

Galyna Mikhnenko

National Technical University of Ukraine

„Kyiv Polytechnic Institute”

Intellectual mobility of future engineers and the criteria of its formation

The analysis of scientific investigations of mobility in various fields of science shows that in addition to physical mobility of people, objects, images and mobility of thoughts, ideas, minds, there comes understanding of the concept of mobility as the most general characteristic of the personality's readiness for qualitative changes in life. Nowadays scientists consider different dimensions of mobility, such as professional, social, cultural, transdisciplinary, methodological, technological, and thought mobility which is connected with mental flexibility [4]. Stimulating the mobility of minds is becoming the key task for the educational programmes all over the world. Among their requirements for the jobs in modern companies, e.g. “FF”, the ability to be intellectually mobile is essential. Intellectual mobility is becoming the goal, whereas geographical (physical) mobility in this understanding is only a tool.

We define intellectual mobility as an integrated characteristic (quality) of a personality which ensures that the modern specialist is prepared to find, process and effectively apply required information, to produce new ideas and be tolerant towards innovations, to choose the best methods to solve both reproductive and creative tasks when changing quickly the types and forms of intellectual activities without reducing their efficiency and productivity.

Intellectual mobility as a quality of a specialist, in our opinion, combines intellectual capabilities and personality traits as a whole [2]. We believe that the process of formation of intellectual mobility should be based on the structural

model of intelligence developed by M. Kholodnaya [3], who considers intelligence to be a specific organisation of the personal mental experience (cognitive, metacognitive, and intentional). The requirements of qualification characteristics concerning the development of instrumental and personality-and-social competencies justify the identification of the second main component of intellectual mobility (personality traits which stipulate the development of this intellectual quality, namely, adaptability, communicativeness, tolerance, persistence in achieving goals).

It cannot but mention that the organisation of an educational process in connection with the new educational paradigm – intellectualization – is possible when an educational environment of a university, on the one hand, corresponds to the modern trends in industry and technology, but, on the other hand, provides the conditions for intelligence development of students. We argue that to create the conditions for the development and formation of intellectual mobility as a quality, an educational environment of a technical university should have the following features: deep integration of educational, scientific and innovative processes; communicativeness which implies the optimization of an educational process by all of its members, subject-to-subject interaction between a teacher and a student; active implementation of information technologies, and the ability of the environment for self-development.

As a result of scientific analysis we identify the following criteria and indicators of the formation of intellectual mobility of future engineers in the educational environment of a technical university:

- motivational (understanding of significance of intellectual development, interest in intellectual activity);
- cognitive (characteristics of thinking; level of mental functions; creativity);
- operational and technological (instrumental competencies; ability to use cognitive strategies);

- metacognitive (awareness of intellectual mobility issues and personal psychological characteristics; self-regulation of intellectual activities; self-criticism);
- personality and social (adaptability, communicativeness, tolerance, persistence in achieving goals).

On the basis of these criteria and indicators we distinguish three levels of intellectual mobility of future engineers, namely, reproductive (low), variational (medium), and creative (high).

The identification of the mentioned above criteria and indicators of intellectual mobility makes it possible to create the structural and functional model of the formation of this intellectual characteristic (quality) of future engineers in an educational environment of a technical university.

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