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Virtual Reality in Professional Activity of A Teacher of Technology

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Abstract

The definition «virtual reality» nowadays is used very actively not only in the sphere of computer techniques as well as by representatives of different fields of man's vital activity. The process of training mainly seems to be virtual and may be apprehended like interaction of virtual spaces, and people in this case fulfill a function of bearers or like a process of coping and appropriating strange virtual spaces. A role of virtual reality in professional activity of a teacher of technology is analyzed in this issue: relativity of professional activity space of a teacher of technology as a main sign, distinguishing it from space, displaying in functional, valuable and emotional spheres is defined. It is noted, that professional activity space of a teacher of technology is a part of common space of pupil's personal development. Problems, preventing broadening virtual pedagogical activity space, connected with insufficiency or low quality of virtual training appliances and methodical elaborations are marked. Most important aspects, connected with use of virtual component of professional activity space in the educational process are considered. Principal differences of virtual educational space from classical one as well as degree of virtualization educational activity space in the process of preparing for fulfilling social functions are disclosed.

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1. Main text

A tendency to increase a production share in the economic system of Russian society makes actual a problem of training workers and specialists, capable to perform social duties under the circumstances of new technologies effectively. The state of this problem to a greater degree is stipulated by the quality of training young people to efficient labour on all stages of training and upbringing, connected in its turn with peculiarities of professional space of the subject «Technology» and with competence of teachers of technology. Obviously, quality of training specialists and workers in the system of professional education depends firstly on adequacy of a model of industrial

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activity, created in the educational space. And here we come across two main contradictions; their solution will define the state of training on this discipline on all levels of educational process for a long period of time. The first contradiction is stipulated by intensive development of technologies on the one hand, and by deepening incapability of educational institutions to reflect on their own basis really existing industrial (first of all machine-tooled) basis – on the other hand. The second contradiction is defined by active introduction of different kinds of electronic educational resources (virtual in narrow meaning), multimedia training appliances into educational process and by lower degree of elaboration of use principles without loss for the process of forming skills of interaction of future specialists with elements of objective reality (Casas, 1997). In this case consecutive (independent) solution of defined contradictions practically impossible. For instance, different ways of special training to use in professional activity real technical meanings used in the system of professional education can be confessed effective only conditionally. We won't pay attention to the evident impossibility of educational institutions to create their own contemporary machine-tooled park; even the process of creation integral resources centers of combined use is of great doubt, because attempts to reflect «bigger» into «smaller» simplify the initial model. Some definite perspectives of development of the system of professional education are connected with social partnership, intensively winning the right for existence abroad as well as in Russia. However in this case wishes and possibilities of enterprises to give actively used expensive technological equipment in the capacity of «training appliances» for workers and specialists are of great doubt. More often Russian model of social partnership is associated with traditional for our country limits of the so-called «patronage assistance» of enterprises to educational institutions. Thus, we can make the following conclusion: contradiction between industrial and educational basis, to our mind, won't be solved in the nearest future, and what is more it will be deepened. Attempts to weaken practical displays of this contradiction can lead to another extremity – that is to groundless use in the educational process the elements of virtual reality. Experience of the latest decades shows the following: one of the main tendencies in development of pedagogical activity space in aspiration to elaborate virtual substitutes of real objects. In spite of all this their quantity not always conforms to pedagogical and psychological expediency (Bespal'ko, 2002). In any case, no matter how perfect a virtual image or a real object is, it is only imagination of its creator about modeled real object, partly realized in the virtual image with regard for possibilities and peculiarities of computer techniques. This point of view seems to be impasse for the following reason: computer itself and computer technologies are interpreted like an independent aim, not a meaning of achieving the aim; thus, it provokes not only virtualization of professional activity space of a teacher of technology, as well as virtualization of aims and tasks of education. What way should be created professional activity space of a teacher of technology with regard for exposed contradictions and intensive development of computer technologies? In search of an answer to this question, let's determine first the basic definition. In contrast to pedagogical space as simple totality of circumstances, potentially important for a person, professional activity space of a teacher of technology represents in subjective way structured circumstances, really influencing on forming individual peculiarities, connected by pupils. Otherwise, if space is totality of objective circumstances, then space is totality of subjective possibilities realized under these circumstances (Borytko, 2002). Professional activity space exists in the context and is characterized by dynamite and relativity in contrast to inert. Inertness of space, its dependence on pupils should be considered a main sign, distinguishing space from surroundings. In spite of this inertness of professional activity space of a teacher of technology is defined by the following factors:

1. Inertness of meanings of these or those pedagogical (forming, upbringing) events with dependence of the situation in which a pupil finds himself. Changes of the situation are dynamic, as they are connected with functional interaction of people.
2. State of value component of a pupil's personality. With dependence of valuables, subjective comprehension and estimation of objective situations will be different.
3. State of emotional component of a pupil's personality, defining appreciation / non appreciation of different types of outward events.

Thus, we receive three main spheres of display of inertness of professional activity space: functional, valuable and emotional.

Professional activity space of a teacher of technology is a part of common space of pupil's development, connected with enlarging knowledge, ways of creative activity and scientific- technical world outlook. They represent totality of possibilities of personal and professional development, potentially existing and aiming at

realization of future personality's states, defined with participation in the pedagogical process, circumstances of forming space and individual peculiarities of a pupil. Organic connection of pedagogical activity space and pedagogical state (Kuleshova, 2002) pays attention to the whole complex of changes of great importance due to the points of this research (Selivanovoj, 2001). These changes are connected

- with development and spreading of new information media;
- with development of communicative meanings;
- with intensive development of science and techniques.

The latter points to the correlation of the definition of pedagogical activity space with definition of virtual space in wide meaning, representing some kind of non-material, existing only in the man's consciousness world (part of the world), created with his active direct participation and having attributes of real life. Virtual reality and virtual space are appreciated by a man as real world or as direct reflection of real world. In spite of this the main attributes of virtual space are considered to be relative integrity and possibility of manipulation by a man. Accordance of virtual pedagogical space to peculiarities of consciousness in combination with swift development of computer techniques and informational systems is a great factor of virtualization of professional activity of a teacher of technology. A serious problem preventing broadening of virtual pedagogical activity space is connected with insufficiency of low quality of virtual training appliances and methodical elaborations. Designated problem sharpens due to the reason of absence common demands to electronic training appliances, taking into consideration peculiarities of virtual education, absence in Russian society formed virtual culture. Hence the logic of computer thinking, most of educational computer tasks pull out demand to choose the right answer out of the list of ready variants (Pelletier, 1997). This basically impedes the development of creative abilities of pupils, forming ability correctly formulate a question and independently find variants of the answer. An algorithmic logic of a computer promotes forming algorithmic thinking of a man working with it. Also in the process of virtual education basically increases a role of inner motivation of educational activity. In connection with the following, that an instructor can influence a pupil only indirectly falls down a role of a teacher in provocation educational activity. With due regard for broadening of virtual component of professional activity space of a teacher of technology it is necessary to notice several important aspects, connected with its use in educational process. Virtual space principally differs from classical one. In spite of that virtual space is being created and reproduced with the help of a computer itself is a real element, not virtual. Virtual pedagogical state as a condition of virtual pedagogical activity space represents computer reflection of real educational state, difficult elements of the universe, as well as totality of virtual objects non-existing in reality, capable to fulfill (directly or indirectly) educational functions. Virtual pedagogical state and accordingly virtual pedagogical activity space, characterized with intensive degree of development, stipulate necessity of their scientific understanding and intensive use not only as a meaning of decision of pedagogical tasks under the circumstances of real pedagogical state, but like principally new sphere of pedagogical activity; firstly, being characterized with acting of specific laws and regularities and development of pupil's personality, and secondly, taking into consideration «really-virtual» conditions of technological activity. Intensive development of informative technologies defines not only virtualization of professional activity of a teacher of technology and educational space on the whole, but and virtualization of industrial activity. Really, most operations, being structural elements of modern technological processes have brightly expressed virtual character. Informatization of production often leads to the following: a worker at the enterprise riles unreal industrial process in fact, but its virtual reflection, incarnated in the computer. A worker-operator can stand far from a real mechanism, and this can lead to objectivity of virtual model of real process. Physiologically it expresses domination of computer reflection process towards a real process. Indoubtly, even absolute virtualization of technological process doesn't exclude necessity of training workers-operators basis of real industrial process, only in this case these processes are secondary in attitude to virtual. The same may be said about necessity of training operators of electronic physical basis of functioning different blocks and groups of a computer. We understand not a single operator won't create new models of electronic computers; moreover he won't even take a risk to repair them (Vacca, 1996). This situation, indoubtly, seems to be very speculative. At the same time we must say, that tendency to informatization of space early or later will lead to virtualization of majority industrial operations. It can be stated and the following: in the nearest future a list of working operations will be kept; they will demand real interaction of a man with the object of his labour. This list includes primitive unalgorithmized operations and vice versa elite working specialties, connected with manufacture of piece-goods (Gershunskij, 1987). All said upper lets state the objectivity of sharing all totality of

worker and engineering professions on the degree of their virtualization. Moreover, totality of operations, forming a profession, can also be graduated on the same sign (Robert, 2004). From here follows one of the main principles of virtualization of professional activity space of a teacher of technology: a degree of virtualization of the process of training must be directly proportionate to a degree of a concrete working function, which a pupil is preparing to fulfill:

$$V_o = k V_f \quad (1)$$

here: V_o – a degree of virtualization of the process of training; V_f – a degree of a working function; k – coefficient of proportionality, reflecting higher degree of virtualization of educational activity in attitude to industrial.

In spite of its evidence, the shown principle has a character of theoretical orientation, not guidance to action. The problem consists in the following: firstly, teaching technology not always suggests narrow special professional training; it is connected with common personal development; secondly, under the circumstances of an educational institution it is possible to suggest those concrete functions and meanings of their realization which a school-leaver will come across under the circumstances of concrete manufacture and concrete working place (Shakurov, 1999). The latter points to the necessity of coarsening the given upper formula (1) with a purpose of ensuring its practical use in the pedagogical activity of a teacher of technology.

With due regard to this necessity, the process of sharing a variety of social functions (as well as working) into two parts (mainly virtual and mainly real) may be expedient. In this case the process of training corresponding to these functions can be shown in the aspect of two sequences:

$$V \rightarrow R \rightarrow V \quad (2)$$

$$R \rightarrow V \rightarrow R \quad (3)$$

It is expedient the process of fulfilling mainly virtual functions to begin with formulation of educational task in a virtual form; and only after it to mark the connection of virtual with real process with the following transition to virtual meanings and methods of solution a task. And vice versa, training to solution technological tasks mainly of a real type demands marking a problem on the basis of real objects with the following virtual searching solution ways and their practical realization.

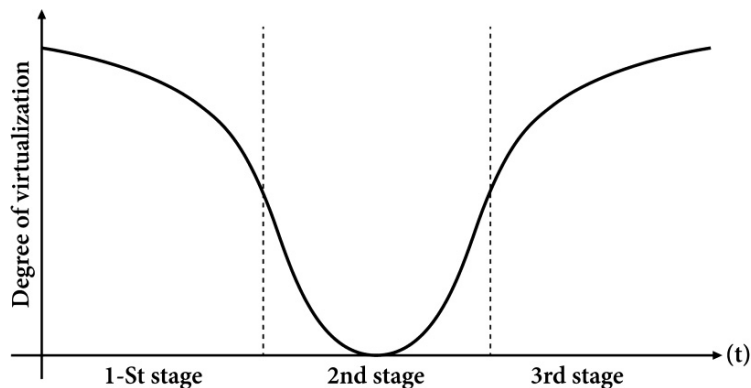


Fig. 1. Dynamic of degree of virtualization educational activity space in the process of preparing to fulfill social functions mainly of virtual type.

It is logically to suppose, correlation between virtual and real objects of educational activity space in the solutions, reflected by sequences (2) and (3) must be inverse to normal distribution. That is, in case of preparing for

fulfilling mainly virtual functions correlation of virtual and real objects of educational space on different stages of training must correspond to the diagram, shown at fig.1. The process of projecting professional activity space of a teacher of technology with regard for defined demands will let avoiding serious mistakes in the process of virtualization of training specialists on different levels of education.

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