

**КІБЕРНЕТИЧНІ ЗАСАДИ ПРОЕКТУВАННЯ МОДУЛЬНОЇ
СТРУКТУРИ НАВЧАЛЬНОЇ ДИСЦИПЛІНИ НА ОСНОВІ
ІНТЕГРАЦІЇ НАУКОВИХ ЗНАНЬ**

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імені Г.С. Сковороди

Робота представляє основні наукові результати, одержані при дослідженні проблем проектування модульної структури навчальної дисципліни на основі інтеграції наукових знань. Висвітлюється технологія такого проектування на кібернетичних засадах, її вплив на формування змісту вищої освіти.

**CYBERNETIC IDEAS OF THE PROJECTING OF A CURRICULUM
SUBJECT MODULAR STRUCTURE ON THE BASIS OF SCIENTIFIC
KNOWLEDGE INTEGRATION**

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The paper represents main scientific results obtained while treating problems of the projecting a curriculum subject modular structure on the basis of scientific knowledge integration. It is described the elaborated projecting technology on cybernetic ideas along with its impact on forming of higher education content.

Problems of curriculum development for all forms and levels of learning are still crucial and cause necessity of deep investigations. It can be explained by increasing demands to contemporary gradulators from universities, to their formed abilities of professional mobility and knowledge flexibility. Credit-modular system of students' training which is common now in the majority of universities is based on the system of modular structured curriculum subjects. It is necessary to emphasize that approaches to modular structuring of a subject and their results play an important role in subsequent process of learning material accepting by students, of mastering it, in formation of students' knowledge and skills system. A curriculum subject is considered to be a mean of implementation of certain education content, and relevant modular structure of a subject can facilitate and improve these processes.

On the other hand, any curriculum subject (especially in higher education) is an embodiment of some scientific branch adapted to teaching and learning. Hence, it is to reflect correctly the branch's structure preserving main links between notions, concepts, facts, theories that really exist both inside the scientific branch and between sciences in a whole. It will promote and contribute to creation holistic and flexible system of students' knowledge. Such system of knowledge can be characterized by optimal information capacity, by readiness for implying in related areas, for mobile rising of students' educational level in their future lives.

However the modular structuring of curriculum subjects very often does not preserve or does not convey necessary essential links between scientific knowledge, which can cause negative consequences for trainees'. Among such consequences there are forming of separate and uncoordinated system of trainees' knowledge, earning of purely specific skills instead of generalized ones, breaking of general holistic and logic of a subject as well as destroying of links between related subjects etc.

Thus, investigating of knowledge integration mechanisms in scientific branches as well as searching of ways of these mechanisms embodiment at modular structuring of curriculum subjects seem to be urgent for higher education development.

The aim of the paper is representing of main scientific results obtained by the author while treating problems of the projecting a curriculum subject modular structure on the basis of scientific knowledge integration [1].

The basis of scientific knowledge integration were determined on the base of the investigation of influence of integration tendencies in science on the formation of the professional education content in general as well as on a curriculum subject in particular. It was determined that didactic component of a subject (in order to reflect scientific knowledge integration) apart from traditional functions has to realize such didactic procedures:

- revealing subject specific characteristics, measures of implementation of its conceptual and methodological arsenal;
- forming of fundamental all-over-scientific notion potential;
- detecting integration potential of a subject, learning cross-discipline methods of research;

- providing adequate types and mechanisms of knowledge arrangement which are able to reflect variety and complication of cross-discipline links;
- carrying out three-aspect mutual penetration of curriculum subjects via formed fundamental notion apparatus, cross-discipline means of cognitive activity, and information content of subjects.

Forms of revealing scientific knowledge integration in education content were clarified. Logical sequence and stage-by-stage fulfilling of above didactic procedures were proved and determined, what in total composed the integration basis of the subject modular structure projecting.

Didactic bases of this projecting were scientifically proved. They are: the essence, aim, regularities, principles, stages and logic of the projecting. Crucial importance has also our elaboration of the projecting technology: we developed special didactic and technological procedures, based on frames knowledge representation, to be done on each stage of the projecting in order to get as a result the modular structure of a subject keeping and spreading links between knowledge both inside a module and between modules and subjects of curriculum. As we used for this ideas of frame-based knowledge representation taken from the Artificial Intelligence theory to realize integration mechanisms among knowledge, our theoretical didactic results might have practical application for coordinated and consistent projecting of modular structure of all curriculum subjects. Such an approach might help to solve some important didactic problems of higher education like: forming students' holistic knowledge system of optimal information capacity capable to be used flexibly in related branches; automatical control of cognitive processes in higher education; creating of optimal educational trajectory from the standpoint both of a student and the situation on labour-market and others.

The kind of expertise and its types were also defined for the subject modular structure designed on the basis of scientific knowledge integration: internal scientific-method expertise of the pedagogical project by the models of estimate and diagnostic types. Appropriate criteria system was developed for the expertise of each model practical realization.

With the aim of verification of the designed technology on the basis of scientific knowledge integration empirical investigation was carried out which proved high quality of the ready-made project as well as positive influence on the planning and results of university academic process.

Literature

1. Gryzun L.E. Didactic bases of projecting of the subject modular structure on the basis of scientific knowledge integration:author's abstract ... doctor degree in Pedagogic: 13.00.04 / Kharkiv, 2009. – 39 p.