ISSUES OF QUALITY ASSURANCE OF TRAINING SPECIALISTS FOR WATER INDUSTRY AT TECHNICAL UNIVERSITIES

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Abstract

One of the controversial and complex business problems remains the evaluation of the value system and its separate components both in the past and nowadays. The Accreditation Council of Higher Education has defined the quality as compliance with the state educational standards which has been accepted by accreditation and authorities of quality assurance. To effectively organize a teaching process for engineering professions it is necessary to have professional and teaching staff able to combine research-and-educational and practical activities, modern research and teaching laboratory facilities, effective system of conducting educational practice and to provide admission of most prepared applicants to appropriate departments of the higher educational institutions. The higher education institutions of Armenia and Artsakh Republic in recent years have become main subjects of effective activities. The peculiarities of training the specialists of water industry by the example of Shushi University of Technology are discussed in this paper.

Key words: higher education, quality, national wealth, water systems, laboratory.

Introduction

In the course of time various methods of assessment used in practice have been developed and employed. Both the principles and approaches to wealth assessment are being improved and the list of objects to be assessed is being expanded. The Eiffel Tower in Paris was recognized as the most expensive architectural structure in Europe, the value of which in 2011 is estimated at € 434 billion [1]. According to the expert evaluation of the tower which is a symbol of France ranks after the Tower of another European architectural marvel - the Coliseum, a symbol of Rome, which was about 5 times less expensive (€ 91 billion). The study, which also involved experts from the Italian Chamber of Commerce, found that the price of the Eiffel Tower in 2011 was equivalent to 25% of France's GDP. In addition to European monuments, experts have decided to estimate the residence of the US President - the White House, the value of which, according to the study in 2011, was $ 81 billion.

A new study by the Italian Chamber of Commerce estimates the Eiffel Tower $ 544 billion, placing it far ahead of other historic sites, including the White House ($ 110 billion), the Roman Colosseum (about $ 90 billion), Milan Cathedral (about $ 81 billion) , The Tower of London (about $ 70 billion), Prado Museum in Madrid (about $ 58 billion) and British Stonehenge (about $ 10 billion) [2]. The significant increase of the value of the Eiffel Tower is due to its leading growth on the French economy, mainly due to the increase in tourist flows, as well as the growth of activities related to tourism.

The value of the most expensive company in the world (Apple) (capitalization) in 2011 was estimated $ 624 billion which in 2021 already became $ 2,4 trillion [3].

It is interesting to note that the assessment of these facilities took into account not only the cost of construction materials needed for their construction or the land on which they were built. The image of these structures, the brand and the reputation were appreciated more. Among the dozens of parameters used during the assessment was the “tourism rate” which includes, in particular, the number of tourists who visited these facilities as well as the number of jobs created by these facilities. The Eiffel Tower, for example, has about ten million tourists each year, a European record for any visitor to the monument. It was estimated how much the country could lose if that country did not have that structure. In the case of France, that amount was a quarter of GDP.

Intangible assets are a significant part of assets of each country and the company and brands and service marks make up a significant portion of the latter. For example, the value of the “Apple” brand has exceeded $ 100 billion and $ 178 billion in 2021. Coca Cola Company band was estimated $ 59,9 billion in 2011 and is estimated $ 73 billion in 2021 [3].

The rating is based on the assessments of brands, duplicates and independent European experts in the field of intellectual property. To compile the rating, Euro brand surveys more than 3 thousand European, Asian and American companies running business in 16 spheres. The educational perspective of human development, among other means of education, is the development of cognitive activities, knowledge transfer, capacity building and skills development including quality assessment. Among the European standards and guidelines for the quality assurance of vocational education institutions, the system of assessment of student education is included which must meet the following conditions: equal application of publicly accepted standards, existence of established regulations and procedures.

Let us turn to the analysis of the concept of quality which has various interpretations. It has a number of dictionary explanations. However, when it comes to the quality of higher education, it turns out that there is no clear definition of the latter. However, quality has the following definitions [4].

a) any important or distinguishing feature;

b) degree of merit or perfection;

c) an action that makes or helps to make a feature as it should be;

d) distinguishing feature or characteristic;
e) unique ability or feature.

As an adjective the quality has the following definitions [4].
a) high degree;
b) high social status.

Harvin and Green explored the nature and application of quality in their work according to which quality is often perceived as a relative concept [4]. There are certain situations where the quality is relative.

First. Quality is directly related to the environment. It has different meanings for different people and the same person may perceive quality differently at different times. In the higher education system, the problem is complicated by the fact that it is formed with the participation of the parties: students, teaching and administrative staff, accreditation bodies, supervisors and evaluators. One of the peculiarities is that the society is also an evaluator.

Second. In some versions quality is considered an absolute value. As a result, noncompliance and independence of quality are present.

Third. Quality is measured by the number of thresholds that must be overcome to obtain a degree of quality.

Harvin and Green suggest 5 approaches to quality definition:

1. Exclusive approach to quality: it is considered as a peculiarity. Quality usually refers to some different elite product, and in the field of education it is closed to the idea of “excellence” – “high quality” to which not all are competent.
2. Quality as a perfection: it is considered as a sustainable result.
3. Quality as conformity of goals: it is considered as the satisfaction of the customer's goals and desires. Theoretically, customers present their requirements. In the field of education, this means the ability of the university to fulfill its mission.
4. Quality as a value is considered as income or investment. If the same product can be purchased at a lower price, or a better product can be purchased at the same price, then the customer buys just that. At the same time, with rising tuition fees, students are beginning to demand quality in exchange for higher tuition fees.
5. Quality shift: it is the classic idea of quality. In the field of education, the shift refers to the possibility of increasing the attractiveness of education or the acquisition of a new knowledge.

The authors of another approach, Campbell and Rossynay, describe quality as a multidimensional and subjective concept [5]. Based on the five approaches they proposed, the concept of quality is introduced by Harvin and Green [4].

- Quality as an exception. This is a traditional scientific view on the matter because it aims to be the best.
- Quality as a “zero error”. The idea of zero error is more easily defined in mass industry where product standards can be defined in more detailed descriptions. Since the “product” of higher education institutions - the graduates, can not be the same, this view can not be applied to the field of higher education.
- Quality as “compliance with goals”. The view from this point of view is that the product or service meets the requirements, needs and desires of the customer. At the same time, students, industry, academia, government, society and all those who are “consumers” of higher education to one degree or another may have differing opinions about “purpose” or “relevance”.

- Quality as a "stakeholder". Certain quality norms, standards and any institution that meets them are considered as high quality.
- Quality as attractiveness or improvement. This concept focuses on the facts of continuous improvement and is guided by the motto that achieving quality is a major issue for the representatives of the field of science and it is the workers of the field of science who know best what quality is. The disadvantage of this concept is that it is quite difficult to "measure" the improvement and that this improvement can be difficult to see from the outside world.

UNESCO defines quality in higher education as a multidimensional, multilevel and dynamic concept that addresses institutional goals and missions, as well as system-specific norms, programs or standards [6, 7]. Therefore, quality can have different meanings depending on:

- the interests of stakeholders of higher education;
- the manner of use: mission, goals, processes, costs, revenue, etc.
- the features of the scientific world that are worthy of appreciation;
- the historical period of development of higher education.

The following definition of quality was used here:

- Quality as excellence: traditional and elite view according to which only the best criteria can be considered real quality.
- Quality as compliance with goals: a concept that emphasizes the need to meet the criteria set by a qualification or quality assurance body focusing on the effectiveness of the process, the plans to achieve the goals or the mission.
- Quality as attractiveness or improvement. Focuses on continuous quality improvement, emphasizing the responsibility of higher education institutions to use their institutional autonomy and freedom more effectively.

Each approach has its advantages and disadvantages corresponding to some extent to any period or being in the national context.

Several universities in the UK have agreed that quality reflects the effectiveness of university education, that is the urgency and effectiveness of opportunities to achieve students' learning, teaching, assessment and achievement [8].

Van Kemened presents transcendental, product-centered, customer-centered and production-centered approaches to quality. In the case of the transcendental approach, quality is absolute and can be evaluated objectively. Quality is, without a doubt, the best. Winkenburg calls it the "perfect image approach" [7].

Pircig defines quality as follows: "Quality is neither intellect nor matter, but a third essence that is independent of these two ... although quality cannot be defined, we know what it is" [8].

Today in Armenia and Artsakh national wealth and its individual elements are not sufficiently valued, so we have no idea about that greatness. Higher education is the sphere in which human capital is created, so it is possible to study the system of evaluation of their activities.

Conflict setting

The presence of different approaches to the problem under study allows to define the specifics of the results of the graduation attestation for different universities. The main direction of economic policy is the provision of jobs in conditions of stable inflation (for this idea Jan Timbergen was awarded the Nobel Prize in 1969) - the field of higher education becomes the focus of employment of high-quality professionals which undoubtedly contributes to curbing the emigration of professionals.

In the current situation, the most important problem is a certain expansion from higher education - the whole educational system and science. It is necessary to turn universities to centers providing scientific and technical progress. The university was and remains the main link in the types of various mechanisms for promoting and developing innovations which is due to the high efficiency of the production of theoretical-experimental-industrial samples of such structures. Such a system best allocates financial resources in the "idea-result" chain.

The aim is to define the priority steps aimed at training of highly qualified university specialist-graduates for water industry of the Republic of Artsakh.

Research results

Work in this direction is carried out, in particular, at Shushi University of Technology (hereinafter referred to as the University). In particular, the majority of the University lecturers are involved in the work of hydraulic facilities in the water sector including irrigation, water supply, design of hydroelectric power plants, technical state inspection over their construction and providing operation safety. They designed and built the water supply system of Stepanakert, studied the technical conditions of Sarsang reservoir dam with a volume of 625 million m^3 and carried out engineering control over the construction of irrigation systems. Based on the obtained data, numerous monographs, textbooks and teaching materials were published and dissertations were defended. In this regard, the teaching staff of the University has sufficient practical experience, which, combined with theoretical knowledge, creates sufficient preconditions for the organization of professional courses in the field of water management at a proper level.

The University established modern educational-research laboratory bases as part of scientific institutes and expert centers. These laboratories are not only more up-to-date but they will also contribute to the development of science. Students there will not only take practical training within the curriculum, but also participate in research as part of a research team. In this regard, we consider the establishment of training centers jointly with scientific institutes and expert centers a major issue. In particular, on the basis of the hydraulic laboratory of the Institute of Water Problems after Academician I.V.Yeghiazarov, a modern training center has been organized which is one of the best scientific-experimental laboratories in the region.

The laboratory base provides an opportunity to implement both the educational orientation included in the framework of university curricula. Educational activities included both laboratory and teaching-practical training of professional subjects as well as the organization of educational-production internships. The laboratory is a two-story building: the floor measures 18x60 m^2 and the height of ceiling of each floor is approximately 8 m.

The models created in the laboratory allow conducting research to determine Reynolds, Bernoulli coefficient of frictional resistance; local loss coefficients; leakage from holes; filtration coefficient; free jet distance; potable water cleaning using local sling materials; water depths on the overflow dam and slope; parameters of the stilling pool and operating valves; values of free surface coordinates and average velocities of individual cross-sections in the fast-flowing section; study of the accumulated air behavior, the maximum level to be established in the reservoir during the removal of floods etc.

Models of water systems can also be used in a set of experimentations for determining trench drain and fast-flow conveyance capacity; the occurrence of aeration and under such conditions cross-section dimensions of drainage channel; the amount of silt entering in the channel (mainly as quartz sand and partially in the form of clay) and dependency of water velocity and sedimentation basin dimensions necessary for their settling; the amount of water required to remove the sludge. Presented

models of other hydro schemes available in the laboratory can be used as training facilities for students studying water-related professions. At the same time, they can be used to select topics for master's theses and to conduct relevant experimental studies.

The role of the laboratory in organizing research work at the third level of education may also be important. Let us present some priority topics that can be done here.

1. Anti-flood structures

In countries with mountainous and foothill areas, mudslides cause great damage to the economy. They destroy highways, railways, engineering communications and settlements. They are accompanied by numerous human life losses. Research on anti-flood hydraulic structures can be carried out in the directions of flood-carrying, flood-draining canals, mud-dams, dams, barrages, etc. Mudflow canals and river beds are widespread among the measures to protect the roads, settlements and other important objects from mudslides. Their purpose is to safely remove mudslides from the approaches of protected buildings. However, no reliable methods have been developed so far to determine the size of mudflow canals and the current carrying capacity of these canals. That is why most of the flood canals are filled with mudslides some time after their operation they cease to serve their purpose. As a result, resources used become meaningless and protected objects suffer great losses. The appropriate equipment available in the laboratory makes studying various flood canals possible to determine their appropriate size and current concentration at different flood outlet and slope values. As a result, it is possible to develop reliable calculation methods of canal for this or that baseline condition. Flood protection structures are installed in the upper reaches of floodplains and river tributaries. While their functioning, they protect the various objects and settlements, located in lower reaches, from destruction. In Armenia, the Lori and Zangezur highways, railways and settlements, including Alaverdi and Kapan towns are protected by flood protection structures. They are widespread in Europe, China and many parts of the Americas. These structures are earth or concrete dams made of various prefabricated structures etc. Despite the widespread use of mudslides protective structures, they all have a number of serious drawbacks:

a) Most frequently occurring small-to-medium sized debris flows or mudslides are a part of most dangerous to life and property because of their high speeds and the sheer destructive force of mudflows. As a result, a large part of the upper volume of the mudflow retarding structure is filled with the debris carried by the flows and its periodical cleaning takes considerable resources;

b) the structures, retarding the whole flow, in the lower reach of the river, disrupt the natural state of the environment which is fraught with such undesirable grave consequences as ecological-riverbed damaging phenomena.

Taking into consideration these shortcomings, the above mentioned laboratory may carry out investigations on the development of fundamentally new types of flood protection structures. The first serious results and the copyright have already been obtained.

2. River bed-formation phenomena

During spring and autumn floods of rivers, overflowing of the riverbed intensifies, especially the river banks. As a result, shore protection and other coastal structures often collapse. The laboratory has an experimental device designed to study riverbed formation phenomena and to test models of specific structures. In particular, the device can be used for carrying out tests on the stability of a number of mouth parts of rivers flowing into Lake Sevan. On the same model it is possible to carry out riverbed formation studies during the floods of the Araks River.

3. Construction of new experimental devices

In the hydraulic laboratory it is planned to build in the near future:

(a) models of gravity water pipes on which new proposed air removal devices are to be tested;

(b) experimental equipment for testing small hydro turbine units of small hydropower plants.

With a similar approach, in the Institute of Mechanics of the National Academy of Armenia there is a "Soil Mechanics" training-research laboratory and in the National Agrarian University of Armenia – a laboratory of chemical and environmental expertise.

Conclusion

Preparing highly qualified manpower for the water industry of Artsakh Republic is first and foremost necessary to solve regional geopolitical realities which have been formed over the last 30 years confrontation, when the problems of formation and utilization of water resources are gaining not only economic, social, environmental, but first of all political significance. Training of qualified personnel for various engineering professions is not an easy task and for the secondary education system has not yet fully restored. The above-mentioned achievements in the educational process (sufficient potential of the teaching staff, availability of laboratory base) continue to be at risk. The average age of the University instructors is very high, besides they are mainly of Yerevan universities. In this regard, it is high time to train highly qualified young instructors and build modern laboratories in Artsakh. The solution to this problem should be directed to the professional potential that still exists today.

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ՏԵԽՆԻԿԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆՆԵՐՈՒՄ ՈՐԱԿԻ ԱՊԱՀՈՎՄԱՆ ԽՆԴԻՐՆԵՐԸ ՋՐԱՅԻՆ ՈԼՈՐՏԻ ՄԱՍՆԱԳԻՏՈՒԹՅՈՒՆՆԵՐՈՎ ԿԱԴՐԵՐԻ ՊԱՏՐԱՍՏՄԱՆ ԳՈՐԾԸՆԹԱՑՈՒՄ

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Տնտեսագիտության վիճահարույց և բարդ հարցերից մեկը, ինչպես նախկինում, այնպես էլ այժմ, շարունակում է մնալ արժեքային համակարգի և դրա առանձին տարրերի գնահատումը: Բարձրագույն կրթության հավատարմագրման խորհուրդը որակը սահմանել է որպես համապատասխանություն ընդունված չափանիշներին, ինչն էլ ընդունվել են հավատարմագրող և որակի ապահովման մարմինների կողմից: Ինժեներական բարդ մասնագիտությունների ուսումնական պրոցեսը արդյունավետ կազմակերպելու համար, անհրաժեշտ է ունենալ գիտամանկավարժական և գործնական գործառույթները համատեղող պրոֆեսորադասախոսական կազմ, ժամանակակից ուսումնագիտական լաբորատոր բազաներ, ուսումնական պրակտիկաների կազմակերպման արդյունավետ համակարգ, ապահովել առավել պատրաստված դիմորդների ընդունելությունը բուհերի համապատասխան մասնագիտություններ: Հայաստանի և Արցախի բարձրագույն ուսումնական հաստատությունները վերջին տարիներին դարձել են արդյունավետ գործունեության հիմնական սուբյեկտներ: Շուշիի տեխնոլոգիական համալսարանի օրինակով, սույն աշխատանքում քննարկվում են ջրային ոլորտի մասնագիտությամբ կադրերի պատրաստման առանձնահատկությունները:

Բանալի բառեր. բարձրագույն կրթություն, որակ, ազգային հարստություն, ջրային համակարգեր, լաբորատորիա:

ПРОБЛЕМЫ ОБЕСПЕЧЕНИЯ КАЧЕСТВА В ТЕХНИЧЕСКИХ УНИВЕРСИТЕТАХ В ПРОЦЕССЕ ПОДГОТОВКИ КАДРОВ ДЛЯ ВОДНОЙ ОТРАСЛИ

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Одним из наиболее спорных и сложных вопросов экономики как в прошлом, так и в настоящее время является оценка системы ценностей и ее отдельных элементов. Совет по аккредитации высшего образования определил качество как соответствие принятым стандартам, которые были приняты органами по аккредитации и обеспечению качества. Для эффективной организации учебного процесса по сложным инженерным специальностям необходимо иметь профессорско-преподавательский состав, сочетающий научно-педагогические и практические функции, современные учебно-лабораторные базы, эффективную систему организации учебных практик, обеспечить прием наиболее подготовленных абитуриентов на соответствующие специальности вузов. Высшие учебные заведения Армении и Арцаха в последние годы стали основными субъектами эффективной деятельности. В данной статье рассматриваются особенности подготовки кадров для водной отрасли на примере Шушинского технологического университета.

Ключевые слова: высшее образование, качество, национальное богатство, водные системы, лаборатория.

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