

Personalizing Education in Post-Industrial Society

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Abstract—The paper deals with significant technological changes in society when it moves into Post-Industrial age. Some of these changes have fundamental social consequences. The paper analyses the main social trends such as Virtualization of the society in their interaction with newest technology trends and their influence on education. The concept of Virtualization allows formulating the main feature of the Post-Industrial education, which is personalization. The phenomenon of personalization is supported by newly developed and introduced personal communication means forming totally person-dedicated, unique learning environment.

I. INTRODUCTION

The changes, which continue affecting the present society, are on both the structural and the substantial levels. Mainly, the changes are likely to be associated with the phenomenon of computerization and the related phenomenon of much more extensive consumption of information as a result of drastic changes in communications. Indeed, no one of recent technological breakthroughs or latest developments in the society can be compared with these phenomena in terms of social consequences. The opinion that the computerization is the actual basis of these recent developments in the society intuitively seems to be correct.

This interpretation of the role of computerization naturally leads to understanding the Post-Industrial society as an information society.

The majority of researchers [1], [2], [3], [4] determine a number of attributes that highlight the information society: a) transition from the Capital-centered society to the Information-centered society; b) transition of social conflicts from the economic sphere to the cultural sphere; c) the antagonistic conflict between “rich people” and “poor people” is being replaced with a newly dominating conflict between “informed” and “non-informed” people; d) the information infrastructure becomes dominating over the economic infrastructure.

However, some authors call into question the above conceptions, which seemed quite obvious. For example, D. Ivanov [5], [6] rejects considering the Post-Industrial society as the information society. He introduces an alternative concept of a so-called “virtualized society”.

According to Ivanov’s ideas, computerization is a secondary phenomenon of the primary one, which is the phenomenon of virtualization. One of the main reasons of considering the Post-Industrial society as the virtualized society is a phenomenon of global communication.

In the present paper, we develop the above concept of the virtualized society by introducing a concept of personalization. We propose a so-called personalized learning environment that, actually, is software of a new kind, which is going to replace the conventional educational environments.

II. PRELIMINARIES

In this section, we recall some concepts that are used in the paper. When talking about features of the present society in comparison with previous societies, we use the concept *reification*.

Reification (in Philosophy) - the consideration of an abstraction or an object as if it had living existence and abilities; at the same time it implies the materialization of social relations.

An antonym of the above concept is called *de-reification*.

De-reification or Virtualization – the process when human essence is transferred into not social, but Virtual Reality (VR), in which one deals not with things, but with simulations (images).

The dialectic idea is that history progresses in stages of development where the driving force is the negation of a previous social stage by a new social stage. According to this widely accepted social theory, we consider the three stages in development of the human society: Pre-Industrial, Industrial and Post-Industrial Society.

Pre-Industrial society refers to specific social attributes and forms of political and cultural organization that were prevalent before the advent of the industrial revolution and the rise of capitalism. Some features of the Pre-industrial society: limited production, limited communication between human communities, absence or a primitive level of basic institutions such as school, university, science etc. Experience based technology dominates in the Pre-Industrial society. The most important driving force is primitive creativity based on individual experience.

Industrial society started with the Age of Enlightenment, refers to a society with a modern social structure. Such a structure developed in the period of time following the industrial revolution. The phenomenon of manufacturing and mass-production caused appearance of new predefined and formalized social relations and, as a result, creation of corresponding institutions. The important feature of the Industrial Society, as mentioned above, is the phenomenon of reification. Extraordinary reification in the Industrial Society has led to forming the presently known social institutions (market, monetary system, manufactory, school, university) – universal and real standards that regulate the human life.

In the present paper, we would like to point out the following features of the Industrial society which seem to be important for understanding our concepts:

- The external world is supposed to have the objective nature. The Applied Science paradigm becomes the main definition for Technology. Technology Institutes dominate. One of the most dominating professions is an engineer; even other professionals, like a teacher or a doctor, are motivated to acquire skills similar to the engineering skills.
- The truth has an absolute value for validation of any hypothesis. Every problem is believed to be resolvable by finding a relevant formula or model. The world is thus perfectly organized, describable and understandable, since it may be formalized by using simple laws (linear models). The success of the Industrial Technology is mainly achieved owing to that the Linear Models are simply formalized. In these circumstances, the creativity component in solving problems seems quite insignificant.

In view of the above understanding of the Industrial society, we consider the Post-Industrial or Post-Modern society as a society where the manufacturing loses its central role; the economy is transformed into a service-centered economy, and where importance of the state institutions gradually decreases. It is a society of diffusion between the national and the global capital. It is also a society of mass personalization and mass privatization of life. The Post-Industrial society loses the previously common “real” character of the industrial society. The society de-reifies thus gradually becoming a virtualized society. Such a phenomenon, called virtualization, is discussed in the next section of the paper. In contrast with the Modern age, which is based on formalization as the main paradigm, the Post-Industrial age may be characterized by increasing the role of the creative component, while the formal component moves to the “virtual space”. The formalization stops to be the main tool widely accepted everywhere.

III. VIRTUALIZATION OF SOCIETY AND MAIN TECHNOLOGY TRENDS

For adequate understanding the main technology trends in the present society – i.e., computerization and/or personalization - one should accept that the Post-Industrial society is not a society with a simple technological domination, but the society where the technological and the social phenomena are in their complex interaction. Below, we analyze the main technology trends and their conjunction with the virtualization trend.

A. *Global Computerization Trend*

First of all, it should be clarified that in the phenomenon of Computerization, pure computing gives up its place to computerized simulation. The computerization has introduced, in our everyday life, the very phenomenon and many practical examples of Virtual Reality (VR), and they become a replacement of real events and real human actions. Presently, a lot of commonly accepted and respectful institutions of the society are transforming into their virtual form and, actually, are de-materializing. In such a manner, the society in its traditional form is gradually substituted by the virtualized society. A computerized simulation being a virtual analog of a real social interaction implements interaction between a human and the society. Computer simulation of some institutions has become a characteristic feature of many types of virtual interaction: for example, of virtual communities, virtual corporations, virtual entertainments, and even of virtual crime and virtual release of sins as well.

In a VR of any kind (economics, politics, science, education) a person deals not with a real object, but with a simulation/image [5]. A person who finds himself/herself in a virtual social reality, takes it seriously, perceives it like something naturally given which he/she has to live in. A person immersed in a VR enthusiastically plays in it, realizing its conventionality, conditionality of its parameters and the possibility of quitting it.

B. *Global Personalization Trend*

Virtualization of the society comes in conjunction with the global personalization trend that deepens the effect of virtualization.

Recent innovations in the field of digitization - such as all-IP network technologies, packetized media in conjunction with revolutionary communication technologies in mobile/wireless networks (3G, WiFi, WiMax) and their capacity - provide the individual with a number of Personalization features.

One of them is a so-called **Global Mobility** tool allowing the individual to be always connected to the content across various access networks (and using network convergence), when at home or traveling.

A mobile consumer’s status is also enhanced by such global services awareness as

- Global Presence/Location – consumer’s current connection and availability status, not only in terms of the current network connection but more in terms of

his/her availability in different social groups, blogs and communities.

- Consumer's Context awareness, meaning that the modern services environment should be adaptive and aware of the user consumed services and visited webs (the consumer history). Obviously, to ensure that, data mining tools are likely to be used.
- User's Profile/Preferences, where the awareness takes into account the consumer's preferences, his/her age, social status etc.

Another Personalization feature is a so-called **Community to Individual** trend. The total computerization (when we are taking into account both the fixed and the mobile PC's or notebooks), together with the deployment of Internet, has significantly changed the social life. These changes, *inter alia*, are characterized by the following tendencies:

- Personalization and individualization of the consumed services and content, and creation of personal TV;
- Transition of Broadcasting towards the Narrowcasting, which means that the broadcasting TV channels are substituted by personally created TV channels packages;
- User Generated Content, which means the consumer is more involved in the content generation. This content is uploaded and distributed within a specific social community;
- Broadcast terrestrial TV is more and more replaced by Mobile TV.

There are some other global personalization features, not mentioned in this section.

IV. PERSONALIZED LEARNING ENVIRONMENT

Needless to explain, that modern education institutions undergo a deep crisis in the period of transition of our society to its Post-Industrial stage. The boosting development of the computerization and the communication technologies including Internet diverse efforts and interests of the modern students from the formal educational programs to informal, sporadic data consumption.

There is even a quite popular opinion among the modern teachers in the primary and secondary school, that computers and Internet destroy the classic system of education since students do not read books, do not acquire but loose basic skills of reading, writing, counting, formulating ideas, human-related communications, etc. If so, these problems will have their continuation at any later stage of education.

In our opinion, there is no perspective in struggling with the Post-Industrial technology; the technology will anyway win since it will keep developing. The only way to save and improve education of students of various ages in the Post-Industrial epoch is to become allies of its technology and members in its virtualized society.

In other words, we believe that the educational concept should accept an approach of a Personalized Learning Environment which would enable a student to study in the way he or she likes (in the way maximally suitable to the student's personality), but would present the necessary

formal content to that student, while developing creative skills of the student during the learning process.

There is no secret that any formal content is differently understood by different students. The Personalized learning environment would allow presenting the formal content in the manner and at the level, which suits to the specific individual. The environment would be capable of further tuning and changing the manner /raising the level of presentation in line with the progress of the student. This is only one example of how the Personalized learning environment would function.

A number of software and communication means, which can form the basis for building the environment, already exist and will be mentioned below. Others should be developed.

Based on the concept of Virtualization and taking into account the global personalization trends mentioned above, we see the following exemplary scheme of an innovative learning environment oriented to the new Virtualized reality. The proposed schematic model should be based on the following main principles.

- The Personalized Learning Environment (PLE) constitutes a universal, self-tuning and completely person-oriented tool. On the one hand, the PLE is a powerful computerized simulation tool and, on the other hand, it allows emancipating the individual students from their troubles and shames, which would be non-avoidable in a conventional learning environment. The PLE may be considered as an educational tool that supports developing creativity of individuals.
- The PLE is a powerful tool with the newest infrastructure based on the Global Personalization features, such as individualization, customized adaptation, context mining; Global Presence/Location and Global Mobility.
- The teacher's role will be changed drastically. Teachers should be able to virtualize (computerize) the formal component of the curriculum. Further functions of the teacher become more creative than in a conventional learning environment.
- Assessment of the student's achievement should not be made by a formal process, but by a new creativity-oriented education paradigm where the teacher would try to direct the students to develop their creative approach.

Figure 1 shows an exemplary schematic diagram of the VR based Personalized Learning Environment. Following the diagram from top to bottom, we can see that:

- The subject matter is being transferred and personalized by a specific software tool, and becomes a virtualized individual component before it is presented to a student (say, to the user's laptop or mobile phone)
- The personalized learning environment includes:
 - A User's Profile aware tool based on user data/context mining technology;
 - A Creativity component, which interacts internally with the "User Profile" and externally with the main education technology components i.e., teaching, curriculum etc.;

A number of lower level tools, related to the Global Mobility feature: Global Presence/Location tool, “Always Connected” tool and Adaptive Services Creation Environment.

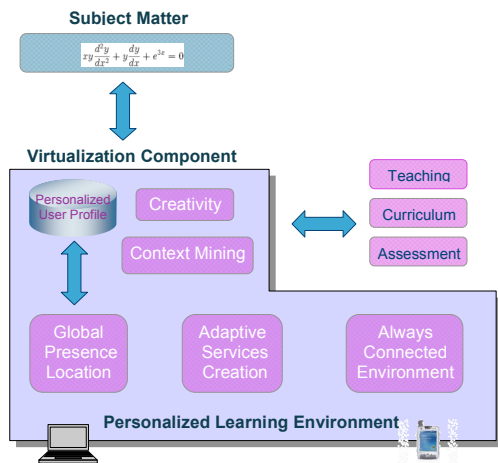


Figure 1. VR-based Personalized Learning Environment

V. CONCLUSIONS

The today's, highly technologically developed society becomes more and more virtualized in all aspects of social life in general and in education specifically.

The global trend of Virtualization significantly affects all components of education – learning, teaching, curriculum, and learning environment, but first of all - students themselves.

The present paper presents an opinion that, in order to preserve and improve the present level of education, it is useless to struggle with the main trends of the today's Post-Industrial society i.e., with the global virtualization and personalization. It seems much more productive to become allies of the new technology and the new trends and to start thinking about creating a new Personalized Learning Environment for the students.

Virtualization of the learning environment is expected not only to fulfill the education function but also to emancipate both teachers and students by freeing them from formal activities so that creative activities become dominating.

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