



Mutual Integration Of Disciplines In Education Of Students For The Engineering Profession

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ABSTRACT

This article is covered by the fact that in the educational process, students are able to master the disciplines necessary for the acquisition of knowledge, skills and qualifications necessary for the implementation of professional activities and apply them at a high level in practice

Keywords:

student, education, upbringing, engineer, creativity, ability, independent education, educational process, interest, skills, qualifications, profession.

Enter. Taking into account the prospects of consistent development of economic sectors and regions, changes in the educational process, the most advanced pedagogical technologies based on international educational standards, educational programs, specializations, and regions and the demands and needs of the fields are driving change in the higher education system today. On the basis of these changes, it aims to train professionals with professional qualifications who are active in the society, creative and enterprising, who can quickly learn the news related to the industry. In the Strategy of Actions for further development of the Republic of Uzbekistan, priority tasks such as "further improvement of the continuous education system, increasing the possibilities of quality education services, continuing the policy of training highly qualified personnel in accordance with the modern needs of the labor market" [1] are defined.

Our honorable president Sh.M. Mirziyoyev said, "Our young people are independent thinkers, have high intellectual and

spiritual potential, and are people who are not inferior to their peers in any field on the world scale."We will mobilize all the strength and capabilities of our state and society so that he can grow up and be happy" [2], and it is not without attention that the youth of our independent Uzbekistan is focused on free thinking. Therefore, it is one of the high tasks before us teachers to organize lessons based on modern approaches based on the demands of the new era.

Literature analysis and methodology. Preparation of engineers for professional activity in technical universities and scientific research institutions, expansion of professionally oriented theoretical assignments related to students' educational and research activities, principles, criteria for selecting educational content and their improvement, scientific research is being conducted on creating an environment for active practical and creative mastering of universal human culture by students, integration of humanitarian and

natural-scientific knowledge, and establishment of interdisciplinary relations.

According to a number of scientists, the concept of "Interdisciplinary relations" is a purely pedagogical term and it serves as one of the principles of didactics. "It is an expression of the existing laws of the world, and due to its philosophical and didactic meaning, it affects the structure, methods and form of teaching in a certain way" [5].

Improving the quality of education is one of the priority directions of the development of New Uzbekistan. President Shavkat Mirziyoev said, "We should continue the reforms we started in this area, go to educational institutions, communicate more with teachers and coaches, and jointly solve the issues raised by them regarding quality improvement.

Results and analyses. We have analyzed the scientific programs and work programs of the training programs for engineers in the aspect of our research. In particular, after analyzing the content of the curriculum and the work program of the 5340600- "Road Engineering" educational field, the following subjects are of major importance for this field: specialty, specialty and optional subjects we came to the conclusion:

1. Specialized disciplines that provide a scientific and theoretical connection of specialized disciplines with mathematical and natural sciences: drawing geometry and engineering graphics; highway design; construction and reconstruction of highways; history of highway development; enter the route; Students' mastery of them creates the ability to analyze real processes taking place in technology from the standpoint of general laws of nature.

2. Specialized disciplines that create special knowledge, knowledge and skills in professional activity, scientific and technical achievements of the field, problems and perceptions of their development prospects: search and design of highways; engineering geology and soil mechanics; building mechanics and construction; artificial structures on highways; construction of highways. The main goal of teaching the subjects of this group is to

develop students' ideas about the implementation of the general laws of nature based on the example of concrete techniques. As a result, students will acquire the methods of engineering calculations for the main options of professional issues, the basics of designing and constructing multi-purpose equipment.

3. Block of elective subjects in the "Road Engineering" field of study. "Highway engineering" specialty subjects include "Highway improvement and equipment" to develop the highway network of the Republic, to establish transport communications leading to the world market, and for this purpose, to equip and improve highways that meet international standards. is one of the priority directions of the state road policy. "In the following years, improvement and equipment of highways, architectural and artistic decoration are considered urgent tasks, and they fulfill the tasks of forming students' theoretical knowledge, practical skills and scientific outlook" [7]. The working curriculum of this subject corresponds to the classifications developed for undergraduate students and is the main document that determines the scope, composition and sequence of studying specific topics and questions in this subject. From a theoretical point of view, training with the interdisciplinary integration of specialty disciplines, and then by introducing a special subject called "Basics of preparation for innovative engineering professional activity" into the curriculum of the "Road Engineering" specialty elective subject between specialty and specialty disciplines as a result of education providing integration, preparation for professional activities of innovative engineering is carried out. The task of the educational process of a higher educational institution is not only to provide educational and scientific information. Perhaps, formation of professional qualities and development of intellectual abilities is of great importance in the training of modern engineers. The process of preparing students for innovative engineering professional activities in higher education institutions includes learning in the following 4 areas: a) humanitarian and socio-economic; b) mathematical and natural-scientific; c) specialty; g) specialization (Fig. 1). "In providing

education to students on such a basis, increasing their professional training is carried out by teaching subjects that provide professional training" [7].

The content of the knowledge and skills required of students is the educational field 5340600-"Road engineering" specified in the curriculum, which includes the hours allocated to the discipline "Road improvement and equipment" for the specialty . In the future, increasing the share of student elective subjects in each educational field, using the qualification of training specialists based on the principles of education-science-production is a reform aimed at improving the application of innovations to the educational process (Fig. 1). 1 - picture. The system of preparing students for innovative engineering professional activities in higher education institutionsThe subject of improvement and equipment of highways is taught in the 8th semester. Study time for science is divided in such a way that one

practical lesson corresponds to each lecture session. In order to master the subject, lectures and practical exercises are held alternately. Such a sequence of trainings provides an opportunity to control the process of mastering the presented material and, if necessary, to coordinate and manage this process. " The type of training and time distribution in the subject "Motorways improvement and equipment" is given in the appendix.Tasks facing the science of "improvement and equipment of highways": to systematize theoretical knowledge from previously mastered subjects and to give them professional guidance in order to form professional qualities in engineers; to explain various physical-mechanical processes to students based on knowledge of physical laws; to teach to find the optimal solution to a problem based on a comprehensive analysis and to stand analytically based on one's point of view.

We theoretically create two external and internal integrations of the subjects used in our research from the blocks of road engineering education (Figures 2, 3).

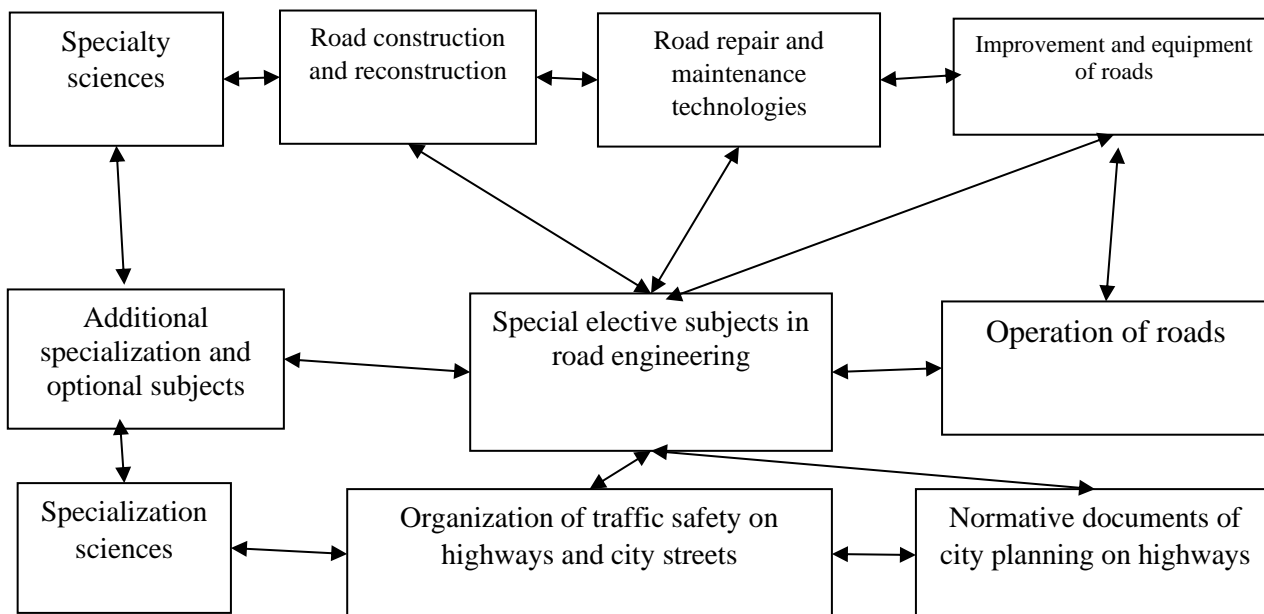


Figure 2. Interdependence of blocks of subjects

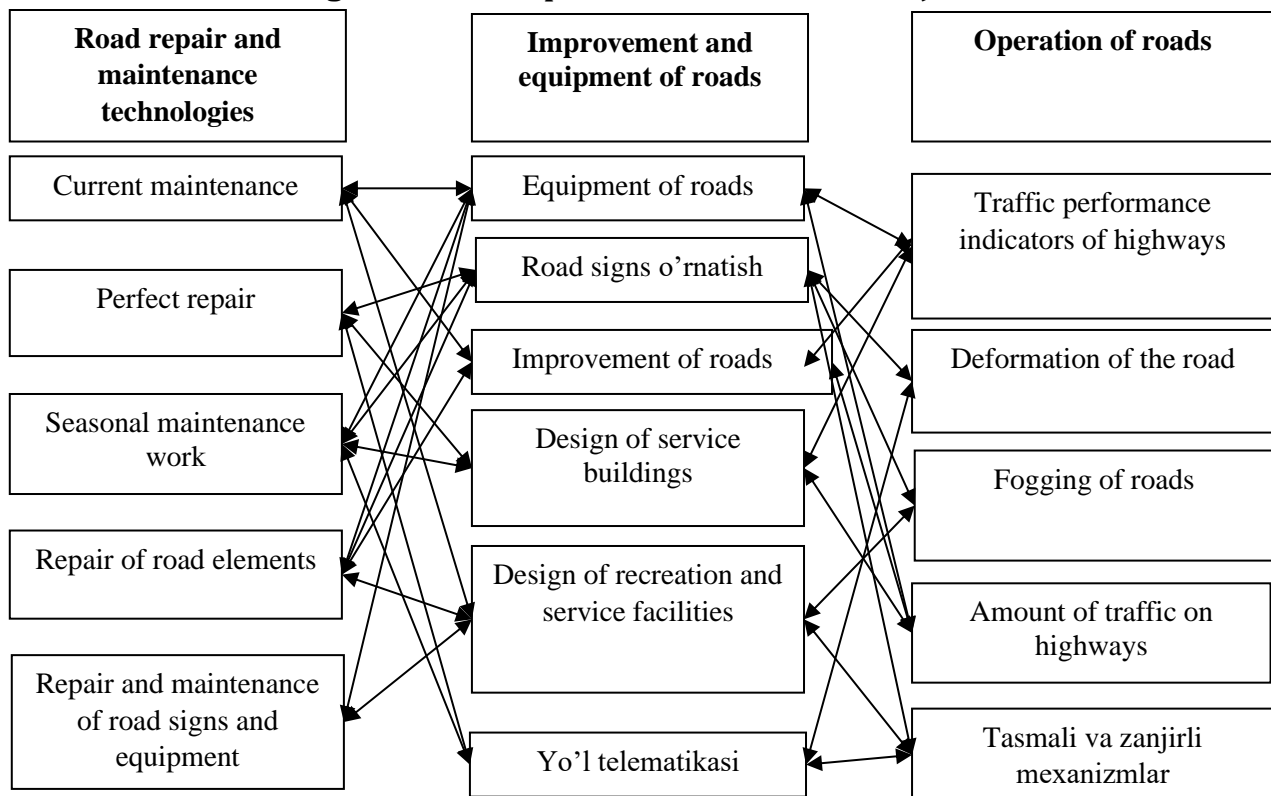


Figure 3. Interrelationship of "Motorway repair and maintenance technologies", "Motorway improvement and equipment" and "Motorway operation"

All the subjects mastered in the first and second semesters are the foundation for the specialty "Machine details" subject, which in turn is the link between natural and scientific subjects and special subjects.

"Road improvement and equipment" is considered a special subject, and to master this subject, special subjects include "Building mechanics and construction", "Resistance of materials", "Engineering geology and soil mechanics", "Construction materials" and especially "Drawing geometry". and engineering graphics" subjects must be thoroughly studied. Figure 2 above shows exactly what subjects "Motorway repair and maintenance technologies" and "Motorway operation" are related to the "Motorway improvement and equipment" discipline. Figure 3 below shows the relationship between the science of "Highway improvement and equipment" and th science of "Technology of highway repair and maintenance" (Figure 4).

5340600-Highway Engineering, the discipline of "Road improvement and equipment" in the specialized subject block and the subject of "Road repair and maintenance technologies" in the specialized subject block are closely related to each other.

We can see in Fig. 4. It is clear from this that how thoroughly the future engineers study the specialized subjects is important in the performance of their specialized subjects, pre-graduation practices, and graduation qualification work. "Students develop their professional competence during the study of specialized subjects, and their professional competence is formed through specialization and elective subjects" [8].

In a word, the student becomes a full-fledged participant in the educational process, his professional experience during engineering training becomes the main source of knowledge. From the model we developed above, it is clear that the pedagogue does not provide ready-made knowledge, but encourages the participants to do independent research and performs the function of an assistant in completing the task.

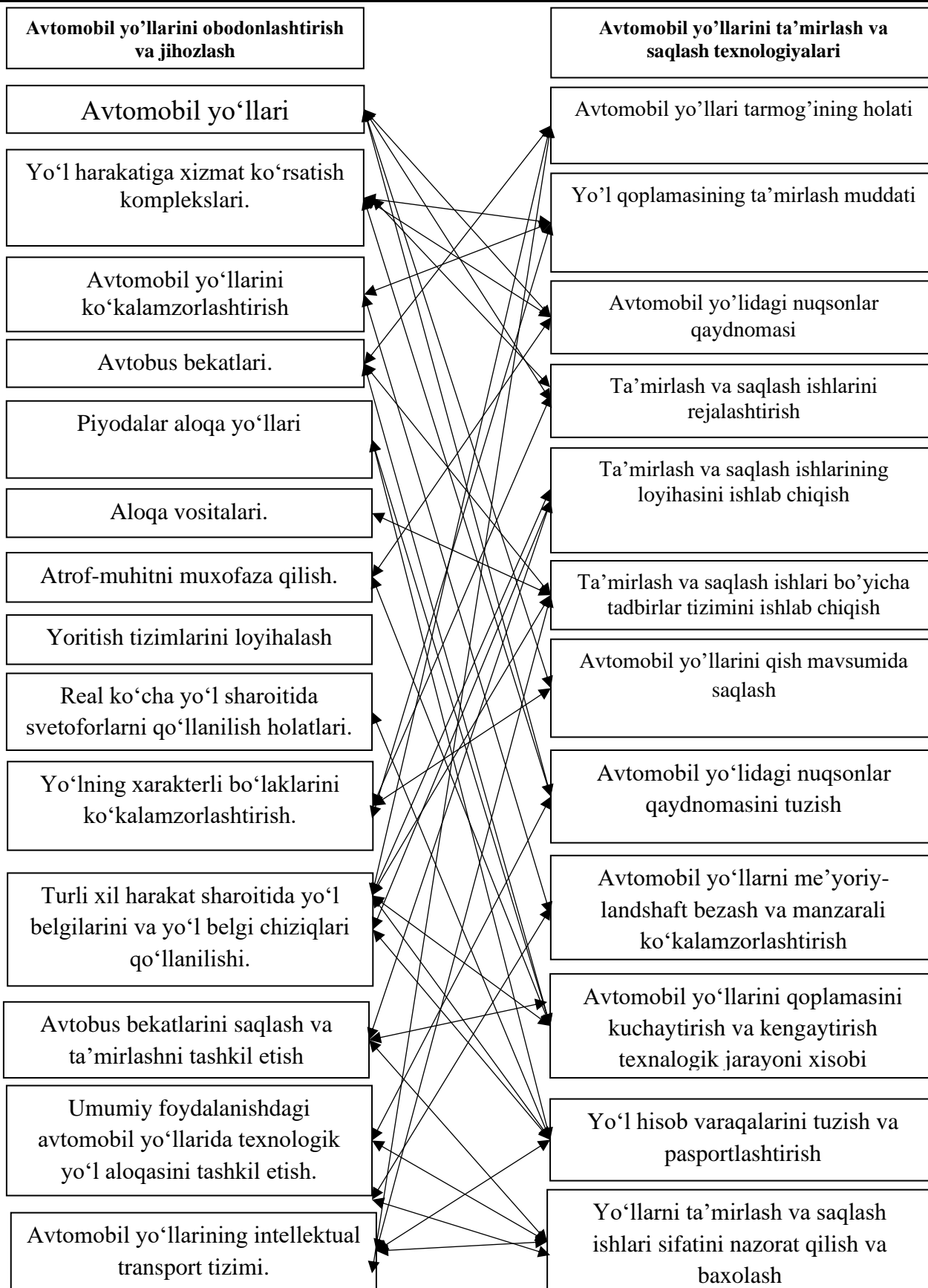


Figure 4. Dependence on the science of "Highway improvement and equipment" and "Highway repair and maintenance technologies"

Summary. In short, higher education institutions should not limit themselves to training specialists in a certain field, but should also be engaged in identifying, developing and realizing creativity in students based on interdisciplinary integration. Because creative students are drivers of the overall development of the country.

Based on the above conclusion, we make the following recommendations:

- the basis of the educational process is based on the needs of the learner:
- in the process of education, it is necessary to introduce individual education along with collective education, choose its path and determine the means of implementation
- it is necessary to develop and implement ways to motivate students to acquire knowledge.

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