

THE IMPACT OF THE DEVELOPMENT OF THE QUANTUM COMPUTER ON A NEW INFORMATION TECHNOLOGY PRACTICAL APPLICATIONS FOR STUDENTS

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Abstract

Theory and practice blend together to form a product which seems to be the next step in information technology, meaning the quantum computer, first considered a paradox, but later, through using the properties of the quantum world, managed to improve the first transmission systems of simple information units.

In this context, the dialogue between universities and the society is a problem that relates to the managerial vision and strategy and which must be taken into consideration by the organizational management. The learning and teaching process is not just a simple theoretical experience, an exercise in abstract knowledge, but also an important step in education, which leads to developing work related abilities for students fresh out of university. The relationship between university and society is a complex and subtle exchange of feedback. The development of the relationship between the higher education and the economic environment, the integration of the students on the labour market is a European priority.

Cuvinte cheie: educational management, quantum computer, information technology

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1. Introduction

The process of gaining knowledge is developing at an unprecedented rate thanks to globalisation, sharing information and information technologies and the sheer volume of the information is increasing exponentially. Initiating programmes and partnerships with national and multinational companies and businesses which are representative for the areas of study present in universities are of help in building a direct relationship between the educational institution and economic environment, a relationship which favours a common development frame, which reunites theoretical knowledge with its practical counterpart, creating cooperation and partnerships between universities and employers, a space for forming abilities and skills for the qualifications in the first cycle of study. Students would have thus the possibility of being in direct contact with economic, industrial, administrative fields where they can develop their careers after graduation.

In an everchanging society, in which the individual is faced with unusual and defining situations from an early age, the passion and dedication of a teacher are the most important qualities for a developer of humanity and which pale in the face of routine and a void of professional recognition.

In his famous *Politics*, the Greek philosopher Aristotel listed the prime relationships that define humanity in the master-slave paradigm. This primary duality was over used in various fields, from philosophy to sociology and politics, and it will serve us now to render the experience of a teacher as an apprentice in the art of education. As ancient Greeks made a difference between paidagogos (the house slave entrusted with the supervision of his master's child as they came and went to school) and paidetes (the true master entrusted with what today we call educational tasks, such as shaping one's humanity), we also distinguish between two dimensions of the modern teacher: that of supervising the development and evolution of the child from a physical point of view, but also that of formative spiritual guidance towards the life the precious paidet Aristotel called authentic, meaning that existence beyond the simple satisfaction of the immediate needs of humanity, which made man accomplished in their community and culture.

Therefore, a definition that we find particularly relevant for the art of being a teacher is given by E. Planchard when he says: "Education is a systematic activity imposed by adults to children and teenagers, with the purpose of preparing them for the life they will have to and be able to live in a given environment." These are small words indeed to convey the full extent of the overwhelming responsibility that falls on the shoulders of the teacher and which is, perhaps, nowadays, trivialized.. Between the daily necessities of the modern man and the ideals of the true educator, the modern teacher is prone to unfortunate compromises. However, despite the fact that being a teacher is more likely a last option, we have met dedicated individuals who have tied their passion with the awareness of the duty to the future citizens of our planet, people who inspire us to take advantage of the rapid changes in today's society and their many benefits.

Thus we bring into discussion the topic of overcoming the generation gap, not only between teachers and students, but also between master and disciple at another level, meaning between the old generation of teachers and the new wave of educators/trainers/ teacher. Debate on this topic have shown the fact that, separately, without interaction, these two models of teaching are not effective in the current society, either due to the rigidity of the old way of instruction, or, on the contrary, to the lax teaching skills that characterize the new generation. Consequently, the ancient *paideia* included also the meaning of ‘torture’ in the formative interventions of the teacher. Without taking things quite so far, we may say that, after seeing things from the other side of the teaching-learning process, in the process of instruction, acquiring and learning a skill, the control which the teacher holds over the class is essential, especially given the sharp minds and the endless sources of distraction one must deal with. Therefore, the authority of the teacher must be viewed under its many aspects: epistemic (see the accumulation of knowledge) and deontic (enabled by moral superiority). In other words, the teacher creates models, whilst being a model.[1]

The recent period of recession has profoundly affected the Romanian economy and society as it hit this country at the end of 20 years of transition, when the first signs of economy rebirth and stability had begun to show. Despite the skepticism, Romania eventually worked through the recession and is now at the beginning of a new road of reconstruction and edification, and it is now the moment to rebuild with the help of a sound and efficient education system.

The main topic for the life, prosperity and future of any modern nation is represented by the relationship between the economic environment, investments and university education. The economies that are sustained by a developed higher education system are strong economies and bound by reciprocity, higher education institutions, university education and scientific research are efficient, performant and competitive, where the economy and business environment are developed, where there are investments in the education and research systems, as the universities are strong if they benefit from funding, investments and sponsorships from the government and the business environment.[2]

2. Quality and efficiency in education through the curricular reform

The priority of the curriculum reform is represented by orienting education towards life, the economic environment, the labour market, in a process of revolutionizing the vision, of conceptual renewal, in the sense of separating it from the purely theoretical and abstract model. The strategic elements that form the basis of such a revolution are student-oriented teaching, goal-oriented teaching, which entails forming abilities and skills for professional qualification.

Faced with a continuous flow of information, the new generation of students is better able to assimilate the necessary knowledge to integrate and adapt themselves to the social community. Along with the changes in the knowledge pool and set of skills needed by a (post)modern student, the teaching methods have also changed, as well as the attitude of the educator towards education.

Institutional partnerships are the perfect framework for student internship, which is mentioned in the curriculum, through which students can prepare for their future job, while benefitting from the conditions, infrastructure, expertise and experience of the people working in those respective fields.

Such changes can be accomplished only through a comprehensive curriculum reform, which has as its starting point the idea of lifelong learning. Lifelong learning is the process of improving personal, social and occupational development throughout one’s lifetime and opens opportunities for the design and implementation of the curriculum. Unlike the traditional view (when one developed a curriculum for each level of the education system), nowadays we speak of continuing education curricula so as not to lose sight of ‘opening lifelong learning and multiplying its aspects for each individual during his life and for each phase of his life’.[3]

Curriculum reform can not be accomplished without having an often poignant positive impact on society at a macro-level and on individual development at a micro level. To illustrate the link between reform and society we propose a list of references and principles underlying the accomplishment of a coherent reform:

- **Curricular reform must be integrated in the global reforms of the society:** this means that there must be a reforming shift in education, and through its indirect effects, on medium and long term, it determines changes in all social subsystems.
- **The reform reflects the global development objectives of the society,** if it’s based on a good circulation of the information pertaining to the reform project and its implementation, on permanent consultations between teachers and an open attitude from the authorities. These consultations and debates represent a way of raising awareness and sensitizing the public and also a training of incoming teachers to apply the reform.
- **The structures needed by a curricular reform are beyond the framework of a rigid educational system:** they entail changes at other levels of society.
- **The curricular reform becomes a social and pedagogical reality only if it manages to transform, in time, the educational practice** (i.e. the teaching relationship between schools and families and the community, the teaching and learning mentalities etc.)

- **The curricular reform is a continuous and perfectible activity:** the reform seen as permanent innovation is the easiest method to avoid unavoidable discontinuities and incoherent nature of a hasty reformation process.

Consequently, the curricular reform must be designed and applied in relationship with the achievements of permanent education.

3. Information technology and university management

In any field, obtaining relevant and current information can positively influence decisions taken by organizations, information being considered the fourth resource, more important even than the other classic three (labor, nature, capital). Information as a resource "being generated by knowledge and innovation processes, is potentially unlimited, it develops gradually and cumulatively and it has a very rapid growth rate; it is multiplied by dissemination".

Information society requires "intensive use of information and communication technologies in all spheres of human existence and activity, with significant economic and social impact." Considered the key driver of the information society and determinant of globalization, the Internet becomes an international resource and an international market at the same time.

In the face of such changes, the educational system, particularly at its highest levels, can only adapt, reform and perform. Widespread use of technologies involves a degree of civilization, and in the educational process leads to the formation of an active and responsible attitude. The advantages of using new technologies in education are multiple. We can list: saving time, personalizing the educational programmes, easily adapting to changes and new knowledge sets in various areas, extended possibilities of interdisciplinary education and last but not least serious cost savings with continuous education. In the face of an avalanche of knowledge and a more pronounced dispersion of skills and increasingly more specialized and interconnected industries, any individual should be prepared for a lifestyle based on education. Current educational systems - formal education, learning in the workplace or other form of continuous education - differ from the traditional ones through a series of principles, of which the most important are:

- High priority given to educational training;
- The main objective is the development of personality and capabilities;
- are focused on training;
- shift the emphasis from teaching to learning;
- training becomes the object and subject of the educational process;
- adopt active, participatory methods;
- encourage new education types, consistent with the evolution of society (such as environmental education, health education and education for democracy and human rights, entrepreneurship education, etc.);
- attach importance to the process (and not the product);
- promote self-employment, inventiveness, creativity,
- stimulate self-effort, self-assessment and self-regulation;
- harmonise with the social individual learning;
- the teacher becomes a mentor of education ;
- restructure the content in modules that allow the selection of relevant knowledge from many disciplines, on a given topic;
- foster cooperation and dialogue by integrating collaborative environments;
- develop learners' autonomy and flexibility.

Given the exponential development of the global information system and digital reflection of society in the Internet environment, the education becomes an extension of real economic space, where:

- work processes will incorporate learning opportunities;
- students will participate in their own training, giving up receiving passive learning experiences;
- learning focus will expand from learners as individuals to students as a team, as an organization.

Internet is profoundly linked to the development of computers and technology development, a phenomenon that will affect the way we perceive instruction and learning. Computer technology knows continuous progress. It creates a new world of chips, a tiny world, where their power is inversely proportional to their size. Quantum computers process information at the atomic level, and today there are only a few basic quantum computers. The success and superiority of the quantum computer in comparison with the classic computer occurs due to another operating mode, a mode of operation that, in the background, highlights the difference between classic probability and quantum probability.

Faced with a decision an individual has n number of possibilities. It is a state of quantum superposition of opportunities. Many erroneous decision might be avoided, if the individual's cognitive mechanisms have the capacity of processing information at the level of quantum computer. That is to say, if they had simultaneous processing capacity

of all the possibilities of truth and falsehood, during the time of consistency between the superpositioned states. In the pragmatic plan of social needs, this can be solved by the computer as an extension of the human mind.

The evolution of these platforms is the result of continued growth in capacity and flexibility of new information technologies with applicability in educational situations, accompanied by a continuous decrease in the cost of equipment. The unprecedented dynamics of information and communication technology has the effect of inclusion in modern teaching techniques of more and more learning resources, which are fully consistent with the psychosocial profile of the learner in contemporary society.

The combination of education and technology can be achieved through effective strategic management. Organizational strategic management has been developing especially in recent decades, as a result of profound changes and their propagation speed in the external, political, economic, social, scientific and technological environment. Also the process of globalization and the exponential growth of information technologies, namely the transition from industrial society to the knowledge society contributed to the development of the strategic management.

Strategic management differs from operational management in that the organizational development is projected in a possible future up to around 4-6 years. This time scale is usually correlated with the mandate given to academic management. Strategic management is based on strategic thinking, which is a product of intelligent thought harmonized with creative thinking. This means that, in fact, the basic thought patterns are dynamic, entropic, nonlinear and random, with emphasis on nonlinearity and creativity.

These thought patterns can be combined in different proportions, but the end result should be characterized by the existence of a synergistic effect and openness to creativity, in order to achieve the dynamic adaptation of the organization to its external competitive environment. Strategic thinking generates strategies and builds appropriate mechanisms for their implementation, by evaluating competitive advantages, the associated risks and barriers that already exist or which may arise during the implementation [4]. Through these strategies, the organization proposes a coherent and stable development, transforming inefficient and weak elements in strengths, and threats from the external environment into opportunities.

The results of the implementation of a strategic academic management will streamline the process of achieving the following directives proposed by the Ministry of National Education [5]:

- Reduce the overloaded curricula and increase the European compatibility of curricula;
- Promote creative education and relocate scientific research as the foundation of university studies;
- Improve the infrastructure and generalization of electronic communications;
- Create a partnership and, generally, a new interaction between schools and universities, on the one hand, and the economic, administrative and cultural environment, on the other hand;
- competitiveness and performance-oriented management.

4. Conclusions

In conclusion, the importance of the teaching profession in postmodernity is not completely lost between careless and unprofessional figures, as long as there are those - few - people who realize that society's demands will be met by the imperatives of education. Consequently, changes in the axiological dimension of individuals' personality are - and will remain - tributary to the true figure of the educator. This figure now incorporates striking aspects of lifelong learning, both for teacher's professional development and personal development of the student. Information technology completes the picture by the contribution it makes to facilitating instruction. Advances in information and communication technology create new opportunities for communication and interconnection of individuals and organizations, leading to a radical change in human behavior and the functioning of organizations.

Intelligence, as the only sustainable asset of an organization, is made up of individual and collective knowledge. Therefore, people feel more acutely the need for information and communication, organizations seek to restructure so that access to useful information prompt. The technological platform offered by media such as the Internet, the relationship between university and society, between training and performance becomes an act of permanent feedback in both directions, a phenomenon that empowers the individual in terms of educational and professional development. Or in other words: the future is in our hands.

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