



## A Comparative Study of ICT Programs in Basic Education in Australia, Finland and Iran

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ARTICLE INFO	ABSTRACT
<p>Received: 27 July 2019            Revised: 09 February 2020            Accepted: 21 February 2020            Online: 21 February 2020</p>	<p>International assessments of information and communication technology (ICT) in educational systems show that some countries have made quick advances. This study aimed to investigate ICT policies and programs in the pioneering countries i.e. Australia and Finland and compare them to Iran. To analyze the data and present the results, George Bereday's method was used in four levels of description, interpretation, juxtaposition and comparison. The sample included the relevant documents that were purposely selected through the library and electronic resources. Data were analyzed by qualitative analysis of the documents. The findings showed that Australia's latest action is the National School Reform Agreement 2019-2023, which emphasizes the development of educational programs and curricula. Finland, as the first European country to initiate the integration of ICT in the educational system has been pursuing the development of future teachers' skills, designing e-learning, cultural preparation of schools and attracting business partners by launching the "ICT in School Everyday Life" initiative since 2010. Iran, along with its first efforts in designing programs such as Takfa, Roshd Network and Smart Schools, was able to accompany these developments. Overcoming challenges such as weak private sector participation, lack of long-term financial investment, lack of pre-service teacher training, and lack of coherent evaluation strategies can be a major step in the development of ICT programs in Iranian public education.</p>
<p><b>KEYWORDS</b></p> <p>Comparative Study            Education System            ICT            Australia            Finland            Iran</p>	

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## **1. Introduction**

Information and Communication Technology (ICT) refers to "processes and tools for accessing, retrieving, storing, organizing, controlling, producing, presenting and modifying information electronically" (UNESCO, 2002). In its most recent definition, the ICT concept has been completed by adding "ICT support, special teacher standards and digital literacy" (UNESCO, 2018). Nowadays, this technology has led the educational practices from "memory-based learning" to "dynamic and creative learning" (Kian, 2018). By examining the evidence available about the success of ICT in education in countries around the world, it can be found that the formulation of ICT strategies in education is at the forefront of the educational activities. Among these countries, Australia and Finland are among the most successful countries in the use of ICT in education. These countries have been among the countries participating in the international study evaluating the use of ICTs in education, the results of which show a significant improvement in the development of ICT strategies in the education system (Kozma and Voogt, 2003).

According to the Kozma and Voogt report, Australia and Finland have been recognized for superior information and communication technology, so Australia has been able to rapidly deploy information and communication technologies in its various sectors of education. Australia is internationally recognized for its effective and stimulating approaches.

Finland, on the other hand, came in second after the United States in a study on the growth of the information society and the application of information technology in education among 55 countries (World Education Systems Report, 2006). According to the European Commission's 2019 report, Finland is at the forefront of ICT indicators among EU countries, including digital public services, human capital, 5G network reporting, the development of the role of women in digital community management, digital health services and ICT development in schools. Accordingly, 76% of Finland's population has basic digital literacy and skills, which is above 57% of the EU average. Overall, the European Commission ranks Finland as Europe's largest digitized country (DESI, 2019).

Although Australia has long been involved in the use of ICT in the education system and started its strategic programs in the early 2000s, it still seeks to reap the benefits of ICT in schools (Baskin & Williams, 2006). In its most recent efforts, Australia has incorporated ICT into curricula.

According to ATIC (2016), the Australian National Innovation and Science Program has been able to operate ICT integration in primary and secondary schools, especially for 7th, 9th and 10th grades and has funded the Australian \$ 122.2 million budget since 2016 use, for 4 years. Also in this report, Australia is a rich country in ICT resources and infrastructures and has been able to handle one computer per student, a figure that for all five OECD countries is one computer.

There have been studies on the subject of the present study, for example, Kaylene (2017) in his research showed that ICT is an integral part of Australian school curricula. In addition, ICTs can provide learning opportunities to attract students, provide them with relevant and stimulating learning experiences, and the skills they need for their future. This research highlights the effective uses of ICT in teaching and solving real-world problems in elementary second grade. Another study conducted by the Australian Council on Education, Employment, Training and Youth Affairs in 2005 showed that Australian education has an important developmental period since the announcement of the "National Digital Learning Strategy: School Education Plan for the Information Economy". These developments include: school reform, curriculum, teaching methods and assessment, ICT policy in education, teacher empowerment in ICT, raising students and parents' awareness of the positive effects of technology on learning, as well as social-educational technologies and digital content developments, programs and infrastructures.

Another research (by Abdullahi, 2004) showed that the selected countries, by adopting major strategies and implementing them, have expanded the use of ICT in their education; these include supporting ICT projects and research, adopting bottom-up approaches, supporting companies and encouraging technology transfer from the business to education sectors, encouraging and evaluating teachers to collaborate on these projects, teacher training courses, and creating mechanisms to encourage school-level initiative (granting independence to the schools).

On the other hand, various studies indicate that there are barriers to the use of information and communication technology in the educational system in Iran, such as motivational barriers, equipment-technical, cultural, human, economic-financial barriers, educational infrastructures, access problems, social barriers, professional abilities, filtering and lack of technology professionals (Enayati, Zamani & Zanganeh, 2011).

Therefore, a comparative study is needed to find out and analyze the strategies implemented in the successful countries, in order to have better image of decision making for Iranian educational system. The question now is how the successful experiences of the leading countries in applying ICT in education can be instructive to other countries. In the meantime, the question is that what are the effective ICT programs in the leading countries, and how are they applied in schools. Also, what is the status of ICT strategies in the Iranian education system? What are the similarities and differences between the selected countries? Therefore, the present study seeks to answer the following questions:

- What are the major ICT programs in education, in the selected countries?
- What are the similarities and differences of ICT programs among the selected countries?

## **2. Method**

The present study is qualitative in terms of approach, practical in terms of purpose, and comparative in terms of method. The George Bereday's four-step approach is used to design similarities and differences, based on the John Stuart Mill's "agreement and difference" approach. In addition, the present study is "large" in terms of unit of observation and "informed" in terms of sampling. The strategy of "different systems, same results" has been applied. "Similar systems strategy, same results" (including Australia, Finland), and "different systems strategy, different results" (Iran), meaning that it is assumed that all of these educational systems are different in terms of cultural, social, political and economic dimensions as well as the status of the educational system. As a result, it is expected that the results will not be the same in terms of the variables under study (ICT development programs in primary and secondary education).

The reason for choosing Finland and Australia is that they are at the forefront of ICT in the school system. Selecting the country as the unit of analysis constitutes the dominant and explicit aspect of comparative research (Bray, Adamson, & Mason, 2007). In this way, data in the process of description, interpretation, Juxtaposition and comparison led to the main results of the research. Statistical population included the valid written and electronic documents related to information and communication technology obtained from the Ministries of Education of the selected countries. The sample included the valid international and national documents as well as national curricula of the selected countries. They were selected as library or electronic documents in a targeted manner

(the documents from 1999 to 2019). The searched words and expressions were "ICT, technology development, ICT strategy, ICT at school, educational system". The number of the written documents reviewed included 15 books and 64 articles related to ICT. Finally, the most relevant sources, including 34 first-hand sources, were analyzed. Part of the data was obtained through correspondence with ICT specialists in schools in the selected countries, and translation of the related documents. In this study, the data related to ICT strategies in Australian and Finnish public education, which were among the pioneering countries according to the Kozma & Voogt Report (2003) and (2017), were extracted and analyzed. In the following stages, the status of ICT strategies and programs in Iranian public education system was investigated.

The research data were analyzed by comparative analysis based on qualitative and comparative way. Analytical tables were used to present the findings. For data reliability, consistency, and consistency, it was attempted to incorporate those concepts and terms that were in accordance with the specific definitions. Also, the researcher self-verification, (review of raw data during collection and analysis), and comparative experts' opinions were used to determine the validity of the research data.

### **3. Results**

#### ***A) Description and Interpretation***

**A-1) Australia:** The 2008 Australian Statement, titled "Australian National Strategy on ICT in Schools" states: "In this digital age, children and young people need to be highly skilled in using ICT. While schools are currently using these technologies in learning, we need to significantly increase them over the next ten years" (MCEETYA, 2008).

In Australia, the number of students with home computer access increased from 91 percent in 2000 to more than 99 percent in 2013. Internet access has also increased from 67 percent in 2000 to 98 percent in 2013. According to a 2013 report, Australia has the highest percentage of students using home computers at least once a week (81%), while 87% of them report using their home computer at least once a week (DeBortoli et al. 2014). Australia also participated in the international assessment of school ICT assessment.

The definition used for the International Computer and Information Literacy Assessment (ICILS) is as follows: "The ability of a person to use computers to investigate, create and communicate for effective use at home, at school, in Workplace and in the community (Fraillon, Schultz, & Einley, 2013). Australian students performed well in the international assessment of ICILS. In terms of skill level, Australia is one of the countries where students have the most skills and reach the advanced level of ICT skills.

Australian schools have rich ICT resources, according to ICILS. The report shows that there is a wide range of software resources available in Australian schools. Almost all eight-year-olds have access to educational software; digital learning games; word processing and spreadsheet software; multimedia production tools; editing software; communication and graphics software and design software. According to the report, the proportion of students with access to data recording and monitoring tools is (85%) and to simulation and modeling software, is (85%). This figure shows that Australia was much higher than any other country. This rate is significantly higher than the international average 54% and 41% (DeBortoli et al., 2014).

Australia has launched the "National School Reform Agreement" from 2019, which will continue until 2023. The project is a joint agreement between the Commonwealth of Australia, states and territories aiming to improve student performance and academic performance. By continuously rewriting partnerships between all governments to deliver school education, this National School Reform Agreement can identify strategic reforms in areas where national cooperation has the most impact on achieving positive educational outcomes. This agreement will be implemented from 2019 to 2023 (Department of Education & Training Australia, 2019). In this project, the educational reforms are implemented in eight areas (Table 1):

Table 1. Australia's Educational Reforms  
(Department of Education & Training Australia, 2019)

- Reform 1: Strengthen the Australian curriculum to support teacher assessment methods for student performance and progress
- Reform 2: Select online learning assessment tool to help teachers
- Reform 3: Examine students' future academic and career paths in college
- Reform 4: Examine the workforce needs of future teachers
- Reform 5: Strengthen the accreditation system for elementary teachers
- Reform 6: Create a unique national student ID
- Reform 7: Launch an independent national institute to inform and evaluate teachers' actions, improve the education system and design educational policies
- Reform 8: Improve the quality of national data, synchronize and collect data to enhance national documentation and formulate educational policies

In addition, according to the Australian Department of Education and Training, the Australian Department of Education's Executive Board adopted the "Educational Technology 2017" strategy. This strategy included the planned changes in technology services and systems. The strategy outlines the future of technology solutions that will enable Australian schools to keep pace with more sophisticated technology developments, while also being easier to maintain and meet the business needs. This strategy includes the principles that guide ICT policies (Table 2):

Table 2. Principles of Australia's ICT Policies

- Principle 1: Needs-based technology decisions
- Principle 2: Development of Strategic Technology Operating Systems
- Principle 3: Information as an asset of technology companies
- Principle 4: Security in Designing and Deploying ICT
- Principle 5: Human-centered ICT Designs

In addition to these principles, the strategy highlights four key areas of priority for implementation by 2022. These include: enabling business transformation, providing enterprise technology capabilities, self-organizing for success, investing for the Australian people.

In addition, in Australia, the “Digital Education Advisory for Children” project was launched in 2011. In this project, a group of experts in the fields of education, government policy makers, academics and industry, work together. The tasks of the experts in this project include: measuring Australian schools' progress in updating digital education, unfulfilled areas, setting new priorities, designing strategies for future improvement, high quality digital education practices in schools, evaluating learning outputs based on the existing investments (DEAG, 2011).

**A-2) Finland:** Finland is the leading country in applying ICT in the education system among the European countries (Richardson, 2000). It has also been able to maintain its rank until 2018 (Ministry of Education of Finland, 2019). It has launched numerous strategies and programs since the 1990s, including the followings:

A-2-1): “Information Society Education, Skills and Research” Strategy: In the mid-1990s, Finland embarked on a specific strategy in the information society, in which information and communication technology was an important tool for advancing the chosen path. In Finland, as an information society, education and research have been key players. Since 1995, the integration of ICT skills with public good citizenship, a variety of problem-solving and problem-solving skills and specialized work abilities in an ever-changing, networked life, have become the key education goals (Ministry of Education Finland, 1999). The development of ICT in Finnish education has led to more attention being given to continuing education, specialized skills in ICT, the central role of teachers, the development of knowledge and information products and services, research and provision of support (Table 3):

Table 3. Dimensions of the National Strategy for Education, Skills and Research in the Information Society

Principals	Programs
From instant training to lifelong training	All levels of the education system must move their learning environments towards networking and provide personalized learning opportunities using ICT.
Information society skills for everyone	All elementary and secondary schools must provide ICT skills to both gender groups (male and female). Adults should also have the opportunity to develop their ICT skills.
ICT specialized skills	Finland needs to be at the forefront of professional technical skills in the development of information management services and products. This requires basic education and further training.
The central role of teachers	Teachers must achieve high quality content knowledge and teaching skills in guiding learners in independent search. Pre-service and in-service training should be provided.
Development of knowledge and information products and services	There should be high quality national information repositories and resources in the field of education, training and research. Finland's multimedia entrepreneurship sector will be supported.
Research in the Information Society	Higher education and research should be placed in the international dimension of research. This requires careful calculation of infrastructure, such as the capacity of workshop Kozma & Voogt and high-speed connections.
Education and Research Information Networks	The national IT infrastructure is integrated with global open networks such as the Internet. Schools and learning institutions are also local communities and their networks. Specialties must be provided.
Backup conditions	Legal dimensions, issues of copyright, standardization, public and private protection, information network security and business conditions are identified.

(Ministry of Education, Finland, 1999)

A-2-2): "Strategy 2000-2004": In 1999, the Ministry of Education launched a new ICT strategy in education called "Information Strategy for Education and Research, 2004-2000". This strategy is a continuation of previous government efforts to guide national growth towards the information society through learning and education. The general idea behind this strategy is the "learning citizenship community".

A-2-3): "The 2004-2006 Strategy": The Information Society for Education, Skills and Research strategy emphasizes three areas: knowing the methods, content, and operating environment. In this strategy, the goals of education are formulated by 2007 (Table 4):

Table 4. Targets for information society based education, Finland

- Finland is an open, secure and networked society with high level of information knowledge.
- All citizens have the opportunity and basic ability to use eService and e-content.
- Proper use of ICTs in learning and teaching is part of the daily routine of schools.
- ICT is widely used in research.
- E-learning materials are of high quality and are educational evaluated, meet the needs of different user groups and are easily accessible.
- E-learning materials are also widely available in science and research

(Ministry of Education of Finland, 2004)

A-2-4): Project of "Virtual School of Finland": The project was launched in 2000, with the goal of developing and deploying a place-independent, open-source and distance learning virtual education system for high school students as well as technical and vocational school students. The project was designed to meet the needs of students in remote areas in terms of different courses, grades and even degrees. The program came in the form of a number of projects and incorporated them into the virtual school framework. The main goal of this project was to develop and introduce collaborative, interactive and open learning environments and teaching methods. This approach was based on systematic research and development and effective use of learning outcomes as well as learning strategies and ICT use. In addition to teaching, the project utilized network-based user interaction, consulting, learning materials, and educational services specifically for the entire education system. In elementary and secondary education, there are more local and regional approaches that provide online services to ensure more courses and even to provide compulsory courses throughout the field, especially in the relatively populated areas of eastern and northern Finland. The objectives of this project are as follows (Table 5):

Table 5. Objectives of the “Virtual School” Project of Finland (2004)

- Ensuring high quality and varied basic education across the country, regional and network equity
- Improving teaching and learning methods and ICT skills of teachers and students
- Developing a culture of teaching and learning in schools
- Developing Innovations to Organize Educational Services; Minority Languages;
- Integration of ICT into the curriculum

A-2-5): Finland's New Strategies: Finland has begun reforming its national curriculum for primary and compulsory education in 2010. The curriculum reform process has had positive reflections throughout the Finnish educational system and society. The main goal of this reform program is to move towards "schools developed as learner communities", emphasizing the "enjoyment of learning" and "classroom and school collaboration", promoting the "independence of students in education and in school life" (Halinen, 2015).

In Finland, the National ICT 2010 Educational Usage Project was designed as part of the ICT in Everyday School Project in partnership with the Finnish Ministry of Education and the Ministry of Transport and Communications. The purpose of the project was to educate the ICT and develop a national program. In this regard, Finland has formulated its national strategy for the development of ICT in schools in the framework of the Strategic and Operational Policies program (Linden & Lankinen, 2010) (Table 6):

Table 6. ICT Strategic and Operational Policies in Finland, 2010

- National goals and systematic change
- Future Teachers Skills
- Educational models and teaching practices
- E-learning materials and applications
- School infrastructure, educational facilities, shopping services and support
- Teacher Identity, Teacher Education
- Educational skills (including up-to-date hardware and software, teacher empowerment and teacher educators in the field of ICT educational applications, requirements for updating teacher qualifications, continuing teacher education)
- School cultural preparation and school management
- Business Owners and Networks Partnerships

A-2-6): The “New Comprehensive School” project: This project was launched in line with the "Move to Finland 2020" strategy. The plan includes some educational reforms in three major areas: new education, new learning environments, and digital learning. The goal of the project is to improve learning outcomes, meet future skill needs, transform learning through implementation and test new skills. The overall goal of the project is "to transform the Finnish comprehensive school into a learner-centered education system with world-class teachers and to create an open and participatory school culture". Under the scheme, students are moving towards becoming empowered in ICT. In this regard, "digital competence of students" is as follows (Table 7):

Table 7. Digital competences of Finnish students (Kimmo, 2017)

- Students are guided to understand the principles of mathematics and the application of logic in ICT so that they can develop ICT skills through the development of independent projects.
- Students are taught how to use ICT safely and responsibly.
- Students are taught how to use ICT in the area of information management and the research-oriented and creative uses of ICT.
- Students gain experience in practicing ICT with interactive and networking goals.

**A-3) Iran:** Iran's most important national ICT program is the Development of Information Technology (TAKFA) program, part of which is devoted to ICT development in education. The program was designed and implemented in the early years of 2000s. The purpose of the project was to facilitate the development of a knowledge-based economy. The major TAKFA activities were as shown in the following table (Table 8):

Table 8. Iran's IT Development Goals

- ICT Improvement Program in Human Resources Education and Digital Skills Development
- ICT Development Program in Higher Education
- ICT Development Program in Health and Medical Education
- E-Government Creation Program
- ICT Development Program in Economics, Business and Commerce
- ICT Culture and Knowledge Development Program, Strengthening Persian Language and Language in Computer Environment
- The SME Active Development Program in ICT by creating Growth Centers and Technology Parks (Sites).

Much of the TAKFA's work has been on consulting, developing concepts and exploring facilities, building infrastructure in organizations, completing past projects, and developing human resources (Sadeghnejad, 2003). The followings are some of the education activities of Iran in the field of ICT development (Table 9):

Table 9. ICT Programs of Ministry of Education, Iran  
(ICT Development Management Office, 2016)

- Study and design of a comprehensive model of equipping schools with ICT
- Study and Design of Implementation Model of ICT Development in Education in accordance with Fourth Development Plan
- Design of ICT development plan in education
- Designing a Smart School Model and Experimental Execution of this Project in Phase 1 at Three Schools in Tehran
- Designing E-learning Course
- Designing the Executive Structure of ICT Development in Education
- Study and design of ICT development in nomadic education
- Designed to form the core of information technology at school
- Study and design portal of the Ministry of Education
- Initial Study of Cooperation with the International Cooperation Agency of Korea on Information and Communication Technology Development
- Study and design of a comprehensive plan for education required by the Ministry of Communication and Information Technology

In addition, developing a strategic document for the development of information and communication technology in education has been one of the key activities of the Ministry of Education. Compiled by a group of experts in education, strategic planning and information and communication technology in 2003, the document was approved by the Council of the ICT Development Initiative. Here is what is described as "Outlook, Mission, Overall Goals and Outline of Major Programs":

"The Long Term Vision: Providing an ICT-Based Learning and Learning Environment in a Community and Education System where All Students Develop Critical Thinking and the Ability to Obtain the Knowledge and Skills Required Achieving the Idea Personal goals and the realization of the goals of education and active participation in a knowledge and information society".

In order to increase teachers' ability to use information and communication technologies, the Ministry of Education of Iran launched the "Teacher In-Service Training" Project for its human resources in two periods of 2002. In the meantime, some evaluations of in-service teacher training

in ICT have shown that along with the development of knowledge and skills, continued improvement of the quality of infrastructure and equipment are essential requirements for effective teacher training (Kian, 2009).

In addition, the Ministry of Education's Research and Curriculum Department set up a "National Roshd Schools Network" to get involved in information exchange in early July 2000. The target audiences for Roshd Network are students, parents and educators and education managers. The goal of the network is to provide an appropriate framework for information exchange. In order to foster scientific, cultural, educational and informational content, in 2003, the Roshd network focused more on interactive contents. The Roshd Network seeks to provide more audience engagement in content creation by providing opportunities and opening headlines. The purpose of this network is to provide a convenient and interactive environment for users that will ultimately lead to the development of Islamic-Iranian scientific and cultural development (Roshd Network, 2006). Through the National Roshd Network, which is an educational intranet for students to access science resources, secondary education courses such as biology, physics, chemistry, Arabic, geography and ICDL education are available on the network. These lessons were used as a test for a number of teachers and students in 2004 and are intended to be applied to all teachers and students after the trial run and the results obtained. By the end of 2004, the number of 1226 high schools in five provinces had access to the Roshd Network. With the funding provided by the Ministry of Education for this project, another 4,000 schools had access to the Network by 2005. In this way, not only the students at schools can use the Internet as a group and have access to the Network at home, but also the teachers and the practitioners will have access to the Internet continuously (AyandehNegar, 2006).

Regarding the new developments of ICT in Iranian schools, it is worth mentioning the development plan of "smart schools". The "Smart School" Plan is one of the projects implemented to develop information and communication technology in education for elementary and secondary schools. Launched in Iran in the 2000s, the project has been expanding in the country in recent decades, with smart schools being set up in many cities. Smart schools are those types of educational units that utilize e-learning and ICT, face-to-face and with the preservation of the physical environment of the school, with the presence of teachers and students. The first "smart school" in Iran was launched by the officials of TAKFA's Growth and Design Network in 2003. In the

academic year 2004-2005, four schools in Tehran were experimentally conducted as e-schools (IT Analysis in Iran, 2006). The goals of this project were as:

Table 10. Goals of the “Smart School Project”, Iran

- Comprehensive student development with emphasis on research activities and the promotion of individual abilities
- Content becoming electronic
- Encouraging learning and promoting creativity
- Parental involvement, creating efficient and empowered management using electronic tools

These schools provide students with a smart education system with a holistic and integrated approach to providing educational services. Based on the conceptual model of smart schools, these schools have five main pillars: a multimedia content-based teaching and learning environment; an expanded information technology infrastructure; a computer-integrated school management system; skilled teachers in the field of information technology; Integrated Computer Communication with Other Schools (Razavi et al., 2017).

### ***B) Juxtaposition and Comparison***

Since implementing any change requires defining national policies and policies, Australia has adopted alternate strategies for developing ICT in its education. The 1999 Adelaide Declaration addresses issues such as analysis, problem solving, information sharing, planning and organizing activities, working together, high self-esteem, judging ethical, social, active and informed citizenship, skills Employment-related, innovative use of ICTs and healthy living skills are emphasized. This develops the talents and abilities of the students. The formulation of the 'Learning for Information Society' strategy for 2004 in Australia also reflects the country's education system's efforts to train information and communication technologies to students, teachers and all educational stakeholders. This will facilitate the government's move to focus on the transcendent growth of its young generation to live in a new information age. Specific strategies across different Australian states also highlight the need to strengthen IT infrastructure, integrate learning technologies into curriculum and learning plans, develop specialized IT teachers, and develop safe and equal access to integrated learning technology environments in schools. From 2011 onwards,

New Australian programs are also widely recognized through the "Digital Education - Technology in the New Australian Education System" (2017 to 2022) projects as well as the National School Reform Agreement (2019 until 2023). These programs are designed to transform curricula, develop ICT-based human-centered designs for schools, and develop quality of processes and outcomes of ICT implementation in schools.

On the other hand, Finland has also launched its 1990s 'Education, Skills and Research in the Information Society' strategy. It had some principles as: "Towards Permanent Education", "Information Society Skills", "ICT Specialized Skills", "Teachers' Central Role", "Development of Knowledge Products and Services", "Research in Information Society", "Education and Research Information Networks" and "Supporting Conditions". Finland's second strategy for the development of ICT in education also placed greater emphasis on content development and implementation practices, increased international cooperation in education, training and research, increased cooperation and coordination between the public and private sectors, focusing on development, media and the impact of its integration in education, training and research, and providing equal opportunities for all citizens. In addition, Finnish "Education Policy 2006" considers Finland as an open, secure and networked society with high level of information knowledge. It strives to give all citizens the basic opportunity and ability to use eService and electronic content; make appropriate use of ICTs in learning and teaching; be part of the everyday school process; use ICTs extensively and appropriately in research; produce and evaluate high quality electronic teaching materials; and meet the needs of different user groups and easy accessibility. This means that Finland aims to achieve the goal, by 2007, of at least 75% of teachers have access to ICT teaching knowledge and skills and to integrate ICT into curricula, staff development and management training.

In short, Finland's approach is in the form of a systematic approach to development. The ideal of Finland is the systematic transformation of society. Systematic in the sense that all levels of society must be included in the development strategy: the private sector, the public sector, the community, the family and the individual. It is also a transformational approach in that all of these levels work together to move toward a common vision and bring about a fundamental change in society. Finland did not achieve this transformation through a top-down hierarchy, but rather created a political atmosphere that was nurtured and based on a consensus on the goals of social values. These policies facilitated widespread cross-sectorial networking and supported the creation

of new information and technological innovations that shaped economic growth. Finland also launches its latest program in the form of an ICT in Everyday School Life (2010) with the aim of designing ICT policies tailored to national goals, pursuing future teachers' needs and skills, designing e-learning for schools, preparing The school pursues a culture of business and attracts business owners. In general, some comparisons of ICT programs in the Australian and Finnish educational systems with Iran can be pointed out as follows (Table 11):

Table 11. Comparison of ICT Programs in Educational Systems in Australia, Finland and Iran

Comparison Indicators	Results
<b>Similarities</b>	<ul style="list-style-type: none"> <li>– Formulation of ICT macro policies in schools</li> <li>– Start applying ICT in primary and secondary schools</li> <li>– Pay attention to in-service teacher training in ICT</li> <li>– Developing ICT-based content for schools</li> </ul>
<b>Differences</b>	<ul style="list-style-type: none"> <li>– Weaknesses in attracting private sector participation and investment (in Iran)</li> <li>– Lack of long-term and large-scale investment in Iran (this principle was followed in Australia and Finland)</li> <li>– School principals support (very high in Australia and Finland)</li> <li>– Implementation of plans for regional and remote schools (high in Australia and Finland)</li> <li>– Establishing ICT learning centers (existed in Australia and Finland)</li> <li>– Not using ICT pre-service training for teachers (in Iran)</li> <li>– Failure to formulate a coherent evaluation strategy of ICT, based on student and teacher dimensions (in Iran)</li> <li>– Greater emphasis on collaborative and teamwork in the school network (existed in Australia and Finland)</li> <li>– Failure of teachers' skills development in ICT to suit their disciplines (in Iran)</li> </ul>

#### 4. Conclusion

The present study determined the results of a comparative study of ICT programs in education in Australia and Finland with Iran. New Australian programs from 2011 are often identified as the Digital Education, Technology in New Australian Education System (2017 to 2022) and National School Reform Agreement (2019 to 2023) initiatives. Aiming to transform curricula, developing ICT-based human-centered designs for schools and expanding the quality of ICT implementation outcomes in schools are ongoing.

In the area of teacher professional development, Australia has moved in line with global standards by implementing the Teacher Education Qualification Program. By examining existing patterns of pre-service education, programs such as providing effective ICT skills for teaching and learning, with the participation of teacher training centers, implementing ICT-integrated curricula, as well as partnering with schools to provide education Practices follow the appropriate specialization for pre-service teachers. In the meantime, the policy of using the "Teacher-to-Peer" model is seen as the training of trained teachers for other teachers.

Finland also launches its latest program in the form of an ICT in Everyday School Life (2010) with the aim of designing ICT policies tailored to national goals, pursuing future teachers' needs and skills, designing e-learning schools, cultural preparation Schools, followed by the involvement of business owners. The country has launched distance education for teachers by implementing the "Virtual Teacher Training Project" and has implemented a policy of updating teachers' skills, even in remote areas. The lack of decentralization of the Finnish education system has led to the transfer of teacher education decisions to the local level, and local authorities have more responsibility in the process of in-service teacher education. Also, extending the length of time, teachers have to attend compulsory education courses and providing ICT units to teachers, has been one of Finland's other successful ICT development policies.

The findings of the present study are in some respects consistent with the results of Kaylene (2017) research on the evolution of the Australian school curriculum using ICT, and the MCEETYA (2005) research on the emphasis of Australian strategies on the development of educational approaches, teacher empowerment in ICT use. The findings are also in line with Abdullahi's (2004) research on pioneering countries' emphasis on private sector participation, support, decentralization of ICT policies in schools, encouragement of teachers to participate, and emphasis on digital content development.

Studies of the years 2015-2019, in the Iranian public education system, showed that the school-smart project has some merits and challenges. For example, underdevelopment of infrastructure for all educational districts in Iran has led to educational inequality in many areas. Not all cities and villages have been able to implement a smart class system.

Another problem has been the weakness of teachers' readiness and the lack of ICTs in all smart schools. The specialist staff that should prepare for this plan and perform well is not present in many schools. Teachers are also not prepared. These are the problems that the school smart plan is still facing. In addition, a field survey of the performance of Iran's smart schools shows outstanding results. For example, the study of "smart schools in Iran, from policymaking to action: a multiple case study" (Talaee, et al., 2016), suggests that there is a deep gap between smart school policy documents and what is actually happening. This gap is particularly significant in the area of process factors (such as teacher-student interaction in pedagogical practice, interaction between students, teacher-to-peer interaction, and with the school administrator). This study offers suggestions, such as ICT-based curriculum development, infrastructure development, teacher and student education, development of educational equity, and the reduction of the digital divide between ICT-excluded and wealthy schools. Amirafazli's (2014) study of smart school performance showed that challenges such as teachers' poor knowledge of ICT, the lack of ICT use in educational and research opportunities, and technical and infrastructure factors threaten the efficiency of smart schools. This study proposes solutions such as culture building, teacher preparation, motivation and optimal infrastructure development. According to the findings of Razavi et al. (2017), smart schools studied in this study are in poor condition regarding ICT usage in learning process. Based on the qualitative data analysis, the reasons for the poor status of the schools were identified. In general, the problems facing these schools in utilizing ICT can be classified into nine general categories: problems related to resources, facilities and infrastructure; lack of motivation; inadequate education and low knowledge and skills; attitudinal and cultural problems; financial and economic problems; planning and curriculum problems; neglecting ICT educational potential; and student constraints.

Overall, it should be noted that the Iranian education system has begun to take positive steps in the direction of adapting to the information and communication age. But the development of ICT in Iranian schools faces some serious obstacles. Strong centralism in the areas of educational planning and in the executive domain is one of the structural features of Iranian education. This characteristic of the Iranian educational system is far from the information age, with a strong emphasis on innovation, management and learning management. Other issues such as poor motivation and skills of teachers and sometimes poor teacher acceptance, inadequate educational facilities, lack of research capacity and financial constraints on education are the most important barriers in the field of information and communication technology in education.

In general, based on the findings of the present study, some suggestions are made to enhance ICT development programs in the Iranian education system:

- Needs assessment and planning of ICT development in schools, in accordance with the results of evaluations of the implemented projects
- Continuing to empower teachers with ICT competencies in pre-service and in-service training
- Decentralization of ICT development schemes in schools and empowering educational districts to create innovation tailored to regional needs
- Fair development of infrastructure and human resources preparation for all areas of education, (including the deprived and wealthy schools)
- Continuous evaluation of ICT development plans in the education system to ensure continuous quality of these programs.

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