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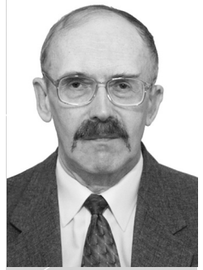
Implementation Features of Interdisciplinary Relationships in the System of University Training of Specialists in the Field of Mechanical Engineering, 15.04.01, and the Enhancement of the Role of Technical Specialists in Contemporary Society

I.N. Romanova



A.Yu. Krasnopevtsev

I.N. Romanova[1], **A.Yu. Krasnopevtsev**[1]
[1]Togliatti State University, Togliatti, Russia

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Abstract
The paper considers major requirements for development of interdisciplinary relationships model during specialists training in Mechanical Engineering, in order to enhance their role in contemporary society.

Key words: interdisciplinary relationships, research activities, functional components, special courses.

Introduction

In order to determine structural elements of interaction between disciplines, the use of complex professionally-oriented interdisciplinary relationships allows to achieve the unity of common education goals and also to lend the system of study of specially designed courses (disciplines) the integrity and logical consistency. Implementation of interdisciplinary relationships is a certain system, which includes interrelated functional units, such as **identification, establishment, and implementation** of interacting interdisciplinary relationships [1-5].

We allocate interdisciplinary relationships so as to study the system of courses (disciplines), which is designed to improve the quality of specialists training in Mechanical Engineering and to enhance research work in technical universities. Additionally, this system is used to prepare students for project, analytical and research work. The entire pedagogical system in technical universities with its structural and functional components belongs to the external environment. It is a high-level system in relation to the allocated system of interdisciplinary relationships during implementation of special courses (subjects). Structural components of the pedagogical system, such as the teacher, the goal, the teaching information, the means of pedagogical communication, the students, are also structural components of interdisciplinary relationships subsystem [3-10]. Their functional components are intended to implement the goal of the allocated system. In turn, this system will be the element of the overall goal of pedagogical system. The allocated goal of the system coincides with that of the general pedagogical system at universities, which consists in **training qualified specialists for contemporary knowledge-intensive industries in the field of Mechanical Engineering** [1-6, 8-10].

Design of Interdisciplinary Relationships

The specific impact on interdisciplinary relationships, on improvement of professionals training for automotive industry is determined by the integrated scientific knowledge system with a high degree of awareness, mobility and strength. This system is based on interdisciplinary relationships. Therefore, the system of courses (subjects) in a certain field needs a **model of interdisciplinary relationships.** On the one hand, this model would highlight features of interdisciplinary relationships and, on the other hand, it would be the integral part and, therefore, would develop the general model of professional training in Mechanical Engineering. Hereby, the model would be related to the ultimate goal of training specialists in the system of higher education. In this case,

- professional and qualification features of specialists reflected in the professional standard or the Federal State Educational Standard in a certain field, must be the basis for identification of interdisciplinary relationships, i.e. their architectonic foundation;
- in the course of attending specialty courses in certain fields,
- this model must identify both intradisciplinary and interdisciplinary relationships;
- interdisciplinary relationships must be of professional orientation of all disciplines belonging to studied professions;
- this model must provide for transformation ways of interdisciplinary relationships of specialty courses system across certain issues with other disciplines, i.e. transformation from successive to preceding disciplines;
- it is required to provide for a scientifically grounded and practically acceptable recording method of interdisciplinary relationships;
- this model must determine optimal conditions for implementation of professionally-oriented intradisciplinary and interdisciplinary relationships in the study of specialty courses system in regards to certain issues.

The above-mentioned content analysis of interdisciplinary relationships and the allocation of requirements for modeling this process, make it possible to develop the model of **professionally-oriented interdisciplinary relationships during the study of courses system (disciplines)**. This model can be designed based on the goal of higher professional education, which consists in executing social services of society to train and educate future specialists in the field of Mechanical Engineering. Each model unit implements certain methods of interdisciplinary relationships. Therefore, each unit has its own functions.

The relationship between training content and content of future activities of specialists in the field of Mechanical Engineering is the function of unit **"Identification of structural elements of the relationship between disciplines through the feature of professional skills".** To reveal structural elements of relationships between disciplines, the analysis method of production activity of future specialists by means of features of professional skills is employed. Also, these elements are grouped on the basis of general scientific professional knowledge. At the same time, the feature of professional skills is considered as the objective basis for determining structural elements of theoretical disciplines content and industrial training, since it specifically determines the socio-economic and national economic importance of the future study field. The repeated in two or more disciplines structural elements of education content serve as the relationship structural elements between disciplines. Still, these interdisciplinary relationships are streamlined neither in relation to certain disciplines, nor in time. However, the employment of the feature of professional skills makes it possible to take the first step in establishing interdisciplinary relationships required for the study of certain professions.

The second unit, **"The establishment of intradisciplinary relationships within the system of specialty courses in regards to**

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the common problem by using training analysis" determines the logic of training content in one discipline. The third unit, **"The analysis of temporal relationship between courses (disciplines) with other subjects (disciplines)"** determines the logic of learning material of a profession in its entirety. These two units are interrelated, because to identify both intradisciplinary and interdisciplinary relationships, it is required to analyze the curricula. This analysis is needed because the curriculum may not fully meet the demands of the given university, due to the specific character of its work and the logic of course presentation. We agree with the opinion of A. A. Pinsky and G. M. Golin, that "there is not any immanent and predefined student course logic, which would forcefully impose only one structure of teaching and learning management" [11]. Curriculum analysis may require adjustments either to improve intradisciplinary relationships from succeeding and preceding ones or, ultimately, to improve the professional orientation of curriculum. The latter is achieved by correlating the curriculum to the specificity of the back-up company. After the curriculum analysis, experienced teachers offer proposals, which are discussed and approved by acceptance boards with the expertise of several board members. During some timeframe, analysis materials that contain comments and suggestions to improve the curriculum, are verified. Afterwards, the curriculum is modified and finalized. Here we need to employ the method, which would assist in avoiding subjectivity in evaluation. Delphi approach, which is used to determine the optimal number of hours for disciplines topics, belongs to this method. Additionally, it is matrix analysis, which is based on expert assessment and allows to study the sequence of learning material and identify the optimal structure of its content. Finally, it is network planning of teaching and learning activities, which identifies classes linked by interdisciplinary relationships and the record of their temporal dependence.

The unit **"Recording interdisciplinary relationships"** has secured the instrumental function, i.e. to precondition the employment of interdisciplinary relationships.

The unit **"Selection of conditions for optimum implementation of interdisciplinary relationships"** performs the training function and covers content, methods and training aids. Interdisciplinary relationships are implemented both in classroom environment and during non-school hours. The latter include conferences, seminars, lectures, excursions, etc. In classes, these relationships influence the teacher's choice of training methods and materialize with the method. This contributes to the achievement of the class goal. Throughout the implementation of interdisciplinary relationships, related components of the syllabus must have a uniform interpretation of concepts, a uniform generally accepted terminology, a uniform system of measurements, etc. Interdisciplinary relationships are expressed through the same training equipment employed in classes when studying various disciplines.

Conclusion

With regards to the training programme of future specialists based on professional orientation of courses system (disciplines), the design of interdisciplinary relationships in the context of the considered units and their mutual dependence in the **system of courses (disciplines) study** covers **identification, recording and implementation** of interdisciplinary relationships in their entirety.

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