Information technologies in the professional sphere. Industrial ICT. Perspectives of development of ICT.

Information and communication technologies for development (ICT4D) refers to the application of information and communication technologies (ICTs) toward social, economic, and political development, with a particular emphasis on helping poor and marginalized people and communities. It aims to help in international development by bridging the digital divide and providing equitable access to technologies.

ICT4D is grounded in the notions of "development", "growth", "progress" and "globalization" and is often interpreted as the use of technology to deliver a greater good. Another similar term used in the literature is "digital development“. ICT4D draws on theories and frameworks from many disciplines, including sociology, economics, development studies, library and information science, and communication studies.

History

ICT4D grew out of the attempts to use emerging computing technologies to improve conditions in the developing countries. It formalized through a series of reports, conferences, and funding initiatives that acted as key policy-making avenues:the 1998 World Development Report from the World Bank, highlighting the role of knowledge and ICTs in development; a report from the G8 Digital Opportunities Task Force, concluding that ICTs play a key role in modern human development, the World Summits on the Information Society held in Geneva in 2003 and Tunis in 2005.

At least three phases can be identified in ICT4D evolution:

- **ICT4D 0.0: mid-1950s to late-1990s.** The focus of this earliest phase was on the use of IT (not ICT) in government and private sector organizations in developing countries. One of the earliest computers used in a developing country was a HEC machine installed in 1956 to undertake numerical calculations in the Indian Institute of Statistics in Kolkata.
- **ICT4D 1.0: late-1990s to late-2000s.** The advent of the Millennium Development Goals combined with the rise and spread of the Internet in industrialized countries led to a rapid increase in investments in ICT infrastructure and projects in developing countries. The most typical application was the telecentre, used to bring information on development issues such as health, education, and agricultural extension, into poor communities. Later, telecentres were also used to deliver government services.
- **ICT4D 2.0: late-2000s onwards**. There is no clear boundary between phases 1.0 and 2.0. The focus in the phase 2.0 increasingly shifts toward technologies in use, such as the mobile phone and SMS technologies. There is less concern with e-readiness and more interest in the impact of ICTs on development.

ICT access and use

Mobile phone subscribers per 100 inhabitants growth in developed and developing world between 1997 and 2007.

ICT development includes many types of infrastructure and services, ranging from telecommunications, such as voice, data, and media services, to specific applications, such as banking, education, or health, to the implementation of electronic government (e-government). Each of these types has its own trends that vary across countries and regions.

One of the most positive trends has been observed in voice communications. Thus, the proportion of mobile phone subscriptions in developing countries increased from about 30 percent of the world total in 2000 to more than 50 percent in 2004 and to almost 70 percent in 2007.

Access to ICTs in the developing world has been framed through the concepts of digital divide and use / non-use. The use of mobile phones as part of ICT4D initiatives shows some positive effects in improving access to information and services. Analysis of mobile phone use in developing countries shows that the use of mobile phones improves access to information, helps to address market inefficiencies, and can be used in disaster relief.

Education

The use of ICTs in the educational system would not be able to solve the current problems in the educational system, but rather provide alternative solutions to the obstacles encountered in the conventional educational system. ICTs would be able to provide education and knowledge in a wider reach, even with a limited amount of resource, unlike conventional systems of education.

ICT has been employed in many education projects and research over the world. The Hole in the Wall (also known as minimally invasive education) is one of the projects which focuses on the development of computer literacy and the improvement of learning. Other projects included the utilization of mobile phone technology to improve educational outcomes .

Health

ICTs can be a supportive tool to develop and serve with reliable, timely, high quality and affordable health care and health information systems and to provide health education, training and improve health research.

According to the World Health Organization (WHO), 15% of the world's total population have disabilities. This is approximately 600 million people wherein three out of every four are living in developing countries, half are of working age, half are women and the highest incidence and prevalence of disabilities occurs in poor areas. With ICT, lives of people with disabilities can be improved, allowing them to have a better interaction in society by widening their scope of activities.

E-government and civic engagement

New forms of technology, such as social media platforms, provide spaces where individuals can participate in expressions of civic engagement.

Social Networking Sites are indispensable for it provides a venue for civic engagement for its users to call attention to issues that needs action because of the nature of social media platforms as an effective tool in disseminating information to all its users. Social media can also be used as a support venue for solving problems and also a means for reporting criminal activity or calamity issues that affects the well being of communities.

Civic engagement plays a large part in e-government, particularly in the area of Transparency and Accountability. ICTs are used to promote openness in the government as well as a platform for citizens to report on anomalous government activities for the purpose of reducing corruption and in promoting efficiency.

Even before the advent or popularity of social media platforms, internet forums were already present. Here, people could share their concerns about pertinent topics to seek solutions.

The e-government action plan includes applications and services for ensuring transparency, improving efficiency, strengthening citizen relations, making need-based initiatives, allocating public resources efficiently and enhancing international cooperation.

Information

Views, properties and units of measurement of information

Views of information

Origin region

- Mechanical
- Biological
- Social

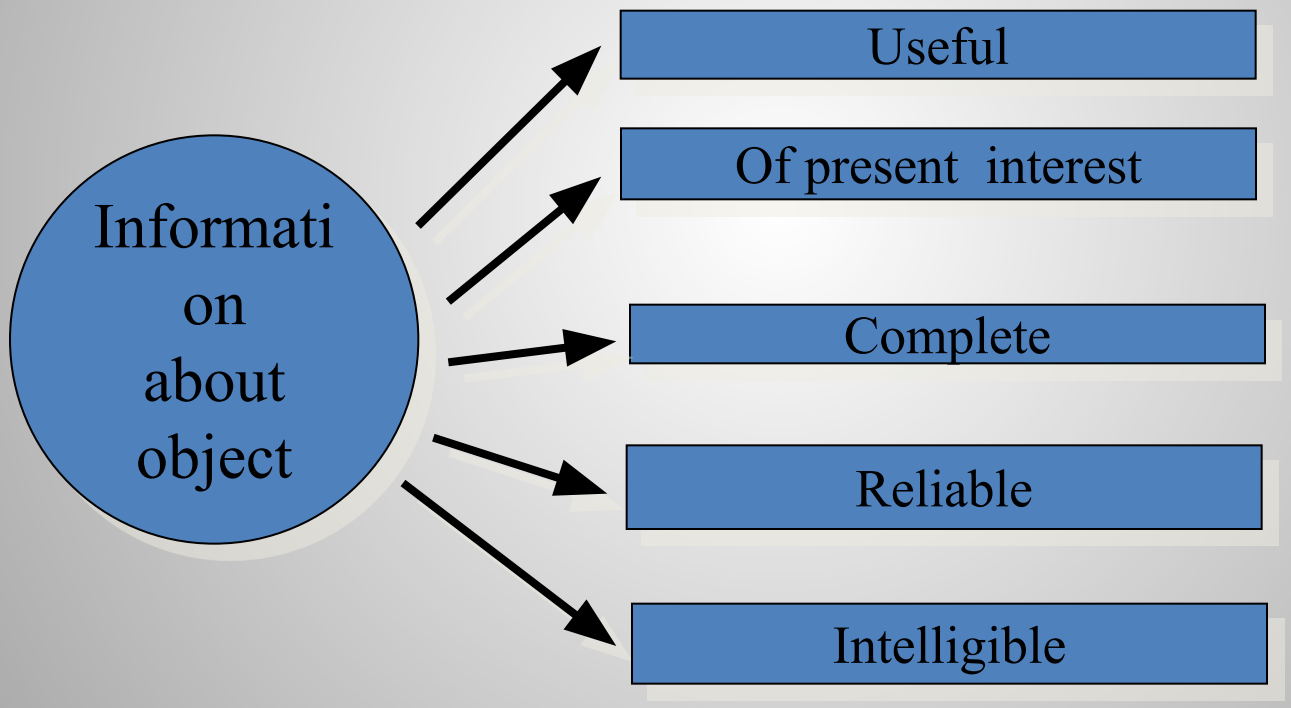
Method of transfer and perception

- visual
- sound or audio
- feeling
- smell and taste
- mechanical

Social using

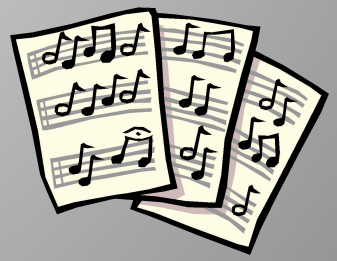
- personal
- mass
- special

Properties of information



Coding of information

- Code – set of symbols for presentation of information.
- Coding – presentation process of information in code.
- Decoding – conversion of data from binary code in form, which people understand.



Units of measurement of information

Name	Abbr.	Size
Byte	b	8 bits
Kilobyte	Kb	$2^{10} = 1,024$
Megabyte	Mb	$2^{20} = 1,048,576$
Gigabyte	Gb	$2^{30} = 1,073,741,824$
Terabyte	Tb	$2^{40} = 1,099,511,627,776$
Petabyte	Pb	$2^{50} = 1,125,899,906,842,624$
Exabyte	Eb	$2^{60} = 1,152,921,504,606,846,976$
Zettabyte	Zb	$2^{70} = 1,180,591,620,717,411,303,424$

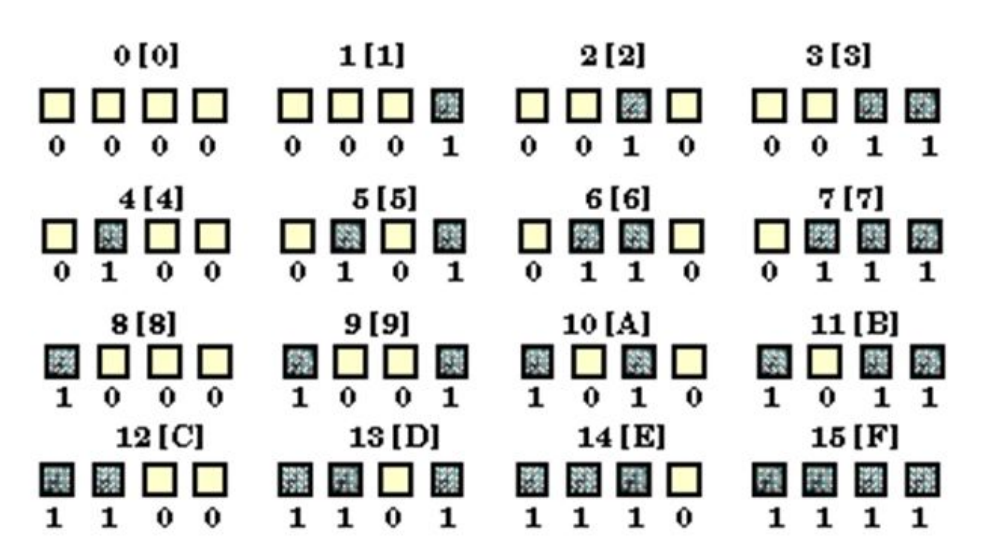
Number systems

Number system is methods and rules of number presentation with help of definite symbols set.

Number system	Base	Using figure
Decimal	10	0, 1, 2, 3, 4, 5, 6, 7, 8, 9
Binary	2	0, 1
Octal	8	0, 1, 2, 3, 4, 5, 6, 7
Hexadecimal	16	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F

13

Hexadecimal



- 1100010101
- 001100010101
- 3 1 5
- Answer : $1100010101_{2} = 315_{16}$

Rules of conversion from binary to decimal number system

Example 1

$$1\,0\,1\,1_2 = 1\cdot 2^3+0\cdot 2^2+1\cdot 2^1+1\cdot 2^0=8+2+1=11_{10}$$

$2^3\ 2^2\ 2^1 2^0$

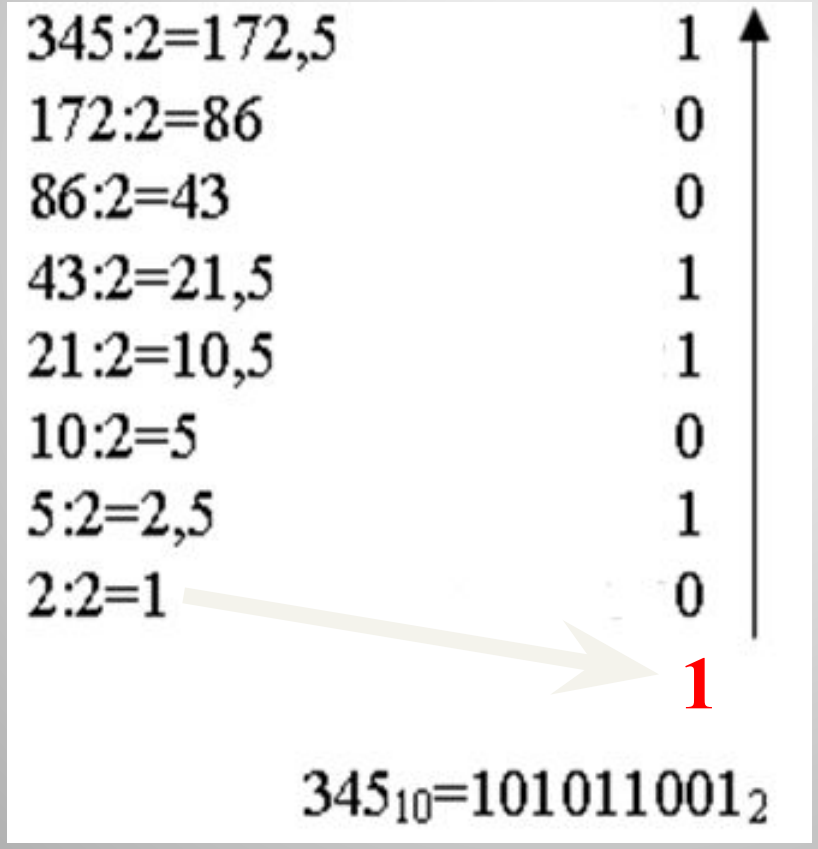
Example 2

$$1\ 1\ 0\ 1\ 1\ ,\ 1\ 0\ 1_2 = (1\cdot 2^4 + 1\cdot 2^3 + 0\cdot 2^2 + 1\cdot 2^1 + 1\cdot 2^0 + + 1\cdot 2^{-1} + 0\cdot 2^{-2} + 1\cdot 2^{-3})_{10} = 27,625_{10}.$$

$2^4\ 2^3\ 2^2\ 2^1\ 2^0\ 2^{-1}\ 2^{-2}\ 2^{-3}$

Rules of conversion from decimal to binary number system

conversion 345 to binary number system:



Find 110011+1101

Logical addition of numbers:

0+0=0

1+0=1

0+1=1

1+1=1 0

1+1+1=1 1

$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ 1\ \ 1\ \ 1} \\ 110011 \\ + \quad 1101 \\ \hline 1000000 \end{array}$$

Students' individual work

1. **Conversion from binary to hexadecimal number system:**

   a) 1001011111010; b) 1111111001001; c) 10101011110; d) 1110010100

2. **Conversion from hexadecimal to binary number system:**

   a) A9E; b) 281; c) 4D6; d) 7CB3

3. **Conversion from binary to decimal number system:**

   a) 10111001; b) 1110001; c) 110110; d) 1001001

4. **Conversion from decimal to binary number system:**

   a) 843; b) 152; c) 491; d) 534

5. **Find addition :**

   a) 11110011+111011; b) 110001+10001

Thank You