PEDAGOGY

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RESEARCH OF EDUCATIONAL ENVIRONMENT IN PHYSICS STUDY APPLYING PSYCHOLOGIC-PEDAGOGICAL EXAMINATION METHODS

The method of examination is one of the most important elements in the algorithm of innovative educational environment creation. It enables to carry out monitoring and get the clearer picture of potential, directions and prospects of the environment development. The article contains some results and conclusions of such research carried out on one of the engineering faculties of National Aviation University.

Розглянуто метод експертизи – один з найважливіших елементів в алгоритмі створення інноваційного освітнього середовища. Він дає можливість здійснювати моніторинг і отримувати більш ясне уявлення про потенціал, напрямки і перспективи розвитку останнього. Наведено результати і висновки дослідження, проведеного в Національному авіаційному університеті.

Introduction

At present the *educational environment* is defined as a system of influences and conditions of personality formation according to specified model and also her or his possibilities for development containing in the social (relation of teachers, approach to educational process, mutual relations style in pedagogical team, students group, etc.), space-appearance (comfort level of educational premises, furniture, technical tools, comfort, interior design, existence of libraries and reading halls, etc.) environment, as well as the links between the social and space-appearance components of educational environment. Just the quality of system links between the social and space-appearance components of educational environment determines the educational process results.

Level of methodical support, efficiency of using the demonstrative study resources; orientation of educational process to opening and development of each student's personal potential, ability of study environment to satisfy the student's needs as completely as possible and to actualize the social value system – all these components ensure successful adaptation to modern living environment, particularly via the professional competence [1].

Examination represents the comprehensive research of educational institution's teaching system (its subdivisions) carried out by competent experts being the main "tool" of this research, with mandatory further conclusion and recommendations to administration and teachers.

Examination method envisages understanding the entire integrity of various data from different sources.

The internal examination, carried out by the educational process participants being relatively "independent" (head of educational institution, eachers, students, psychological service), is based on using the method of involved experts and can be considered as one of independent audit technologies [2; 3].

Analysis of recent research and publication

State policy of Ukraine in sphere of education is based on priority of universal values, humanistic character of education, its scientific nature and ecological orientation, democratic character of management in educational system. Our state continues the integration to world system of higher school conserving and developing at the same time achievements and traditions of Ukrainian education [4].

During Ukraine's independence the break between the education content, educational processes, educational sphere structure, level of its personnel potential, and the needs of new economics became considerable. Its development is impossible without the fundamental educational and professional training of young technical specialists able to perform the progressive and effective innovations in surrounding world.

All these factors have become the cause of appearance and formation of flexible educational liberal concept.

The term *flexible education* means the process of extending the possibilities of person for competent choice of the life path and for self-development of personality.

Examination and projection of new educational environments being adequate to modern requirements, particularly while studying the

fundamental nature-mathematic disciplines, is necessary step for creation of the new developing education and appropriate educational environment which "in ideal situation" should composite complex of possibilities for self-development of all subjects of educational process [5].

Methods of examination and projection refer to innovation techniques of educational environment research, although appearances of their elements can be found in psychological-pedagogical thoughts in Russia in the late XIX century (P.F. Lesgaft) and in former USSR, for example: E.M. Gusinskiy [6], B.F. Lomov [7] and others, as well as in the works of outstanding Polish pedagogue Yanush Korchak [8].

In this innovative sphere there are notable works and ideas of Russian psychologists V.A.Yasvin and S.D.Deryabo [3; 9], who have developed a number of examination procedures for the analysis of certain educational environments with the purpose of their correction and planning. Among the works of Ukrainian teachers and psychologists the works of I.T. Bogdanov [2] and M.S. Conoha [10] attract attention, although in general it is possible to note that the prominent achievements in relevant psychological-pedagogical research in national education sphere are still ahead.

The purpose of research

The purpose of this work is to analyze the educational environment of discipline „Physics" regarding to students type which is formed in this environment on the example of a few groups at Electronics Faculty of National Aviation University (NAU); and on the basis of this analysis to set basic directions of pedagogical strategy of NAU General Physics Chair.

The results of research

Examination has been conducted in a several stages. First is acquisition of background information: analysis of various documents, magazines, summaries, notebooks, reports, administrative orders, stands and others. Simultaneously the basic information was gathered: materials of conversations with „involved experts", i.e. the interested persons – the head of chair (administration), teachers, engineers and, of course, students.

The next stage of the examination, the results of which are shown in the given work, is application of structured procedures, it allows to get the certain quantitative estimations for comparison and ranging.

Final stage of psychological-pedagogical examination of educational environment is expert conclusions which consist of the following items [2]: brief description of problem and formulation of examination purpose; composition of expert group; list of information sources; general characteristics of educational environment; expert estimations and expert recommendations.

The basic criterion of examination quality is its convincingness which is provided by the gathered real facts integrity, their analyses and system understanding.

Expert analysis of educational environment of discipline „Physics" was carried out on the base of psychological -pedagogical typology according to works by Yanush Korchak [9], where are marked:

– "dogmatic" environment which contributes to forming dependent and passive person; however, it provides the strong mastering of necessary educational content by heart learning;

– "career" environment which contributes to forming active, but dependent person; it envisages independent work of students according to specified rules and algorithms;

– "creative" environment which contributes to forming active and internally free person; it envisages that the students perform the creative tasks of design type; the teacher plays the role of pedagogue who evaluates the students' works results;

– "careless" environment which contributes to forming free, but passive person; environment in which students "are given to themselves", and the role of teacher is reduced to warning conflicts and providing the students' safety.

There was conducted questionnaire among the students of the first course of Faculty of Electronics of Electronics and Control Systems Institute of NAU (63 persons) and teachers of General Physics Department of NAU (12 persons).

The results of examination have shown that the students perceive mainly the NAU educational environment of discipline „Physics" as «dogmatic» – 45 %. The environment is perceived as "career" and "creative" ones by 31 and 22 % accordingly, and for 2 % of students the environment seems to be "careless". It is interesting to note that in the process of the expert questioning the teachers showed tendency to color the truth: in their opinion during learning discipline „Physics» the "career" environment prevails (53 %), then ranks "creative" (24 %) and "dogmatic" (22 %) environments, and the "careless" environment constitutes only 1 %.

In the process of examination the attitude of students and teachers toward the subject was also explored. It was estimated from point of "emotional" (is liked –

is disliked) and "cognitive" (interest to physics) relations, "practical" inclusion into study process. Attitude toward subject means attitude to students, teachers, educational process, and also to premises and equipment of lecture and laboratory rooms.

The analysis of obtained results shows that attitude of both the students and teachers to learning subject „Physics" is at a middle level in general. The teachers perceive emotionally positively a pedagogical team where they work, although cognitive interest of teachers to each other is relatively low. Teachers to a greater extent have the interest to the students, but at the same time, emotionally perceive them less positively than the colleagues. The students, in their turn, emotionally positively perceive their teachers, educational process, and also the premises and equipment of university, some of them negatively relate to other students. In addition it is possibly to notice rather low interest to the teachers by students.

In the work the method of vector simulation [3] was also applied to construction of educational environment model during the students' learning the course of general physics at NAU.

According to the method of the vector simulation of educational environment the co-ordinates system, consisting of two axes: the "freedom-dependence" axis and the "activity-inactivity" axis, is constructed. It is necessary to get the answers for at least six diagnostic questions adapted to concrete examination to construct in this system the vector corresponding to one or other type of educational environment.

For example, for the "freedom-dependence" axis the question can be of such kind:

1) Whose interests and values dominate in the given educational environment: a) person; b) society (group)?

2) Who adapts in the process of cooperation to whom: a) teacher to the student; b) student to the teacher?

3) What form of education is mainly realized in the given educational environment: a) individual; b) collective (group)?

For the "activity – inactivity" axis:

4) Is penalty applied to student in the given educational environment: a) yes; b) no?

5) Is any initiative of students encouraged in the given educational environment: a) yes; b) no?

6) Do these or other creative actions of student find a positive response in the given educational environment: a) yes; b) no?

The answers of "a" type correspond to "free-active" environment, and answers of "b" type – to "dependent-passive". Construction of vector model is carried out by subtraction. For example, if the sum of answers concerning free environment equals to 2, and sum of answers concerning dependent environment equals to 1, then 1 is put along the "freedom" axis.

Using such method, 63 students of the first year of the speciality "Aircrafts' Equipment" at Electronics Faculty and the team of teachers of NAU General Physics Chair were questioned in the II term of 2005-2006 academic year. The students of the first year have examined the "Physics" discipline's educational environment as 1 score for "activity" scale and 3 scores for "dependence" scale. According to V. Yasvin terminology such educational environment can be characterized as a "career environment of active dependence", i.e. orienting to interests of teachers who stimulate certain career activity of students taking into account, first of all, their own interests.

However, in the opinion of General Physics Chair's employees a situation is a little different. For "activity" scale the teachers proposed 3 scores, and for "dependence" scale – 1 score. Thus, in the opinion of people who directly work with students, the educational environment created while studying physics in NAU, can be characterized as a "career environment of dependent activity", i.e. it remains oriented to interests of teachers due to fact that teachers trust to initiatives of students little, but offer own initiatives. At the same time, students act actively, but this activity is directed to those impulses which are given them by pedagogical environment.

Using the same procedure the simulation of "ideal" environment was executed. It showed that students dream about the career environment of dependent activity, i.e. the desire to orient themselves to the requirements of teachers who are close to them with internal interests and desires. However, the teachers would like to form a creative environment, where the interests of both teachers and students are taken into account. Such contradictions between „the dream" and „the reality" have two basic ways of development: positive (dialectical) directed to the progressive changes of educational environment, and negative which leads to further alienation between students and teachers.

Conclusion

Thus, in the process of this psychological-diagnostic research it was detected that the students' and teachers' opinions on educational environment concerning the course of general physics at NAU differ sufficiently. During the discussion at General Physics Chair's meeting the obtained results were acknowledged adequate completely and providing the planned way of development. Clear that the pedagogical strategy is to be directed to forming the creative, active and free educational environment, being the integral component of NAU development in the whole. On this way one of the most important stages represents the acmeological principle [2] which consists in interrelation of general and professional education, natural unity of general-scientific, general-professional and special knowledge. This stage is directed to form in student the mobile system of comprehensive development, and to achieve the practical purposes of study on this base. Project works are conducted at a national level too to direct and order the increasing efficiency of interaction of labor market and educational services market according to Bologna declaration, and to create the pre-conditions to improve the students' mobility. Chair's teachers create and constantly modernize such working programs which include optimally necessary minimum of knowledge in physics that will give to student the possibility to learn consciously the educational material on the base of comprehensive analysis of qualifying characteristics, programs of general professional and special cycles and national standards. Self-work and innovative technologies of education remain the key words.

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