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SHOULD EDUCATION BE CHANGED?

Abstract

The paper discusses the question of education in the XXI century. Fast social and technological development requires vital transformation of education. It will be necessary to address the issue of duration of particular segments in education. Education should be designed by the topics, whereas the disciplines should be integrated into the topics according to the needs. It is important to use technologies for faster and better comprehension and more effective adoption of new knowledge. One should bear in mind that already by the middle of this century, about 60 occupations and jobs existing nowadays will no longer exist. Education should be transformed such to develop creativity, curiosity, communication skills and ability to adjust.

Keywords: transformation of education, new education design, creativity, ability to adjust

INTRODUCTION

The future is characterized by many uncertainties which have never been present in the past, and which are being mostly unpredictable. In the first two decades of 21st century the rate of change in many human systems has accelerated more dramatically than at any other time in history. At the same time the education systems have stayed unchanged. In the 19th century the education was designed to meet needs of labor in Industrial revolution, what meant performing simple and repetitive tasks. But, that era is long over. Such, our children would possibly practice in their lifetime 10 to maybe 14 different jobs, even changing their profession.

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Moreover, 25 years from now, 65% of contemporary graduates will be going into jobs that don't yet exist.[1] There would not be shortage of jobs, but shortage of skills.

The right to education is fundamental, and in the most countries, it is a legal obligation for certain age-groups. There is general agreement that public authorities have a duty to provide education for all at basic level. As the consequence, the length of mandatory schooling has tended to expand over the last generations. At the same time unrestricted and free access to higher education is not a realistic case. Actually, it can be traded and people can be excluded from it. In that sense there can be recognized two patterns today: one in which study programmes give individual students possibilities to choose combinations that appeal to them for various reasons (personal interest or career perspectives…), and another which is characterized by increasing awareness that existing diversity has to be fitted to an overall framework.

The rapid transformation of higher education is followed by many issues, such as: problem for the public sector to provide sufficient funding to keep the system internationally competitive; the increasing competition within regions; the distance and cross-border education; and the rapidly increasing number of private institutions in particular in central and Eastern Europe.

Knowing these facts lessons taught in classrooms no longer seem relevant for future world. In the contemporary world teachers are trying to break away from archaic pedagogies and curriculum, while students are jumping off the education conveyor unequipped and unprepared for an „unpredictable future". At the same time everyone is talking of „knowledge society".

Thus, an evaluation, in one or another form, is inevitable process in education. It would help to build education programs, to establish its achievements, and improve its efficiency, such to meet coming needs.

WHY, WHAT AND HOW TO TRANSFORM EDUCATION IN A RAPIDLY CHANGING WORLD?

A lot of research has exposed that schools teach lot of unwanted and unnecessary information. How it is possible to transform educational system which has great history, inertia and fear of changes, while being aware that in 20th century education emphasized compliance and conformity over creativity, two skills that were necessary to hold down a job for decades?

In the first two decades of 21st century the education is aimed to find pragmatic solutions to global problems in the world of growing inter-disciplinary

[1] Within next 20 years 47% of jobs in US are threatened by technology (automation, AI). During the past 25 years number of manufacturing jobs in US almost halved from 21 million to 12 million. At the same time number of jobs in high tech (Internet, R & D, Pharmaceutic, Software) have increased.

collaboration and cooperation, while sharing information from different fields. The schools are in process of transforming from outdated model based on learning raw material to prepare for tests to one of deeper learning preparing students for life in rapid evolving time.[2]

In terms of teaching strategies it is encouraged a multi-dimensional approach to the educational process which tends to regulate multi-convergent and divergent strategies of teaching[3]. The convergent approach is highly structured and teacher-centered. In it the students are passive recipients of knowledge transmitted to them while learning achievements are measured by standardized tests. The divergent approach is flexible, student-centered, where the students are active participants in the learning process, and learning achievements are assessed by a variety of evaluation tools.

Education is becoming reshaped through new, innovative teaching methods, advancements in technology, and program's design. All these changes are aimed to increase educational opportunities for all students. Those changes should be practiced by Project based learning through individualized learning, where all student's needs, learning style, and interests are created such to end with a personal curriculum. This process is mostly affected by the increasing power, portability, and lower price of computers. In that sense the curriculum which imply 10 to 12 different subjects each year has to be forgotten. It should be enabled to students to acquire knowledge from different disciplines through a unifying theme, while at the same time practicing different and special ways to the objectives of the integrated units.

Thus, in particular, education should be focused on individual student, adapting testing to different styles for students, and integrating the curriculum by developing inter-disciplinary curriculum units. The coalition P21[4] identified four 'Skills for Today', namely: Creativity, Critical thinking, Communicating, and Collaboration which should be implemented in education process.

It is important in this process to encourage vocational high school graduates to earn university degree after getting job. That means introducing „Job first-degree later" career path.

Among the most difficult problems faced by the education system are those associated with teaching effectiveness. The current preparation of teachers for specific age levels, specific subject matter, specific academic skills, etc. does not

[2] It means not learning for tests and forgetting shallow and vertical learning. In contrary one should learn to learn while practicing deep and horizontal learning for lifetime.

[3] The goal of teaching can be on one hand the education as the transmission of knowledge by the teachers to the students. On the other hand education is viewed as students' autonomous learning and self-expressing. The former approach may be termed '**convergent**' teaching and the latter may be termed '**divergent**' teaching. Thus, the teaching can be convergent (teachers teach students), and divergent (self-teaching)

[4] Partnership for 21st Century Learning

take into consideration sufficiently the complexity of factors such as students' various characteristics. There is a strong need, by using more differentiated teaching strategies, to train teachers to become qualified to tackle the diverse student abilities, learning styles, personality traits and needs. The 20 first years of education should not be too much formalized. Teaching should be transformed to individual informal learning while education will be for all ages.

It is obvious that these changes will result in a shift from practice of abstract learning to practical learning, even humanities and social sciences being focused on practical skills needed for real situation. Those changes are breaking down barriers between ossified fields of study involving students with multidisciplinary, real-world problems, while teaching them not just how to think, but how to learn, too. Such methods will help to educate students not only to survive but to survive in the challenges and uncertainties to come.

INTER-DISCIPLINARY CURRICULUM

The contemporary tendency is to teach bits and pieces of information related to particular disciplines. In such situation students lose interests in learning, do not enjoy learning and feel unhappy with long hours of study and private tutorial. In view of the cross-disciplinary trends, the curriculum should be integrated around topics that reflect the patterns, interactions, and inter-dependencies of the different fields. Integrating the curriculum by developing inter-disciplinary curriculum units will enable students to acquire knowledge from different disciplines through a unifying theme while having the opportunity to contribute in different and special ways to the objectives of the integrated units. This should enable students to study such to comprehend the world around them through concepts and ideas that are less disparate or disconnected. Furthermore, such approach would enable, in particular, students to live and work with equal opportunities anywhere in the world, as well as to keep up with their interests and abilities.

Inter-disciplinary curriculum education needs to emphasize student's talents and abilities. The creativity and innovative thinking will be more valuable than rote learning of any depth. On top, there will be need to pay attention to other aspects of human life and society, on those things that are uniquely human, like art, teamwork, leadership, empathy, understanding, creativity, ingenuity… Greater application of technology will help to introduce inter-disciplinary curriculum in teaching process. For example, technology will enable students to access lessons from anywhere and anytime what will make education to become more decentralized and more oriented to skill based learning, focused on students gaining skills for jobs. Obviously, in such process teachers will become only mentors. The inter-disciplinary education is strongly influenced by the globalization resulting in more unified education than before with no barrier in time and space.

EVALUATION

Educational evaluation is the process characterizing and appraising some aspects of an educational process by implementing systematic assessment to any educational activity and educational institution. It pays specific attention to aims, needs, perceptions, values, and resources, and it results in specific judgement of worth, significance, and meaning of phenomena. Education evaluation is a research process which implies standards and criteria. Educational institutions usually perform evaluation with purpose to demonstrate effectiveness to stakeholders (founders), and for marketing purposes. Educational evaluation is a professional activity with purpose to provide continuous review and enhance the learning.

The evaluation involves three important methods, which are being implemented by the evaluators:

— *The planning evaluation* is performed prior to development of a given exhibit or program.

— *The Formative educational evaluation*: Through detailed analysis and comparing the data of past this evaluation is done with the intention of improving a particular kind of existing educational program accomplished.

— *The Summative educational evaluation*: It presents the overview of the entire project, and thus highlights how efficiently the program has achieved its targeted goals. By summative evaluation it is easier to determine the overall performance and status of an educational program. Sometimes, in this kind of evaluation students participate.

The common factors in the both latter methods are that evaluation process share a proper organization of the contents of the documents, as well as a professional approach.

The important element of the higher education evaluation is quality assurance what has become a central issue among both politicians and scientists. A consensus on the need for quality assurance has emerged over the last decades. This consensus is not yet an agreement on what should be the consequences of quality assurance. Such, for example, accreditation is in many countries given on the basis of quality assurance, while in others this concept is not accepted.

The university evaluation is usually done in two steps. The first is characterized by determining the different components of quality according to different perspectives. In a second step it is performed a closer look at evaluation in higher education by differentiating subjects and levels, as well as forms of university education.

It is certain that, all around the world, schools will not be the same and they will not act the same. In fact it will happen a dramatic difference of schools and

nontraditional learning experience. This brings evaluation process to top priority. In that sense it is important that the evaluation document should be designed very carefully[5].

TECHNOLOGY AND EDUCATION

The education process is strongly influenced by the proliferation of technology. Technology is, at an exponential rate, being adapted to teaching and learning. Such, textbooks and curriculum have gone digital, online lessons and classes have become everyday practice, computers have been present in all aspects of education… In the coming time the education will experience further assimilation of technology in all of its processes.

The discussions on the role of technology in education are present even in the most modern and developed institutions. Are the new technologies to improve education system such to meet coming challenges, or are they just the toys in the hands of children? Are technological tools, such as tablets and smartphones, helping students to learn, or is their function only to entertain therefore having negative effects on the education system?

The situation in the education sphere can be considered quite controversial. Such, many schools are affraid that technology will replace teachers. Others, on contrary, argue that using gadgets, children will learn better. Certainly, each of the parties is right. Modern technologies will benefit education process and can change many traditional teaching aids, only if they are adequately applied. The use of technology, especially internet, makes lessons more interesting and modern. In traditional learning it is sometimes difficult for students to get a concept. On the contrary, digital simulations and models can help students not only to better understand various disciplines, but also to get involved in the wonders of the modern world.

The technology enables that control and summarizing are provided exactly in time such that students have no need in looking for answers by themselves. Furthermore, the individualization of training appears to be more effective by using technological tools.

In particular, technology enables:

— Access to huge information background. Internet can be used as effective tool for gaining knowledge.

[5] For example, it should consist of: Sample education evaluation, Sample education format, Education evaluation template, Environmental education evaluation, Early childhood education evaluation, Special education evaluation, Evaluation for teachers education, US education, National education evaluation, Physical education evaluation, Patient education evaluation, Distance education evaluation, Foreign education evaluation, Global education evaluation, Health education evaluation…

— To ignore geographical and political boundaries. The internet is becoming gradually one of the most important sources of information and very convenient tool for communication.

— High degree of visibility. The computer help teachers to quickly combine a variety of tools.

— Distance learning. IT facilitates the access to information and opens up opportunities for the variability of learning activities.

— Students to check themselves. Modern multimedia plays a special role in this process.

— Encouraging participation and interaction from everyone;

— Providing tailor-made support to meet the individual needs of each student;

— Study and work at the same time (e-learning, Education Broadcasted System (EBC));

— Project based learning (PBL);

— Industry-academic cooperation;

— Improvement of communication and effective assessments. In education ineffective communication is just not acceptable. Using online collaboration tools with appropriate software everyone can just form a community providing effective learning.

— Open Education. Help to technology there are worldwide numerous free options in education offered by many institutions.

It should be mentioned that development of technology helps to advance non formal education, too.

CO-OPERATIVE EDUCATION AND TRAINING

The co-operative education and learning platforms[6] are becoming very popular. A common characteristic of such process is an approach which links theoretical education with practical work experience. It is supposed to practice an integrated educational and work experience characterized by self-directed learning, reflective practice and transformative learning.

The co-operation between education institutions and business/industry can be practiced in different ways and with different quality and results. The best results can be reached when business and high education institutions take joint responsibility for the learning outcome which should be achieved by lecturers from industry and joint courses for students and industrial employees. The further improvement can be reached when, in the development of curricula and theoretical learning phases, business co-operates and high education institutions are included in practical phases of a business or industrial environment.

[6] A US legal document describes the purpose and definition of co-operative education.

In linking theoretical education with practical work experience it is understood, usually, that this platform includes: cooperative education; clinical rotations; community research; international work exchanges; learning-integrated work; undergraduate and graduate research; service-learning, and other forms of learning in which education is integrated with work experience. This platform emphases duality between an academic study area and a vocational training area. Dual studies usually provide a specific skill profile requested by the business sector. They offer an intense form of co-operation between business and high education institutions, being restricted to a relatively small number of curricula and institutions.[7]

THE RESPONSIBILITY FOR HIGHER EDUCATION

Academic freedom and responsibility have long been topics for public concern and debate. It is an essential precondition to fulfill the mission of educating students and advancing knowledge. Academic responsibility involves professors as well as public review to work together such to foster the education of students.

Education is primarily a state and local responsibility. There are states and communities, as well as public and private organizations of all kinds that establish schools and colleges, develop curriculum, and determine requirements for enrollment and graduation. In that contents departments of education play a leadership and the most responsible role in the ongoing national dialogue while adopting the latest discoveries, and helping in finding out solutions to difficult educational issues.

At the same time, in the education process teachers must bear their own professional responsibility by acting professional, behaving appropriately towards students, being observant, creating a safe learning environment and only communicating students at the place of learning. Certainly, they must ensure that relevant legislation is met. In brief, a primary teacher's responsibility is to ensure that learners are enrolled onto the correct course in terms of meeting their needs, abilities and aspirations, as well as ensuring that learner is on the appropriate course in terms of meeting his award and organizational requirements. Consequently, by understanding the students' needs a variety of different teaching styles should be used to ensure none of the students is isolated and is not able to fully participate. In this process the faculty is responsible for establishing goals for student's learning, for designing and implementing programs of general education and specialized study, and for assessing student's achievement.

[7] In Germany, 7.2% of a total number of 19,822 study programmers are dual study programmers. In Europe, there are 73 dual master's study programmers which amounts to 0.2% of a total programmers in the 2018.

Liberal education[8] is required on most college and university campuses. It seeks to provide a broad array of intellectual and practical abilities. Liberal education helps students to: develop the analytical thinking and communicate well in written and oral modes, as well as develop skills of analysis and critical inquiry. In particular it encourages intellectual and personal development such to enable to develop meaning and commitments in student's lives. In that sense there are several misconceptions about intellectual diversity and academic freedom, such as the freedom of speech. In brief, the liberal education holds the responsibility for ability to participate in civil life and the learned professions by „developing a sense of social responsibility, as well as strong and transferable intellectual and practical skills, such as communication, analytical and problem solving skills, and a demonstrated ability to apply knowledge and skills in real world settings".[9]

The public responsibility for higher education is a cornerstone of the European university heritage. While public funding of higher education is important issue, the concept of public responsibility must be understood much more widely. In this process there is no agreement on what should be the goals, consequences, and responsibilities of quality assurance.

The public authorities have exclusive responsibility for the framework of higher education, including the degree structure, the institutional framework, the framework for quality assurance and authoritative information. Public authorities bear the main responsibility for ensuring equal opportunities in higher education, including access policies and student finance. There should be no public monopoly on higher education provision, although public authorities should be heavily involved beyond designing the framework also in the actual running of higher education institutions and programmes, while having an important financial responsibility for higher education.

CONCLUSION

The complex changes, followed by scientific, technological, and social challenges, which we experience, generate many new demands if we want to reach significant improvement of existing educational system. Such, education system cannot be, any more, based on single unique approach.

Designing education to individual students, while integrating curriculum within inter-disciplinary units and unifying theme, will enable students to acquire required knowledge from different disciplines. This procedure will enable students,

[8] The very term „liberal education" derives from the Roman philosopher Seneca. It is often also known as „general education", or the part of curriculum that is shared by all students, regardless of major.

[9] Association of American Colleges and Universities.

by contributing in different and specific ways, to reach the objectives of considered topic, as well as to practice integral education. That will, compared to contemporary situation, mean practicing „new type of education“ that should be able to create entrepreneurs, innovators, artists, scientists, thinkers and writers who can generate a knowledge based economy.

In the coming time it will happen, from one community to another, a significant difference of schools and learning methods. Basically, it will mean forgetting doing „learning to learners“, but practicing „learning by and with learners“, what should introduce in education: critical thinking in problem solving, while working collaboratively and communicating effectively. Especially, it will be important to be educated while being open minded to new scientific and technological advancements. It is the most important in preparing our student for the increasingly changing and uncertain world that these skills become backbones of education system.

Certainly, fast development of science and technologies influence content and models of learning. Such, for example, many students will never have a chance to meet in person their educators, while textbooks and curriculum have gone digital, and online courses have become more popular. On top, if education is needed for job than it is very uncertain what and how to teach, being aware that we are not clear which jobs will exist and how they will be performed even in the middle of this century. It is certain that at that time human will not practice one job (might change 10–14 jobs), or even one profession for the life. Obviously, the education system has to become whole life system.

The responsibility in educational process is shared by all actors. Involving state, local community, public sector, professional institutions as well as existing regulations it is possible to achieve responsible education.

All these facts require great attention in modeling the education system in the coming time.

LITERATURE

[1] Academic Freedom and Educational Responsibility, Friday, January 6, 2006, AAC&U Board of Directors' Statement

[2] Davidson, Cathy. 2017. The New Education: How to Revolutionize the University to Prepare Students for a World in Flux. New York: Basic Books.

[3] Cotter John, Lading change, Harvard Business Review Press; 1R edition (November 6, 2012)

[4] Johannian, R., Education evaluation: Functions and Applications in Educational Context, Int. Journal of Academic Research in Economics and Management Sciences, Apr. 2012, Vol. 1, No 2.

[5] Public responsibility for higher education and research, Luc Weber and Sjur Bergan (eds.) Cover: Graphic Design Workshop of the Council of Europe, Council of Europe Publishing F-67075 Strasbourg Cedex http://book.coe.int, ISBN 92–871–5679–4 © Council of Europe, April 2005 Printed at the Council of Europe

[6] http://books.google.com/books?vid=ISBN978–0465079728.
[7] https://bordeure.files.wordpress.com/…/liberal-education-and-global-responsibility.pdf
[8] www.chrisducker.com/finding-your-nicher
[9] www.edtechnow.net/2016/10/30/complexity.
[10] http.icodetails.info/?and=2006-smith-essay-evaluation-rogers-and
[11] www.icodetails.info/?and=smith-essey-rogers-and
[12] http.lsce-mena.org/p21-partnership-for-21st-century-learning
[13] www.reseaarchgate.net/publiation/270035178_ Higher Education Evaluation in Germany
[14] www.saampleevaluation.com/education.html
[15] www.topuniversities.com/university-rankings
[16] www.teach.com/teachers-know/teachers-methods
[17] https://www.ukessays.com/essays/education/understanding-roles-responsibilities-relationships.php

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TREBA LI OBRAZOVANJE MIJENJATI?

Sažetak

Budućnost je karakterisana mnogim neizvjesnostima nikada ranije prepoznatim. U takvim uslovima obrazovni sistem je ostao nepromijenjen, inertan na izazove, i u mnogome sličan onome koji je bio dizajniran još u XIX stoljeću, da sa početkom Industrijske revolucije obrazovanje služi ponavljanju znanja, odnosno odgovarajućih radnji. Brzi razvoj mnogih društvenih sistema, naročito u prve dvije decenije ovog stoljeća zahtijeva i suštinsku transformaciju obrazovnog sistema. Prije svega, obrazovanje po pojedinim disciplinama treba zaboraviti i obrazovanje dizajnirati po temama integrišući u njih onoliko različitih disciplina koliko je potrebno da se ovladaju pojedine teme. Svakako, razvoj mnogih tehnologija značajno utiče na obrazovanje. Veoma je važno iskoristiti tehnologije tako da one omoguće brže, bolje razumljivije i efikasnije prihvatanje novih znanja, pri tome otvarajući pitanje dužine trajanja pojedinih segmenata obrazovanja. U tome smislu, neobično je važno da se vrši evaluacija obrazovnog sistema kako bi se omogućilo društvu da ispravno prati sve reforme u obrazovanju, kao i efikasnost i svrsishodnost pojedinih nastavnih programa.

Posebna je odgovornost društva, kako na nivou države, tako i na nivou lokalnih zajednica u procesu dizajniranja i realizacije obrazovanja, pa, naravno, kao i u obezbjeđivanju finansijskih sredstava za njegovu realizaciju.

Naravno, suštinsko je pitanje uloge obrazovanja u XXI vijeku? Svakako da formalno obrazovanje prvenstveno služi za osposobljavanje za rad. No, imajući u vidu da samo sredinom ovoga vijeka neće postojati čak 60 današnjih poslova, problem dizajniranja obrazovanja postaje izuzetno složen. Jedino što je izvjesno je da obrazovanje treba transformisati tako da razvija kreativnost, znatiželju, komunikativnost i sposobnost prilagođavanja.

Ključne riječi: transformacija obrazovanja, novo dizajniranje obrazovanja, kreativnost, sposobnost prilagođavanja