In this section, only the Education Faculties were examined. The number of Education faculties operating in Türkiye is one hundred as of 2024, and they operate with various departments. Figure 5 shows the distribution of these faculties across the country (See Figure 5). The list of the universities with Faculties of Education in Türkiye is also provided in Appendix 1.



Figure 5. Distribution map of Education Faculties in Türkiye

To become a teacher in Türkiye, one must complete one of the teacher training departments of the Education Faculties of universities. Teacher training departments are completed in 4 years. The framework program of the teaching departments includes field knowledge and pedagogical formation training. While continuing their university education, teacher candidates gain practical experience by doing

internships in schools. These internships provide students with experience in a real classroom environment and enable them to put theoretical knowledge into practice. During the internship, teacher candidates teach under the supervision of experienced teachers and learn classroom management. Within the scope of pedagogical formation given to undergraduate graduates of some departments that do not have a bachelor's degree in the teaching department, courses on educational sciences such as educational theories, teaching methods, and classroom management are given.

After graduation, teacher candidates may be willing to participate in graduate education programs at the master's and doctorate levels and improve themselves. These graduate-level trainings allow teachers to deepen their pedagogical field expertise, learn how to use new technologies in educational environments appropriate for their subjects, and learn different techniques, methods, and approaches. These graduate education programs allow teacher candidates to deepen their teaching expertise or learn new educational skills and approaches.

4.3. Faculty Entrance and Departments

Teacher education in Türkiye is divided into departments and majors. Teacher candidates make their choices according to their YKS scores. Some of the undergraduate teaching programs in Türkiye are as follows: German Language Teaching, Arabic Language Teaching, Physical Education and Sports Teaching, Computer and Educational Technologies Teaching, Biology Teaching, Geography Teaching, Philosophy Group Teaching, Science Teaching, Physics Teaching, French Teaching, Primary School Mathematics Teaching, English Language Teaching, Japanese Teaching, Chemistry Teaching, Mathematics Teaching, Music Teaching, Preschool Teaching, Special Education Teaching, Guidance and Psychological Counselling, Art Teaching, Classroom Teaching, Social Studies Teaching, History Teaching, Turkish Language and Literature Teaching, Turkish Language Teaching. All the departments are listed below (The Council of Higher Education, 2024):

- Department of Computer and Instructional Technologies Education
- Department of Educational Sciences: Department of Measurement and Evaluation in Education, Department of Curriculum and Instruction, Department of Educational Administration, Department of Guidance and Psychological Counselling, and Department of Lifelong Learning and Adult Education
- Department of Fine Arts Education: Department of Music Education, Department of Art, and Craft Education
- Department of Mathematics and Science Education: Department of Biology Education,

Department of Science Education, Department of Physics Education, Department of Chemistry Education, Department of Mathematics Education

- Department of Special Education: Department of Education of the Mentally Disabled, Department of Education of the Visually Impaired, Department of Education of the Gifted, Department of Education of the Multiple Disabled
- Department of Basic Education: Department of Preschool Education, Department of Classroom Education
- Department of Turkish and Social Sciences Education: Department of Geography Education, Department of Philosophy Group Education, Department of Social Studies Education, Department of History Education, Department of Turkish Language and Literature Education, Department of Turkish Education
- Department of Foreign Language Education: Department of German Language Education, Department of Arabic Language Education, Department of French Language Education, Department of English Language Education, Department of Japanese Language Education

Teachers are trained in many fields in Türkiye. Training science teachers, one of the main branches of science that provides essential knowledge and skills for the development of individuals and societies, is of critical importance in terms of the quality of the teaching profession. Therefore, it reveals the necessity of equipping science teachers with disciplinary knowledge and pedagogical competence. The context of the Science Teacher Training department is given in this subheading.

4.3.1. Science Teacher Training Program in Türkiye

In Türkiye, science teachers are primarily trained in the Department of Science Education. The courses that science teacher candidates should take at the underground level in the Department of Science Education in Turkish Universities are presented in Figure 6.

General Culture	Professional Knowledge	Field Education
•Ataturk's Principles and Revolution History •Foreign Language •Turkish Language •Information Technologies •Society Service Applications	•Introduction to Education •Philosophy of Education •Sociology of Education •Educational Psychology •Research Methods in Education •Principles and Methods of Teaching •History of Turkish Education •Instructional Technologies •Turkish Education System and School Management •Measurement and Evaluation in Education •Ethics and Morality in Education •Classroom Management •Teaching Practice •Counseling in Schools •Special Education and Inclusion	•Physics •Chemistry •Biology •General Mathematics •Approaches to Science Learning and Teaching •Science Curricula •Science Education •Science Education Laboratory Applications •Astronomy •Earth Science •Scientific Reasoning Skills •Interdisciplinary Science Education •Environmental Education •Outdoor Learning Environments in Science Education •Nature and Teaching of Science

Figure 6. Department of Science Education Courses

In Figure 6, courses that science education teacher candidates should take at the undergraduate level are given. There are general cultural knowledge, professional knowledge (educational classes such as educational philosophy and educational psychology), and field knowledge courses for teacher training.

4.4. Graduation and Employment

Teacher candidates are awarded a Diploma at the end of the undergraduate program (which lasts 4 years). After graduation, teacher candidates took the Public Personnel Selection Exam (KPSS) to be able to teach in public schools. However, a new decision in 2024 makes it mandatory for teacher candidates to take the National Education Academy courses. Academies were officially declared with the “Teaching Profession Law” announced in the official gazette numbered 32696 dated October 18, 2024 (Official Gazette, 2024). Thus, the National Education Academy has been established in 2024. With the Teaching Profession Law No. 32696, dated October 18, 2024, regulations were made that those who will be employed as teachers will be selected from among those who have graduated from at least one of the undergraduate-level higher education programs that constitute the source of the teaching profession and who are successful in the preparatory training to be provided by the Academy. Changes are regarding the appointment of teachers to public schools in 2025.

The “Regulation on The Employment of Contract Teachers of The Ministry of National Education” was announced in the official gazette dated January 16, 2025, numbered 32784, which they can enter within the quota after receiving their Academy Entrance Exam (MEB-AGS) scores (Official Gazette, 2025). As published in the Official Gazette dated 21 December 2024 and numbered 32759, “Regulation on Candidate Teachers and Teaching Profession Career Steps,” those who are appointed to teach for the first time will work as contracted teachers and will have the title of “candidate teacher” and candidate teachers will be subject to the

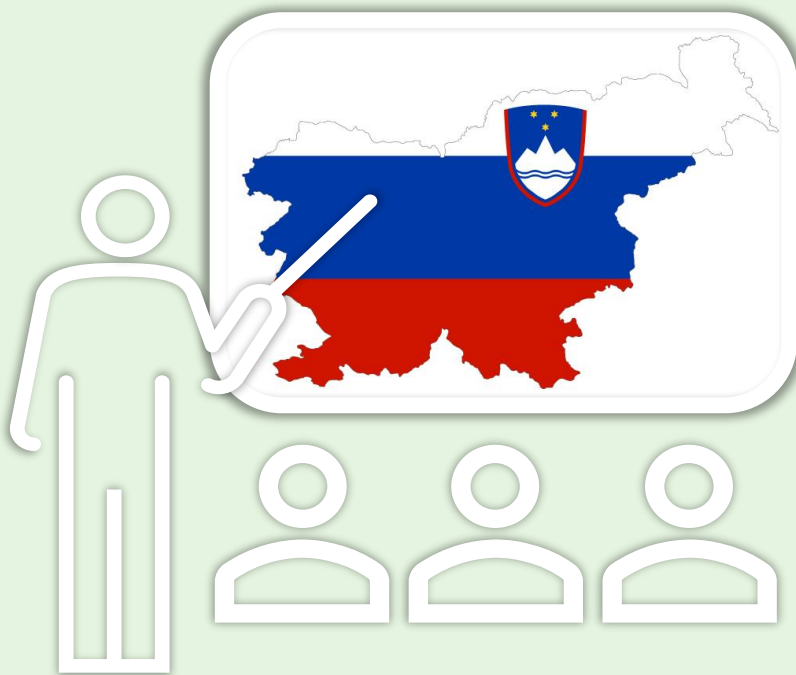
“Training Program” (in-service training of at least 240 hours and observations and practices under the supervision of a “consultant teacher” selected from experienced teachers) for a minimum of one and a maximum of two years (Official Gazette, 2024). According to “Teaching Profession Law,” announced in the official gazette dated October 18, 2024, numbered 32696, teachers are selected from those with at least a bachelor’s degree and are successful in education (Official Gazette, 2024). Contract teachers who have completed their three-year working period are appointed to the teaching staff where they work if they request and cannot change places for one year (Official Gazette, 2025).

The exam is planned to be held in 2 sessions: the 2025 Academy Entrance Exam (AGS) and the 2025 Teaching Field Knowledge Test (ÖABT) (Ministry of National Education, 2024). It is planned that AGS will include 80 questions covering the subjects of verbal and numerical ability, history, the geography of Türkiye, fundamentals of education, and the Turkish national education system and legislation (constitution, National Education Fundamental Law No. 1739, Primary Education and Education Law No. 222, Teaching Profession Law No. 7528); while ÖABT session will include 50 questions regarding field knowledge in Physics, Chemistry, Biology, Geology (Earth Science), Astronomy and Environmental Science (Student Selection and Placement Center, 2025).

4.5. Professional Development

Teacher training is not just limited to undergraduate education; it is a lifelong process. Teachers are expected to improve themselves continuously throughout their professional lives. Various training programs and seminars are organized in Türkiye to contribute to the professional development of teachers. Beyond these, teachers can improve themselves through in-service training and graduate schools (master's and doctorate).

- **In-Service Training Organized by the Ministry of National Education (MEB):** Teachers update their knowledge by attending seminars and professional development courses organized by the MEB. These courses aim to follow new developments in education and improve teaching methods.
- **Master's and Doctorate Programs:** Teachers can receive postgraduate education to deepen their fields or pursue an academic career besides the teaching profession. These programs help teachers increase their knowledge and skills.



CHAPTER 5: SCIENCE TEACHER TRAINING IN SLOVENIA

5.1. Teacher Training in Slovenia

After Slovenia gained independence from Yugoslavia in 1991, the education system underwent significant changes. (Ivančič, 2008). After autonomy, teacher education began to adapt to Western European standards and accelerated by the Bologna process. (Zgaga, 2006). Teacher training institutions also changed during this process. After the modifications experienced after independence, the central institutions that trained teachers in Slovenia became the pedagogical faculties of universities, and universities in Slovenia were autonomous.

Quality processes, one of the most vital components of higher education, are conducted by the Slovenian Quality Assurance Agency for Higher Education (SQAA) in Slovenia. (Leban, 2019). The Ministry responsible for Education gives its opinion on the accreditation of pedagogical study programs, and SQAA conducts the accreditation process. (Eurydice, 2024). Quality Assurance Agency for Higher Education (NAKVIS) has stated that academic freedom and institutional autonomy are among the fundamental values of higher education. Therefore, the pedagogical faculties of universities directly provide teacher education and pedagogical programs and determine their content.

5.2. Universities with Faculty of Education

There are seven universities in Slovenia as of 2024. The number of Education Faculties operating in Slovenia is three as of 2024, and they operate with various departments. Figure 7 shows the distribution of these faculties across the country. The list of universities with Faculties of Education in Slovenia is also given in Appendix 2.

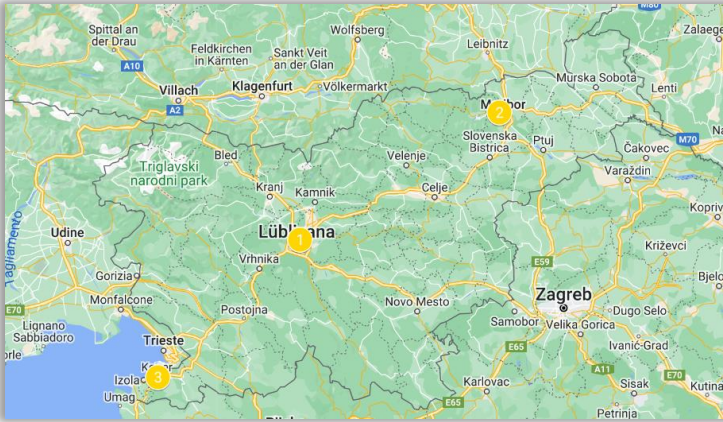


Figure 7. Distribution map of Education Faculties in Slovenia

These faculties offer 4-year undergraduate education to teacher candidates (Some programs take 3 years to finish). Candidates who are students in the Faculty of Education and want to be teachers should also finish the second training cycle (1 year or 2 years). So, according to Bologna study programs, it is an obligation to complete a master's degree (300 ECTS) to fulfil the requirement of being a teacher (Valenčič-Zuljan et al., 2011). Teacher candidates accepted to the teaching program 4+1 or 3+2 year undergraduate and graduate program, which includes pedagogical education covering essential areas such as pedagogical

psychology, classroom management, learning theories, educational psychology, and child development, which cover pedagogical skills for the age groups to be taught; courses in which they gain in-depth knowledge of the fields they will teach (mathematics, science, literature, social sciences, etc.) and the pedagogical aspects and teaching techniques of these courses. In addition, teacher candidates need to gain real teaching experience in Slovenian teaching programs. Students develop their teaching skills by applying them in a real classroom environment. This process is an integral part of teacher education.

5.3. Faculty Entrance and Departments

If the number of applications from teacher candidates exceeds the number of teachers that can be hired, a selection method is used (Valenčič-Zuljan et al., 2011). In that case, candidates with general competencies of all higher education graduates, regardless of their field of study and subject-specific competencies, will be selected based on general success in the Matura or final exam at 60% points and general success in the third and fourth years at 40% points. The candidates with general competencies of all graduates - professional workers in education will be selected based on general success in the Vocational Matura 40% points, general success in the third and fourth years 40% points, and success in the Matura subject 20% points.

The teaching programs nationwide are as follows: Preschool Education, Elementary Education, Primary School Teaching, Special Education, Educational Psychology, Educational Administration, Pedagogical Consultancy, Educational Sciences, Music Education, Fine Arts Education, Foreign Language Teaching, and Double Major Program (they choose two of them: Biology, Physics, Chemistry, Household, Mathematics, Computer Science, and Technical). In Slovenia, there is no science education department like in Türkiye. They have a double-major program that instructs students in the science fields. In this study, Biology Education has been chosen.

5.3.1. The Double-Major Program at
Ljubljana University

The content related to the Double-Major Program (Biology Education) at Ljubljana University is presented under this subheading.

General Zoology	General Botany	The Basics of Zoology Invertebrates
Microbiology	Anatomy of a Human	Didactics of Biology
Systematic Botany	Biological Chemistry	Genetics
Chordate Zoology	Phytophysiology	Zoophysiology
Ecology	The Brain and Behavior	Biology Human Being
Evolution	Educational Theory	Didactics with the Basics of Information and Communication Technologies
Pedagogical Methodology	Psychology for Teachers	Inclusive Education

Figure 8. Biology Education Program (The Double-Major Program in Ljubljana University) (Univerza v Ljubljani, 2024)

Figure 8 gives a sample of the context of the Double-Major Program at Ljubljana University. For this teacher training program, “Biology of the Cell, Embryological Vertebrate Ecology of the Sea, the Ecology of the Surface of the Water, Neurobiology, Environmental Change, and the Protection of Nature and the Slovenian Flora and Fauna, Plants and Man, and the Basics of the biology of amphibians, Life in the teaching of biology and the physical sciences, Microbiology in the school lab, and an Introduction to the relationships between organisms, More of genetics, the use of Information and Communication Technology (ICT) in the teaching of biology and the physical sciences” four of these courses are given as professional elective subject (Univerza v Ljubljani, 2024). The implementation of the objects is based on modern teaching methods that are supported using ICT (etc.), including the active work of the students, for example, through experimental work in the laboratory, the preparation of the individual life, group, and project work, e-learning, etc.). For example, suppose a student has these two subjects, Biology-Household and Biology-Chemistry. In that case, they will choose “Physics in Natural Sciences” and “Mathematics in Natural Sciences,” but if they have Biology-Physics, they will select “Chemistry.” The general condition for advancement from a lower to a higher year is completing all exercises, and a student may repeat a year or change the study program once during their studies (Univerza v Ljubljani Pedagoška Fakulteta, 2023).

A graduate of the double-major study program will acquire basic professional knowledge in two subject areas, special-didactic knowledge in two selected subject areas of education together with practical pedagogical training, and essential professional

knowledge in pedagogical, psychological, philosophical, and sociological sciences. Graduating from the double major is to train qualified teachers, increase their employment opportunities after graduation, and support them in their career paths (Rugelj, 2006).

5.4. Graduation and Employment

Teacher candidates are awarded a Diploma at the end of the undergraduate program (which lasts 4-3 years, depending on the program) (Rugelj, 2006). Branch teachers who will teach science and mathematics (for basic and high school levels) receive their educational qualifications from education faculties or multi-disciplinary higher education institutions (Eurydice, 2024). Education Faculties are primarily responsible for the employability of their graduates. To this end, students of the Faculty of Education at the University of Ljubljana graduate with two field qualifications to contribute to the employment process of teachers and ensure that they become more qualified teachers at school.

After graduation, teacher candidates must apply for certification. Certification is an official document that shows that the teacher is competent to teach at a certain level (Valenčič-Zuljan et al., 2011). After graduation, teacher candidates apply to the Ministry of Education and Sports with their education diploma and transcript, internship reports and supervisor evaluations, graduation certificate, and required foreign language proficiency documents (for those who will teach in a foreign language). In Slovenia, the professional exam is oral (Eurydice, 2021). In the oral exam, teacher candidates must show knowledge of the contents applicable to the field in which the training studies are implemented and a general understanding of other contents. According to Slovenian Business Point (Slovenian Business Point, 2024), people working in education must pass an examination consisting of three parts, taken orally:

- Constitutional regulations in the Republic of Slovenia, the EU institutions and their legal systems, and rules on human and children's rights
- Regulations in education and training
- Slovenian (for bilingual kindergartens and schools Italian or Hungarian) written language.

The teacher candidate must pass all three oral exams before an examination committee of at least three members. If they pass all the parts of the exam successfully, they can receive a certificate (Valenčič-Zuljan et al., 2011). Candidates whose applications are accepted receive teacher certificates granting them the right to teach at a particular school level (primary, secondary, or high school).

5.5. Professional Development

Slovenia encourages teachers to receive continuous education throughout their careers. Teachers update their professional skills by attending seminars, workshops, and development courses. Teachers need to keep up with innovations and methodological changes in education.



CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

The Sorbonne Declaration, dated May 25, 1998, in which the Ministers responsible for Education from France, Italy, Germany, and England came together and stated that Europe should not only be an economic union but also be together from an educational perspective, was put forward with the title of “Joint declaration on harmonization of the architecture of the European higher education system” to create a higher education area in Europe (European Higher Education Area, 1998). The Sorbonne Declaration formed the basis of the Bologna Declaration, published in 1999 (European Higher Education Area, 1999). Twenty-nine countries participated in the Bologna Conference held in 1999. Slovenia was among these countries, but Türkiye was not. The Bologna Process, initiated with the declaration after the conference, significantly affected the European Higher Education systems. The Bologna Process also affected the teacher training programs within these systems. In the Prague Ministerial Conference held in 2001, the number of countries increased to thirty-two with the participation of Türkiye (European Higher Education Area, 2001). Later, with the 2003 Berlin Ministerial Conference, the 2005 Bergen Ministerial Conference, the 2007 London Ministerial Conference, the 2009 Leuven Louvain-la-Neuve Communiqué, the 2010 Budapest-Vienna Ministerial Conference, the 2012 Bucharest Communiqué, the 2015 Yerevan Communiqué, the 2018 Paris Communiqué, the 2020 Rome Communiqué and finally the 2024 Tirana Ministerial Communiqué, the Bologna process is expanding with an increasing number of countries (European Higher Education Area, 2025). Figure 5 shows where the conferences have been held since 2025. Today, the process is progressing with

forty-nine member countries (European Higher Education Area, 2025). It is seen that more than 40 countries (Slovenia and Türkiye is in) have accepted the European Credit Transfer System (ECTS), which is one



Figure 9. Map of Ministerial Conferences (European Higher Education Area, 2025)

of the foundations of the Bologna Process (Rugelj, 2006).

According to the Bologna Declaration, it was decided to include processes such as the development of the diploma supplement application to make diplomas easily understandable and comparable; the implementation of the ECTS; the use of the “cycle” concept in higher education and the use of the three-level (undergraduate, master’s and doctorate) system; and the development of quality monitoring systems (European Higher Education Area, 2018). Bologna contributes to developing international business networks that benefit higher education and establishes a higher education area that respects and preserves cultural diversity. One of the most critical factors in

maintaining diversity is that countries pass it on to future generations through education.

In society, teachers are the ones who transfer scientific knowledge, respect for diversity, cultural assets, and values to future generations. With this perspective, teacher training is essential and at the heart of education (European Commission, 2020). Teacher training is a critical process that directly affects the quality of teaching and contributes to social development.

In many countries, including Türkiye and Slovenia, teacher training systems have changed due to needs over time. One of the reasons for these changes has been the change in the countries' education systems. Another reason is related to the training of qualified teachers. Because the quality of the training that teacher candidates receive is essential, teachers can contribute to their student's academic and personal development by providing academic knowledge to students who will carry the future and be role models for them. Students' awareness, perception, and knowledge about the world and the universe we live in can be academically developed by education. Moreover, by learning science, students can develop critical thinking skills beyond understanding the world around them (Yulianti & Herpratiwi, 2024). Because scientific knowledge plays a significant role in solving problems encountered in daily life and making decisions (Dawson et al., 2024). Hence, the quality of science teacher training impacts educational policies and vice versa. Therefore, science teacher training systems for Türkiye and Slovenia were examined.

6.1.1. The Process of Realizing Teacher Education in Faculties

Education systems should be structured by supporting, not destroying, the cultural diversity of countries. Supporting diversity is one of the issues emphasized in the Bologna process (European Higher Education Area, 1999). Beyond this, “ending extreme poverty,” “combating inequality and injustice,” and “addressing climate change” are the goals that are crucial to achieving all the other goals (United Nations, 2025). Called “Sustainable Development Goals” Slovenia and Türkiye are among the member countries that have stated that they will achieve these goals (United Nations, 2024). The sustainable development goals (SDGs) are given below.



Figure 10. Sustainable Development Goals (United Nations, 2025)

Therefore, the fourth sustainable development goal, achieving quality education, is also fundamental for both countries. Quality teacher training is also essential to the goal of quality education. When the quality boards that conduct studies on the quality of teacher education are examined, quality processes in higher

education have rapidly accelerated in Slovenia. It is seen that Türkiye is benefiting from their knowledge and skills in this acceleration. For the quality of education reforms that are taking place in line with the needs of the countries, The implementation of educational reforms is directly related to the presence of qualified teachers (Tancig, 2006). For this reason, in both countries that have adopted the Republic as their form of government, teacher training must be conducted by highly qualified education professionals. Sure, teaching is not only about having scientific knowledge; the way scientific knowledge is conveyed is significant. For this reason, many methods, techniques, and approaches are used to internalize the subject being taught to students. The research on the suitability of these methods, techniques, and approaches constitutes the job description of university professionals. Practice and experience in teaching are also critical issues.

In Türkiye and Slovenia, where teacher training systems are compared, both countries have a Republican form of government. In Türkiye, teacher training began at the faculty level in 1982 and in Slovenia in 1991. However, Türkiye and Slovenia have different processes for teacher candidates to work as teachers. However, the criteria that both countries want to employ and measure include pedagogical knowledge and field knowledge. Therefore, teacher training systems overlap in this context.

Both countries have internship practices in teacher training programs. Providing an environment for a teacher to practice their theoretical knowledge is essential. Due to university autonomy, Slovenia has the Double-Major Program at Ljubljana University. It can be seen as good practice for teacher training programs in

Türkiye. The reason the double-major program can be applied in Slovenia is due to the autonomy of the universities. Universities' autonomy can meet the country's needs with different program contents in terms of programs.

6.1.2. Institutions and Organizations Conducting Higher Education Accreditation and Quality Processes

In Slovenia, the Ministry of Education and Sports determines the framework of teaching programs regarding qualifications, but universities determine the contextual framework due to their autonomy. The quality and accreditation processes, among the most vital components of higher education, are carried out by the Slovenian Higher Education Quality Assurance Agency (SQAA) in Slovenia (Leban, 2019). In Türkiye, the contextual framework is determined by YÖK, while the Turkish Higher Education Quality Council (YÖKAK) conducts the quality processes. One of the places where the paths of the two countries intersected was in YÖKAK, which conducts the accreditation processes in Türkiye, where one of the three international consultants assigned served as the Director of the Slovenian Higher Education Quality Assurance Agency. As can be understood from this, the quality processes experienced in higher education in Türkiye benefit from Slovenia's experiences in quality processes in higher education. From the perspective of the Slovenian Higher Education Quality Assurance Agency, "Academic freedom and institutional autonomy are among the fundamental values of higher education," they

emphasized the importance of academic freedom and the autonomy of universities to be able to talk about quality in higher education. YÖKAK's core values are "Impartiality, transparency, ethical behaviour, independence, openness to cooperation, sustainability, innovation, inclusiveness, and stakeholder focus." The core values of both countries are that the form of government is Republican and that they emphasize the value of independence. Slovenia emphasizes academic freedom and the value of institutional autonomy.

6.1.3. Universities, Faculty of Education, and Departments

There are more universities and education faculties in Türkiye than in Slovenia. With the Double-Major Program in Slovenia, teacher candidates must graduate from two majors of their choice, and the reason for this is explained as increasing the career opportunities of teacher candidates after graduation. It is also possible to graduate with a double major in Türkiye; however, there is no such program in the Turkish teacher training system. Teacher candidates can apply to their universities for a double major, but it is not mandatory to graduate with a double major. Double major can be seen as one of the systemic differences between the Faculties of Education in the two countries.

6.1.4. Graduation and Employment

In Türkiye, it was expected that teacher candidates who graduated from the Faculty of Education and graduated from different departments that received formation training would take the KPSS exam and pass the interview until 2024. However, it is planned that the

2025 teacher appointments will be made by selecting the teacher candidates who were successful at the National Education Academy established in 2024, according to the highest score. It is intended to join the Academies with the results of the 2025 Academy Entrance Exam (AGS) and 2025 Teaching Field Knowledge Test (ÖABT). In other words, there is a change in the situation of teachers being appointed to state positions in Türkiye. In Slovenia, teacher candidates must apply to the Ministry of Education and Sports for certification after graduation. In Slovenia, the professional exam is oral. (Eurydice, 2021). In Türkiye, it is planned that graduates who have studied at the faculty of education for four years will enter the National Education Academy and pass two different exams for this. In Slovenia, it is considered sufficient for graduates of the Faculty of Education (master's degree) who pass the oral exam to practice teaching. So, it can be thought that Türkiye has faced challenges with teacher oversupply, leading to competitive employment processes and the introduction of a selection examination for teacher recruitment. With this perspective and its smaller population, Slovenia can maintain a more balanced approach to teacher supply and demand, with graduates finding employment more readily in the education sector.

6.1.5. Professional Development

In both countries, in-service training, participation in different teacher education projects, workshop participation, postgraduate programs, and more up-to-date and in-depth knowledge acquisition contribute to the professional development of teachers. In terms of teacher development, the two countries have remarkably similar characteristics.

6.2. Recommendations

Institutions and Organizations Carrying Out Higher Education Accreditation and Quality Processes: Within the scope of achieving quality education, which is the 4th goal for sustainable development goals, the active use of Bologna and quality processes are seen as structures that have positive effects on preserving diversity and increasing the education quality for countries' education systems. It is recommended that these processes continue to be used for both countries.

Universities, Faculty of Education, and Department: “Double major program” in Slovenia can be seen as a good sample of a teacher training program for Türkiye that has faced challenges with teacher oversupply, which can lead to flexible academic and personal development for teachers. This system can provide local and international students with the tools and opportunities to achieve their career goals.

Graduation and Employment: Since teachers are individuals whose contribution to the education of future generations cannot be denied, studies should be conducted to increase their welfare and employability.

Professional Development: In both countries, in-service training, participation in different teacher education projects, workshop participation, postgraduate programs, and more up-to-date and in-depth knowledge acquisition contribute to the professional development of teachers. Projects that support teachers in interacting, sharing their experiences, seeing different perspectives, and implementing practices appropriate for their own

culture, economy, social environment, and values in their classrooms can be developed.

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APPENDIXES

APPENDIX 1: List of Universities with Faculties of Education in Türkiye

1	Ada Kent Üniversitesi
2	Adıyaman Üniversitesi
3	Afyon Kocatepe Üniversitesi
4	Ağrı İbrahim Çeçen Üniversitesi
5	Akdeniz Üniversitesi
6	Aksaray Üniversitesi
7	Alanya Alaaddin Keykubat Üniversitesi
8	Amasya Üniversitesi
9	Anadolu Üniversitesi
10	Ankara Üniversitesi
11	Artvin Çoruh Üniversitesi
12	Atatürk Üniversitesi
13	Aydın Adnan Menderes Üniversitesi
14	Bahçeşehir Üniversitesi
15	Balıkesir Üniversitesi
16	Bartın Üniversitesi
17	Başkent Üniversitesi
18	Bayburt Üniversitesi
19	Biruni Üniversitesi
20	Boğaziçi Üniversitesi
21	Bolu Abant İzzet Baysal Üniversitesi
22	Burdur Mehmet Akif Ersoy Üniversitesi

23	Bursa Uludağ Üniversitesi
24	Çanakkale Onsekiz Mart Üniversitesi
25	Çukurova Üniversitesi
26	Dicle Üniversitesi
27	Doğu Akdeniz Üniversitesi
28	Dokuz Eylül Üniversitesi
29	Düzce Üniversitesi
30	Ege Üniversitesi
31	Erciyes Üniversitesi
32	Erzincan Binali Yıldırım Üniversitesi
33	Eskişehir Osmangazi Üniversitesi
34	Fatih Sultan Mehmet Vakıf Üniversitesi
35	Fırat Üniversitesi
36	Gazi Üniversitesi
37	Gaziantep Üniversitesi
38	Giresun Üniversitesi
39	Girne Amerikan Üniversitesi
40	Girne Üniversitesi
41	Hacettepe Üniversitesi
42	Hakkari Üniversitesi
43	Harran Üniversitesi
44	Hasan Kalyoncu Üniversitesi
45	Hatay Mustafa Kemal Üniversitesi
46	İhsan Doğramacı Bilkent Üniversitesi
47	İnönü Üniversitesi
48	İstanbul 29 Mayıs Üniversitesi
49	İstanbul Aydın Üniversitesi
50	İstanbul Kültür Üniversitesi
51	İstanbul Medeniyet Üniversitesi

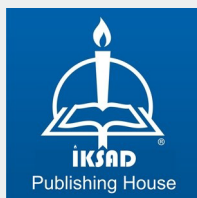
Comparison of education systems in terms of
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52	İstanbul Medipol Üniversitesi
53	İstanbul Okan Üniversitesi
54	İstanbul Sabahattin Zaim Üniversitesi
55	İstanbul Üniversitesi-Cerrahpaşa
56	İzmir Demokrasi Üniversitesi
57	Kafkas Üniversitesi
58	Kahramanmaraş Sütçü İmam Üniversitesi
59	Karamanoğlu Mehmetbey Üniversitesi
60	Kastamonu Üniversitesi
61	Kırıkkale Üniversitesi
62	Kırşehir Ahi Evran Üniversitesi
63	Kilis 7 Aralık Üniversitesi
64	Kocaeli Üniversitesi
65	Kütahya Dumlupınar Üniversitesi
66	Lefke Avrupa Üniversitesi
67	Maltepe Üniversitesi
68	Manisa Celâl Bayar Üniversitesi
69	Marmara Üniversitesi
70	Mersin Üniversitesi
71	Muğla Sıtkı Koçman Üniversitesi
72	Muş Alparslan Üniversitesi
73	Necmettin Erbakan Üniversitesi
74	Nevşehir Hacı Bektaş Veli Üniversitesi
75	Niğde Ömer Halisdemir Üniversitesi
76	Ondokuz Mayıs Üniversitesi
77	Ordu Üniversitesi
78	Orta Doğu Teknik Üniversitesi
79	Pamukkale Üniversitesi
80	Recep Tayyip Erdoğan Üniversitesi

81	Sakarya Üniversitesi
82	Selçuk Üniversitesi
83	Siirt Üniversitesi
84	Sinop Üniversitesi
85	Sivas Cumhuriyet Üniversitesi
86	Süleyman Demirel Üniversitesi
87	Ted Üniversitesi
88	Tokat Gaziosmanpaşa Üniversitesi
89	Trabzon Üniversitesi
90	Trakya Üniversitesi
91	Ufuk Üniversitesi
92	Uluslararası Fırat Üniversitesi
93	Uluslararası Kıbrıs Üniversitesi
94	Uşak Üniversitesi
95	Van Yüzüncü Yıl Üniversitesi
96	Yakın Doğu Üniversitesi
97	Yeditepe Üniversitesi
98	Yıldız Teknik Üniversitesi
99	Yozgat Bozok Üniversitesi
100	Zonguldak Bülent Ecevit Üniversitesi

APPENDIX 2: List of Universities with Faculties of Education in Slovenia

1	Univerza V Ljubljani
2	Univerza V Mariboru
3	Univerza Na Primorskem



ISBN: 978-625-378-297-9