What We Teach Our Children

A LIST OF SKILLS FOR THE 21ST CENTURY

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Intellectual capital is the driving force of the 21st century. Political, social and economic progress in this millennium will depend on the intellectual potential of future generations of young people. The skills students are being taught, the manner in which they are taught and the necessity to refresh their skills should, thus, come as no surprise. The urgency for workers to expand their skill sets in order to meet the requirements of the 21st century is apparent, given the number of reports from various sources calling for immediate action.

The list of skills needed for the 21st century was compiled by referencing different sources. These include a great number of excellent scientific papers, reports, contemporary literature and the opinions and research results of high-ranking professionals in the fields of education, business and economics.

By illustrating common definitions and scenarios in relation to the skills students and workers need to possess in the emerging digital age, the list serves as a bridge between the public, business and educational sector. In order to prepare themselves properly, students should acquire their skills and competences within the framework of contemporary skills. The ability of students to implement their skills in the digital age as well as objective skill assessments will determine whether the children of today are ready to live, study, work and serve society in a digital environment.

The current and the future state of global economy as well as that of individual nations depends on the level of proficiency young people attain in this new kind of literacy - the literacy of the 21st century. Being literate in the 21st century means that you have excellent academic skills, that you can think about and comprehend content, that you can work in a team and that you know how to use technology.

In order to progress in a digital economy, students will have to acquire the skills of the digital age. The educational system should keep up with these changes in order to successfully prepare its students for the world outside the classroom. The educational system should understand and accept the 21st-century skills into its academic standards. In other words, schools should implement the aforementioned skills into their programmes.

The framework for education in the 21st century demonstrates a holistic approach to teaching, which combines the discrete focus on learning objectives (a set of specific skills, substantial knowledge, competence and literacy) with innovative systems which enable students to master multidimensional 21st century skills.

These are what many people believe to be the most important skills when it comes to being successful in the 21st century.

Literacy in the Digital Age – The Basic Requirements of Today

As society changes, the skills needed to perform complex functions also change. In the early years of the 20th century, people who knew how to read, write and do basic maths were considered to be literate. Only in recent years has the educational system come to expect students to be able to read critically, write convincingly, think logically and solve complex mathematical and scientific problems. Students are expected to master computer and media literacy. They have to know how to analyse, access, manage, integrate, evaluate and create information in various media.

Alvin Toffler: "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn. Those who can unlearn and relearn will be the leaders of tomorrow."

Visual and Information Literacy

The increased use of graphic tools has resulted from the fact that the Internet uses a graphic interface and that audio, video and data have been transferred into the digital format. Digital cameras, graphics, videos, photo standards and other such advanced technologies enable users to convey their ideas through images. Students need good visualisation skills in order to interpret images, spot patterns and communicate via images. Information literacy refers to the effective and efficient access to information, the evaluation of information in a critical manner and the use of information in an accurate and creative fashion.

Cultural Literacy and Global Awareness

The world has been networking at great speed and trade globalisation has increased the need for cultural literacy. In a global economy, where interaction, partnership and global competition are highly regarded, there is a greater need for knowledge, understanding and respect among cultures, including the cultures which have been established as norms in the tech world, e.g. virtual reality.

Creative Thinking – Intellectual Capital

Adaptability/managing complexity and self-direction

The interconnectivity of today's world has brought about an unprecedented complexity. Globalisation and the Internet are very complex and they accelerate the changes in the world. In such an environment, individuals are required to independently identify change and react to it – self-actualised students will learn how to analyse and identify new conditions, as well as the skills necessary for managing them. They must be able to consider alternative plans, anticipate change and understand the way elements within the system are connected.

Curiosity, Creativity and Risk

Future professionals are expected to adapt to an ever-changing environment. This life-long learning process requires one to be curious about the world and the way it works. Researchers have now discovered that intellectual efforts can change a person's brain structure. They discovered a correlation between the amount of experience a person gathers in complex environments and the changes to his brain structure. Curiosity enables lifelong learning, as it contributes to the quality of life and the intellectual capital of a nation. It is also important to take risks – without this, there would be fewer discoveries and inventions and learning would rarely take place.

Higher-order Thinking and Reasoning

For decades, reports have called for higher-order thinking and reasoning in educational programmes. The SCANS report, for example, defines cognitive skills as "creative thinking, decision making, problem solving, the ability to see things in their entirety and the ability to learn." Reasoning enables students to plan, create, realise and assess different solutions. These processes are often more efficiently carried out when technological tools are used.

Collaboration

Collaboration is a structured and renewable process in which two or more people work together to achieve a common goal which in most cases is some sort of intellectual and creative effort. To achieve their common goal, the collaborators share their knowledge, they learn from each other and they reach an agreement. Collaboration does not require leadership. In fact, it yields better results when it is decentralised and all parties are equal. Teams in which the collaboration level is high can attain more resources and recognition when competing against others whose collaboration is weak.
Collaboration methods within a structure encourage behavioral introspection and communication. These methods have a specific goal - to increase the success level of collaborating teams. Forms, columns, tables and charts are useful in these situations, as they can objectively document personal features with the aim to improve the team's performance in ongoing and future projects.

The rapid changes of our modern society and communication networks have affected and facilitated the changes at the decision-making level, ranging down to the employee who closely deals with clients and products. At the same time, the complexity of our modern world requires decision makers to be highly specialised.

Hence the need to create specialised teams which would execute complex tasks. In that sense, information technology has played a key role in facilitating the collaboration between groups and individuals. Email, fax, voice mail, audio and video conferences, chat rooms, shared documents and virtual workplaces can enable a successful collaboration.

Cooperation

Cooperation is a process of joint work and action, which can be achieved using voluntary and involuntary entities. In its basic form, it enables components working side by side to do so in harmony, while its complex forms may include things like the inner functioning of a human being or even the social framework of a nation. Cooperation is an alternative to individual work. Computers can also cooperate by processing joint resources while sharing processor time.

In a more formal sense, cooperation refers to system components working together in order to gain global features. In other words, individual components, which may appear selfish and independent, work together in order to create a highly complex system that represents more than the sum of its individual parts. Examples can be found anywhere around us. A cell can survive because of the cooperation between its parts. Cells work together to create multi-celled organisms. Organisms create food chains and ecosystems. People form families, gangs, cities and nations. Neurons create thoughts and consciousness. Atoms cooperate in a simple way, by creating molecules. Understanding the mechanisms which create cooperative entities in a system is one of the most important, but at the same time, one of the least studied phenomena in nature.

Cooperation can be voluntary, involuntary and imposed. Individuals and groups can cooperate even if they do not have anything in common, with regard to their interest and objectives. Examples of this kind of cooperation (whether it be voluntary, imposed or prescribed by law) can be found on markets, in wars, within families, in the workplace, at schools, in prisons, as well as in any other institution composed of individuals.

Communication

Communication is a process which enables organisms to exchange information using various methods. It is a process in which messages are sent and received through conversation, writing and gestures.
For an exchange to occur there has to be return information. The word communication is also used in contexts where there is little or no return information. Examples of such contexts are broadcasting and situations where the return information is delayed because the sender and the receiver use different methods, technologies, time frames and ways of conveying information.

Communication can be defined as a process of sensible interaction between people. It is an act of conveying information and a process through which meaning is exchanged in order to create understanding.

Communication refers to the process of sending verbal and nonverbal messages by conveying intriguing ideas, making gestures, performing actions, etc...
Means of communication can either be auditory or nonverbal. Auditory means include speech, signs and sounds, while nonverbal means include physical signs, such as body language, sign language, touch, eye contact and writing.

Communication occurs on multiple levels (even for just one thing), in various ways, between most people and certain machines. Several, if not all areas of research deal with communication, which is why it is important to know all of its aspects.

Communication can be defined in a multitude of ways. Some of its definitions accept that animals can communicate with each other as well as with people, while other definitions are narrower and only include people within the parameters of human symbolic interaction.

Still, the following factors are usually used when defining communication:
content (what is being communicated)
source/emitter/sender/the person who encodes (communicates)
form
channel (media)
destination/receiver/goal /person who encodes (to whom)
purpose/the pragmatic aspect.

In today's interconnected society, students should communicate by using technology which includes both asynchronous and synchronous modes of communication, such as e-mail, group interactions, virtual classrooms, chat rooms, interactive video-conferences, the telephone and interactions via simulations and models. Such interaction requires certain etiquette, which is often specific to the environment.

Although IT does not affect quality communication, it provides new dimensions one should master in order to make them transparent. Otherwise, they will hinder communication, rather than improve it. Several new dimensions represented through global communication include scheduling meetings across time zones, different cultures and languages.

Creativity

Creativity is a mental process which includes generating new ideas, concepts or associations from existing ideas and concepts.

From a scientific standpoint, the products of creative thinking (sometimes referred to as divergent thinking) are considered original and appropriate. Alternatively, the standard concept of creativity holds it to be an act of creating something new.

Although intuitively a simple phenomenon, creativity is in reality quite complex. It has been studied from various angles, including behavioral psychology, social psychology, psychometry, cognitive psychology, artificial intelligence, philosophy, history, economics, design research, business and management, among others. Studies have dealt with everyday creativity, high creativity and even artificial creativity. Unlike many phenomena in science, there is no single, main perspective or definition of creativity. Unlike many phenomena in psychology, there is no standard measuring technique.

Creativity is referred to as a gift from god, it is attributed to cognitive processes, the social environment, personal characteristics and luck. It has been associated with genius, mental disorders and humour. Some say it is a trait we are born with, others say that It can be learnt using simple techniques.

Although usually associated with art and literature, it is also an important part of innovations and inventions. In that regard, creativity is important in areas such as business, economics, architecture, industrial design, science and engineering.

Organisation

Organisation is a social convention aimed at achieving common goals, which controls its own performance and has a border dividing it from its environment. It comes from the Greek word "ὄργανον", meaning tool. The word is used in English on a daily basis in various ways.

Problem Solving

Problem solving is a part of the thinking process. It is considered to be the most complex intellectual function. It has been defined as a higher-order cognitive process which requires the modulation and control of routines and fundamental skills. It occurs when an organism or artificial intelligence system is unable to proceed from a current to a required state. Problem solving is a part of a process which also includes problem identification and problem shaping.

With regard to problem solving skills, the Engineering Department at the University of Michigan has set up an excellent webpage which lists various skills for various types of problems. If you want to learn more about Bloom's taxonomy, visit the official site of UM's Engineering Department.

Self-direction and Social Responsibility

Modern technology often causes dilemmas regarding ethics and values. With the advancement of technology, society should also strive to bring ethics and morality to a higher level, so that it can direct the application of science and technology, as well as manage the use of powerful tools on a personal, social and state level. It is very important for students to comprehend this level of responsibility and as informed citizens to contribute to it on all levels.

Students are expected to have a certain level of self-direction, to oversee and understand their needs, to locate resources and transfer acquired skills from one area to another.

Also, social responsibility, i.e. socially responsible behaviour is crucial. People should adapt their behaviour to the interest of the wider community, and constantly display ethical behaviour in their personal and working environment.

Quality, excellent results, high productivity

Hank Levin asserts that, "When it is argued that the prime reason for high standards in testing is to create a productive workforce for the economy, we should be cautious". Based on his studies during the 1990s, Levin concluded that high test scores do not correlate with workplace productivity.

High productivity, on the other hand, although not being given much attention at schools, often determines whether a person will improve in their workplace.

Priorities, planning and management aimed at achieving results

A high complexity level requires careful planning, management and the creation of backup plans. This means doing more than just concentrating on achieving the main objectives or final project goals. Also, flexibility and creativity are essential when it comes to foreseeing unexpected outcomes.

The effective use of real tools

The twelfth business rule of Bill Gates is: "Use digital tools to help customers solve problems by themselves". This idea is based on networked communication and the selection of real tools and their use in real situations, in a way that provides significant results, facilitates increased collaboration, promotion, creativity, models, publication preparation etc.

Doug Henton describes three types of knowledge important in today's economy: know-what, know-how, and know-who. He suggests that while everyone now has access to the know-what, "what really matters most in the new economy is know-how and know-who".

Top-quality results with real-life application

Researchers highlight the benefits of the kind of learning where students make authentic products with adequate tools – whether it be sand castles, computer programs, documents, graphics, LEGO constructions or musical pieces.

Such experiences will teach students to have an open mind regardless of their field of study.

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