**An ICT role in key sectors of development of society. Standards in the field of ICT**

Plan of lecture

* **Definition of ICT.**
* **Subject ICT and its purposes.**
* **An ICT role in key sectors of development of society.**
* **Standards in the field of ICT.**

**What is Information and communications technology?**

Information and communications technology it is more extended term for information technology which stresses the integration of communications and of telecommunications, computers as necessary software, its storage and the audio-visual systems, which give opportunity to access, store, analysis, and management information. They include the “old” ICTS of radio, television and telephone, and the “new” ICTs of computers, satellites and wireless technology and the Internet. These different tools are now able to work together, and combine to form our “networked world”, a massive infrastructure of interconnected telephone services, standardized computer hardware, the Internet, radio and television, which reaches into every corner of the globe. ICT has no universal definition, as "the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis." The ICT covers anything that will store, retrieve, management or receive information electronically in a digital form e.g. computers, email, movie, cryptocurrency, applications and even the robots. ICT, probably, area that has had one of the strongest impact on society during the last years. The technology is visibly present in our use of computers, gadgets (tablet, smart phone), bots, robots, information search, but, has an even greater impact for a large number of application areas, such as education, healthcare, economics, public management, logistics. In these modern times of technological advancements, children are more interested in trying out; hence, a teacher should act as a facilitator and should encourage a child / student to advance technologically and in the right direction. In the field of education, ICT can be used to enhance quality and value of education especially through integration. Information and Communication Technology can contribute to universal access to education, equity in education, the delivery of quality learning and teaching, teachers’ professional development and more efficient education management, governance and administration.

**There are two definitions of ICT**

ICT is the study, design, development, application, implementation, support or the management of computer-based information systems. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. (Chandler, Daniel; Munday, Rod, I. August 2012)

A branch of engineering dealing with the use of computers and telecommunications equipment to store, retrieve, transmit and manipulate data is called ICT. (Daintith, John, ed. 2009)

FUNCTIONAL DEFINITIONS

 1. ICT refers to Information and Communication Technology which includes media of communication (Radio, TV, Tapes, CDs), Information Machines (Computers, Tablets), Telecommunication Technologies & Equipments (GPRS, Satellite Phones & Mobiles).

2. CAL refers to Computer Aided Learning making use of computers, internet and smart boards.

3. Communication is a basic prerequisite of all human performances & interaction between two or more people in the form of transmission of thoughts, information & commands by employing the different infrastructure available – verbal (oral) or non-verbal (technological).

4. Technology means "science of craft". It is derived from Greek word ‘techne’ meaning "art, skill, cunning of hand"; and ‘logia’ which is the collection of techniques,skills, methods and processes used in the production of goods or services or in the accomplishment of objectives such as scientific investigation.

**Subject ICT and its purposes**

The goal of the course is to teach critically evaluate and analyze the processes, methods of searching, storing and processing information, methods of collecting and transmitting information through digital technologies.

 **Objectives of ICT**

* to learn of the conceptual foundations of computer systems architecture, operating systems and networks;
* to formulate knowledge about the concepts of development of network and web applications, information security tools;
* to formulate skills to use modern information and communication technologies in different areas of professional activity, scientific and practical work, for self-study and other purposes.

Be a standardized and unified system for the effective implementation of targeted information management processes.

Today, the role of information and communication technologies is expanding due to the demand for information resources of society.

The information society is a society that is engaged in the creation, storage, processing and sale of information. The highest form of such information is knowledge. To advance the development of society, it is necessary to organize the production of not a material, but an information product.

Thus, the transition to the information society is accompanied by a change in the production of material goods for the provision of services. Such a transition, for example in the economy, entails a significant reduction in the cost of extracting and processing raw materials, as well as energy consumption. In some cases, one or more steps may be excluded altogether.

As part of the instructions of the President of the Republic of Kazakhstan, described in the article “Social modernization of Kazakhstan: twenty steps to the society of universal labor” dated July 23, 2012 No 961, a new program “Information Kazakhstan - 2020” was approved. The purpose of this program is to create conditions that would ensure the country's transition to the information society. The program is aimed at ensuring the effectiveness of the public administration system, the availability of innovative and information and communication infrastructure, the creation of an information environment for the socio-economic and cultural development of society, as well as the development of the national information space

**An ICT role in key sectors of development of society.**

We use ICT every day and ICT contributes to the development of different fields of life.

ICT, which includes computers, software applications, and the internet, are benefiting countries and their citizens. A 2009 World Bank report found that for every 10 percent increase in high speed internet connections, there is a 1.3 percent increase in economic growth.

Let’s look ICT in key sectors

**ICT in Public Sector Management**

Using ICT in Government to provide more efficient and cost-effective government, promote creating more convenient government services, give greater public access to information, and make government more transparent to citizens. For example egov.kz, government.kz, sergek

**Education**

The technology helped us in our education as well. This has introduced the easiest way of learning and teaching for both students and the teachers. We can use internet every where to different books and also we can watch videos on the internet to get more ideas about the topic that we want to research on. Using projector in schools and other educational field to discuss the work with the whole

We can also ask question from our teacher using emails while we are at home which could be very important especially before the exam day and we can also research on the internet and we don't have to look at the books and find the right page. Also good examples of ICT in Education is eBooks, interactive whiteboard, online courses, internet portals.

**Health**

ICT has revolutionized healthcare in many developing countries by more efficiently disseminating public health information and facilitating consultation in health issues. Through telemedicine, patients can avoid long and expensive journeys to seek help by receiving remote consultation, diagnosis, and treatment from specialists in far off hospitals. ICT also means better collaboration and sharing of learning and training among health workers. The use of ICT in administrative systems of health care facilities brings huge gains in efficiency and cost savings. Thousands of lives are already being saved though the monitoring of public health threats using ICT which also allows a faster and more effective response.

For example: expert systems, idoctor (chocolife), IBM Watson Health

**ICT in Agriculture and Food Security**

Information and communication technologies (ICTs) can facilitate access to timely and accurate information for an improved agricultural production. Access to information is crucial in family farming, which is known to be heterogeneous, primarily family-based labour, production of highly diversified products, and limited access to productive resources.

ICTs, especially mobile applications, are playing key role in facilitating access to these resources by the poor. The “digital financial services” revolution has huge implication on family farmers. Also example of ICT in Agriculture is intelligent irrigation systems, specialized programs for working with agronomic maps, Software for monitoring equipment in agriculture

<https://www.youtube.com/watch?v=suMI7ntPpBk>

**Standards in the field of ICT**

In the Republic of Kazakhstan in the field of information technology, there are many state and interstate standards.

The ICT industry has a great responsibility for the further development of society. Effective government regulation of ICT innovation development is the basis for improving the efficiency and competitiveness of the national economy of Kazakhstan. The main legislative acts that regulate legal relations in the field of IT include:

1) Business Code of the Republic of Kazakhstan dated October 29, 2015.

2) The Code of the Republic of Kazakhstan on Administrative Offenses of July 5, 2014.

The Laws of the Republic of Kazakhstan include:

1) “On Communications” dated July 5, 2004.

2) “On informatization” dated November 24, 2015.

3) “On television and radio broadcasting” dated January 18, 2012.

4) “On technical regulation” dated November 9, 2004.

5) “On ensuring the uniformity of measurements” dated June 7, 2000.

6) “On natural monopolies and regulated markets” dated July 9, 1998.

There are two technical standardization committees in the infocommunications industry of the Republic of Kazakhstan:

1) TC 34 "Information technologies" on the basis of the ALE "Kazakhstan Association of IT Companies".

2) TC 63 "Systems, facilities and services of infocommunications" based on the ALE "The National Telecommunications Association of Kazakhstan". Technical committees on standardization participate in the development of national, preliminary national, international, regional, interstate standards, as well as in the formation of the national standardization program. Also in Kazakhstan, national standards in the field of SmartCity are approved. And there are ISO standards, including ISO / IEC 27031: 2011 “Information technology. Methods of protection. Guidelines on Information and Communication Technology Readiness for Business, which describes the concepts and principles of information and communication technology (ICT) preparedness for business continuity (BSS), and provides a system of ICT readiness methods and processes for any organization to ensure business continuity.

<https://www.nitec.kz/pages/gosudarstvennyie-standartyi-respubliki-kazahstan--v-oblasti-informatsionnyih-tehnologiy>

**ICT Standarts**

The online Cambridge dictionary provides the following definitions for the term &quot;standard&quot;: &quot;a pattern or model that is generally accepted&quot; (example, &quot;This program is an industry standard for computers&quot;) and &quot;a level of quality&quot;

(example, &quot;This piece of work is below standard/is not up to standard.&quot;). We may distinguish between two main different types of standards, according to the way they are born: &quot;de facto standards&quot; and &quot;formal standards&quot;. A &quot;de facto standard&quot;, also known as &quot;standard in actuality&quot;, arises when a winning solution is widely and independently adopted by different industries within a market segment and products developed on such a basis are widely accepted by customers.

Let’s have a look at the following ICT- related items:

■ PDF: a document format created by Adobe Systems.

■ HTML: a language for describing the structure and content of Web pages. Tim Berners-Lee originally created it.

■ Microsoft Windows: an operating system that became an industry standard, and so did its specifications (e.g. the Microsoft Web Services Security specification, WS- Security).

What they all have in common is that they have had a huge impact on society, as millions of users use them. They are called &quot;de facto standards&quot;. They are common practices adopted by the market, which are not the result of any standardization process.

Another Example of &quot;de facto standard&quot; is

■ most widely used keyboard layout (QWERTY) dates back to 1864, when Christopher Sholes patented it. The later Dvorak version (1936, by August Dvorak) was intended to increase typing speed, but owing to the already consolidated position of QWERTY, was not as successful (though natively supported by most modern operating systems).

A de facto standard is a custom or convention that has achieved a dominant position by public acceptance or market forces (for example, by early entry into the market), and that usually has the attractive characteristic of having been validated by market processes.

A formal standard is a document that has been approved by a standards development organization. In our country, one of such organizations is the Kazakhstan Institute for Standardization and Certification http://www.kazinst.kz/

Standardization documents can be classified according to many approaches, is a list of categories and representative examples, Terminology standards. These documents compile structured vocabularies,

terminologies, code sets and classification systems that most ICT systems rely on, e.g.:

■ ISO/IEC 17788:2014 Information technology – Cloud computing – Overview and vocabulary

Measurements or test methods. These documents define the objectives and guidelines for testing ICT. They provide guides for test planning, implementation and reporting.

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System architecture. Documents that support the formal description of ICT systems and their components, characteristics and processes. For example:

■ ISO/IEC/IEEE 42010:2011 Systems and software engineering—Architecture description.

Reference models. These documents inform the design of the architecture of ICT systems according to a given model, for example:

■ W3C Recommendation, 15 December 2004. The Architecture of the World Wide Web, Volume One.

Software and networking standards. There are documents about computer software, including programming languages (e.g. C++ is published as ISO/IEC 14882), Application Programming Interfaces (API) (e.g. ISO 17267 on API for navigation systems for intelligent transport systems) Quality assurance. These documents provide requirements for managing the quality of projects or systems, such as:

■ IEEE 730-2014 – Software Quality Assurance Processes.

The above classification is not strict in the sense that one document may be allocated to more than one category. Another broad classification of standards is related to whether a standard is horizontal or vertical standards apply to different aspects within an industry sector or entity. Horizontal standards, however, address aspects that are applicable across multiple industries or entities.

Example of vertical standards: Standards about social alarm systems, which are ICT mediated services aiming to provide safety and wellbeing to citizens, especially to the elderly and disabled.

This standards deal with different aspects of social alarms, such as the vocabulary and terms, the technical requirements for their devices (sensors, panic buttons etc.), their interconnections.

Example of horizontal standards: Standards about electromagnetic compatibility addresses aspects that include descriptions of electromagnetic phenomena and the EM environment, measurement and

testing techniques, and guidelines on installation.

**Conclusion**

Information and Communications Technology (ICT) has an important role in the world since we are now in the information age era. Nowadays ICT cannot be separated with our daily needs.

The impact of ICTs is also seen in their creative and cost-efficient use in basic sectors, such as education, health, and agriculture, among others.