

Role and impact of the US higher education and scientific staff formation on the global cooperation strategies as part of sustainable development

Angelina Roliak^{1,*}, Iryna Humeniuk¹, Nataliia Fedorchuk¹, Oleksandr Mozolev², and Larysa Chornobai¹

¹Podillia State University, Shevchenko str. 12, Kamianets-Podilskyi, 32316, Ukraine

²Department of Tourism, Theory and Methods of Physical Culture and Valeology of Khmelnytskyi Humanitarian-Pedagogical Academy, 139 Proskurivskoho Pidpillia Street, Khmelnytskyi, Khmelnytskyi Oblast, 29013, Ukraine

Abstract. In modern conditions of global cooperation and development of sustainable growth effective models, the influence of tertiary education and science systems on the social and economic spheres is increasing. In complex interaction and mutual integration, this ensures high efficiency of progress both in individual countries and in a global dimension. For example, the American model of tertiary education and science reflects the specifics of worldviews, social orientations, and social demands - Americans regard education with their inherent pragmatism. From the American point of view, training programs and courses are products that differ in quality and price. The US principle of educational specialization, but not universalization is a conscious desire to achieve economic goals. This approach is also based on the Protestant idea of corporate social responsibility; and the education system, as one of the forms of this responsibility manifestation, was formed on the basis of these values (neobehavioral philosophy of education and Protestant socio-entrepreneurial ethics). Supporters of this trend reject self-expression as the main goal of education. They favor the principle that a man is a learning being, and in the process of learning all the behavioral norms are developed. The learning effectiveness is achieved by introducing the achievements of science, technology, and experiment into the system of education. According to these prevailing principles of management, pedagogy, and philosophy of education, all life, educational aspirations, and requests, both personal and professional, must be clearly algorithmically and purposefully modified in conjunction with the goals, values, and direction of the state and society.

1 American tertiary education in the global perspective

At the present stage of social development, the majority of countries in the world pay great attention to the global tendencies that will bring their system of education to the

* Corresponding author: vivonapnuivo@gmail.com

competitiveness all over the world. With the increase of attention to sustainable development, American tertiary education plays a significant role promoting effective models of world cooperation policy. We realize that complex interaction and mutual integration of different educational schemes guarantee great efficiency of advancement in both individual countries and on a global scale.

Any transformation has to be the result of a systematic strategy. Since today American tertiary education is considered to be the driving force for innovational change and carrier of the global values of a knowledge-based society, it is important to make the analysis of structural and organizational principles, the system of standards and requirements, as well as its historical background. We can assume that the latest achievement of the US high education challenge the modernization of traditional processes, methods, and approaches to teaching in institutions of high learning.

In general, United States have peculiar tertiary education system with several thousand different higher education institutions that can be classified in many ways in the. US institutions of higher learning can be divided into three types, which usually differ significantly from each other. Another characteristic feature is that every state still has a dominant role in tertiary education, funding a significant share of research programs in universities. Public and state-affiliated universities are often very large and, as a rule, are not so prestigious as private ones. The annual university rankings are traditional. Particular attention is attracted to the list of "25 best universities in the USA", which has long been headed by the three private ones famous all over the world [1].

The period when nations adopt global policies aimed at integrating their economies, political-social systems, and educational structures has already come [2]. Our research shows that an important factor is the comparative study of theory and practice of the new educational strategies in advanced countries, in particular: the United States of America, that leads the world in impact of internationalization and cooperation in education and society and have gained a positive experience in creating their own strategic plans for reforming of all the important educational components based on the sustainable development.

2 Higher education organization principles and activities of scientific personnel in the United States

There are several thousand different higher education institutions that can be classified in many ways in the United States. Generally speaking, US institutions of higher learning can be divided into three types, which usually differ significantly from each other, mainly in the number of students and goals. Thus, according to the form of funding, they are divided into two main groups. The largest number group consists of private institutions, characterized by the students' tuition fees, self-financing, private donations, sponsorship, and smaller share from the state budget. The next group is public institutions where much of the funds come from federal and local budgets. In general, the state still has a dominant role in tertiary education, funding a significant part of research programs in universities, maintaining two- and four-year colleges with almost 80% of the total contingent of students.

The American model of higher education also reflects the fundamentals of worldviews, social orientations, and social demands. Americans treat education with their inherent pragmatism. They consider training programs and courses as products that differ in quality and price. The United States' basic principle is the specialization of education, but not the universalization of it [3]. One of the main features of US tertiary education is the presence or absence of research and postgraduate programs that distinguish college from university.

A college is a higher education institution that deals mainly with the professional education of students, and as for the scientific work, it remains in the background. The vast majority of four-year colleges are small (less than 2,000 students) and private. Although

colleges for talented students within one state have recently begun to appear. Many small colleges are religious, sometimes called "bible colleges." Humanities colleges are often referred to as "liberal arts colleges." The best liberal arts colleges, such as Amherst, Williams, and Swartmore, are comparable in prestige to universities, but as they are much smaller, they are less well-known, even if very often the quality of their education is better.

Most US universities have a developed research structure at the level of doctoral programs, while the rest are multi-profile universities with a large number of training programs for bachelor's and master's degrees. Universities are divided into two types: universities at the federal level and universities funded by the authorities of specific states. The public or state-affiliated universities are often very large and, as a rule, are not so prestigious as private ones. Their main goal is to teach students from their state, and therefore competition, and the training fee is usually larger for students from other states. Many state universities' education suffers from the large number of students in groups, bureaucracy, and little attention from teachers to students. Nevertheless, students, even from other states and countries, enter the best universities, such as California University in Berkeley, Michigan University and Virginia University. The circle of private universities includes the most famous American institutions, such as Harvard, Yale, Princeton, Stanford, Massachusetts Institute of Technology, Duke University, Brown University, and California Institute of Technology. Most of them are medium-sized, although some are very small, for example, Caltech (California Institute of Technology), and others are very large, such as the University of Southern California. The annual university rankings are traditional. Particular attention is attracted to the list of "25 best universities in the USA", which has long been headed by the three private (Harvard, Yale, and Stanford), and several state universities, including Michigan and some institutions from California.

Consequently, according to the structure, level and content of training, American institutions of higher learning may be divided into the following groups:

- Institutions of postsecondary education of various types and semi-professional schools with programs lasting from 1 to 3 years and awarding Associate Degrees. Short-term college education offers high school diplomas, technical degrees and certificates. A limited number of medium-term programs are finished with Associate Degrees, giving the right to perform the work at the level of technicians or transfer to a four-year college to continue their studies for a Bachelor's Degree;
- Community/junior colleges with two-year programs, designed to arrange students' educational trajectory for either obtaining a professional license (Occupational License) or getting additional education at another college through passing more advanced academic courses towards a Bachelor's Degree;
- Liberal arts colleges are traditional for the system of higher education in the United States. As a rule, a full-time course of study at a liberal arts college leads students to a Bachelor's Degree diploma with a dominant academic and minimum professional content. However, to extend the professional capabilities of graduates, there is a noticeable tendency to include specialized courses in the final years of educational programs. But for individual specialties, for example, medicine and law, a student must go through the program of postgraduate professional training to achieve a Master's degree in university schools;
- Comprehensive colleges with a Bachelor's and Master's degree (programs include pre-professional and in-depth professional development). Most of these institutions train teachers, businessmen, specialists whose activities require a Master's degree;
- Independent vocational schools offering Bachelor's (very often Master's) degree programs in technology, arts, etc. With the content of the programs close to the institutions of the first group, these schools use much more qualified staff, educated in universities;
- Universities with the right to train Doctors of Sciences, including all cycles of education. They form the most prestigious group of institutions of higher learning. This group is often differentiated into narrower ones, based on the level of research (by the number and thematic

diversity of doctoral dissertations defended each year), the amount of research funding, the presence or absence of a medical school with a research clinic, the range of faculties, and, finally, the number of lecturers and students, and the relationship between them [4].

A separate group of higher education institutions that make extensive use of ultramodern means of information transfer and organization of distance learning differs from the usual ones. Among the first was the well-known company IBM, which exercised two-way video communication via satellite to train its staff simultaneously on both shores of the Atlantic Ocean. Nowadays, teleconferences of scientists have become commonplace. Instant communication between teachers and groups of students in the United States is also increasingly applied.

As a rule, the structure of American higher education institutions is very diverse, but the main link that performs most of their tasks is a small branch or department, the head of which can be appointed and elected. He and his colleagues solve all issues of teaching a certain discipline and research work in the department. Higher levels (departments, educational colleges and the whole institution) only approve the collective decisions of the department. At the largest US universities, applicants usually have to enroll in a particular faculty, but at the same time, they enter this higher education institution in general, making their final choice of faculty and specialty after successful selection tests and enrollment. Moreover, there are ways to move from faculty to faculty and the opportunity to have the status of "not decided", although the path to some faculties becomes almost or completely closed. In other tertiary institutions, the student must decide the sphere of specialization at the end of the first and very often the second year. Sometimes, in addition to the major specialty, they can add one or even more minor ones, and occasionally they can choose two or even three majors [5].

Our investigation shows that there are three levels of tertiary education in the USA. The first is the level of Bachelor's degree, which usually lasts four years (except for medicine, law and some other specialties). The diplomas at this level, which are represented by Bachelor of Arts or Bachelor of Science, testify mostly of academic qualifications. The second level program (after 1-2 years of specialization in a certain field) ends with the award of a Master's degree. The requirements for obtaining it are various: writing theses or scientific work, passing an exam in a foreign language, certification of the ability to use computers and databases, final exams. The flexible degree system of American tertiary education allows students to interrupt training at any level, to change a profile of training, and to continue education. The term of training in the magistracy depends on the features of the specialty: from a year and a half in the field of arts to two or three years in medicine and psychology. At the end of training, it is necessary to write a reference paper, present research, or take an exam.

The third level is a postgraduate education and production of a doctoral dissertation, which requires scientific studies within 3-5 years after receiving a Master's degree. The main criterion for the selection of candidates in doctoral education is the ability to conduct scientific research. During 2-3 years, the doctoral student must assimilate a significant amount of theoretical material, having received up to 72 credits from 20 exams, compile qualifying exams and complete a dissertation. Current requirements depend on the realm of studies, but very often they comprise: scientific research and defense of a dissertation, written on its material, general or professional exams, etc. Usually, after the completion of the third level of higher education, a Doctor of Philosophy (PhD) degree is awarded, which is the highest academic rank in the United States. Some leading universities in the United States provide a further type of degree training-postdoctoral research, designed to verify the represented scientific ideas and their experimental substantiation.

3 Formation of higher education system in the USA

The first steps towards the formation of the higher education system in the United States were taken in the early seventeenth century. Then liberal arts colleges were created on the model of English technological institutions. Later, agricultural colleges appeared in almost all states. However, in Europe, high vocational schools existed independently, although in the United States they were usually included in universities along with the colleges of liberal arts and sciences. Thus, by the beginning of the XX century, the evolution of American higher education institutions led to the creation of large universities, which became the main centres of academic science in the United States.

Deep research and funding have helped to make American colleges and universities quite prestigious in the world. They are especially attractive for foreign students, teachers and scientists due to the high quality of education and the best working conditions. According to the Academic Ranking of World Universities prepared by Shanghai Zhao Tong University, more than 30 of the 45 best educational institutions in the world are in the United States (assumed by the number of awards and research papers) [5]. According to UNESCO, the United States ranks second in the world in the number of tertiary education institutions. The total number of them is 5,768, with an average of more than 115 in each state. The United States also has the largest number of university students in the world, namely 142,617,778 students, approximately 4.75% of the total population. There are 4,861 colleges and universities in the United States with 18,248,128 students [6].

On one hand, most higher education institutions can be divided into public and private. The difference between these two rather conditional types is the cost of training. As a rule, public universities are much cheaper than private ones. As surveys demonstrate, their cost is about 8 times lower. Public universities include such institutions as the City University of New York (CUNY), the State University of New York (SUNY), etc. Private universities are the so-called top tertiary education institutions. In particular, they include: New York University (NYU), Harvard University, Columbia University, Yale University, and many others. As for tuition fees, CUNY costs about 5,000 a year and NYU about 40,000 a year [3].

On the other hand, there are 4-year and 2-year colleges. In 4-year institutions, you can get both a bachelor's degree and a master's degree, or even a PhD. Two-year colleges, called community colleges, offer two types of specialist degrees. With the first type (A.A.S.) you can go to work immediately after graduating from a college, and with the second (A.S. or A.A.) you can apply for admission to 4-year tertiary institutions. These institutions are also called senior colleges in the American environment.

Our research illustrates that there are no free universities in the United States (and no free institutions of higher learning at all). So, a very important question arises: how to pay for education for those who do not have enough money or who have a low income? The answer is that in such cases, there is financial aid that students can apply for. There are also many different grants and scholarships that a student can receive for a certain academic achievement and social activity. But to receive financial assistance from the state, grants and some scholarships, you must be a US citizen or a Green Card holder. There is also another option, the essence of which is to borrow money from the Free Economic Zone and study on credit (loans).

4 The standardization system of educational requirements in the United States

Over a hundred years ago, the top managers of American high schools and tertiary institutions came to the conclusion that college entrants needed uniform standards. In this period of time, schoolteachers despaired that each college had its own criteria; sometimes they had to train

16 students in 16 different programs- for each college in its own way. Some school principals call this situation "anarchy in education [7]."

College administration had their own reasons for dissatisfaction: many students arrived completely unprepared to study at universities, and colleges frequently had to open special departments to address these deficiencies. Some colleges introduced their own system of entrance examinations, others took students only from "tested" schools, and still others sent teachers to schools to assess the quality of education. Like school principals, college heads were not satisfied with the differences in the process of transition from secondary to higher education.

Columbia University President Nicholas Murray Butler and Harvard University President Charles Eliot have convinced colleagues in the education sector of the need for a special organization to develop common standards for curricula and a single exam system. The fruit of their efforts was the creation of the Council for Universities Entrance Examinations (College Entrance Examination Board) in 1900 [7].

In the history of the American educational system, the new organization has established the best quality, and widely communicated standards. The Council's operations, as it was known, had a significant positive influence on secondary education in the country. Despite the fact that only one out of every twenty-seventeen-year-old American graduated from high school in 1900, and not all of them went on to colleges, every high school student in those years followed a curriculum that became known as the "road to college." Whether the pupils were the offspring of physicians, farmers, or factory employees, they were all expected to learn mathematics, physics, English literature, writing skills, history, and a few foreign languages – Latin as usual.

The council was a non-governmental organization, and compliance with its standards was voluntary. These standards were adopted by colleges that decided to join the council. The newly created organization decided on which subjects to conduct exams and how to evaluate them. School and university teachers jointly developed examination tasks and scoring criteria, as well as periodically reviewed school curricula on subjects for which entrance exams were taken.

It must be stressed that not everyone was enthusiastic about this new idea. The president of Princeton University was worried that this could lead to a system of state exams. Eliot assured him that this was completely out of the question. The president of Lafayette College complained that the proposed system could prevent his university from accepting the children of sponsors and teachers. Butler noted that Lafayette College, if it wants, can accept "only those students who are unable to pass these exams [8]." The tests first developed by the Council were offered in June 1901 to 978 entrants to Columbia and New York universities, as well as to Barnard College. Every year, all the new universities, realizing the value of innovation, were introducing the exams under this system.

The methodology of examinations in chemistry, English, French, German, Greek, history, Latin, mathematics and physics was not based on a system of questions with several answer options, from which the entrants had to choose the right one. They were required to demonstrate their knowledge in a voluminous written work or to offer a solution to a specific problem. For the English exam, students were asked to read ten literary works in advance, including *The Venetian Merchant*, *The Wakefield Vicar*, *The Last of the Mohicans*, *Silas Marner*, and *The Tale of the Old Sailor*. Students were told that it would be not so much the familiarity with these works in all the details that would be evaluated as the ability to express their thoughts clearly, but nevertheless, they should carefully study these books and be prepared to answer specific questions [9]. Every two to three years, assessment standards and bibliographies were reviewed, and school teachers were informed in advance which works would be taken for the exams.

Over the years, teachers and professors who developed the methodology of entrance exams have created not only common standards: they have a "sense of elbow" and collectivism, a sense of shared responsibility for how students will be prepared for college [10]. Perhaps it is this spirit of professional solidarity that has united schools and universities and has become the most important result of the Council's work. As this organization was highly respected, the examination methods it created for many years helped to raise the standards of teaching and training of students, regardless of whether they were going to enter a college or not. And the Council itself considered its main task to raise the level of school education in the country.

Unfortunately, over time, the situation began to change. By the time the Council gained a high reputation among the public, pedagogical professionals were already developing new categories of tests. Having tested the new technique on the system of examinations in the army, introduced during the First World War, educational psychologists began to promote the benefits of mental abilities group testing. Psychologists such as Carl C. Brigham, Lewis Terman, Edward L. Thorndike, and Robert Yerkes have argued that new tests can quickly make an accurate prediction of future student abilities [11]. The purpose of traditional exams, such as those conducted according to the methods of the Council, was to assess the knowledge already obtained by students. The developers of the new testing system promised to save time and money by establishing not the amount of existing knowledge, but the student's ability to acquire new ones.

Faced with allegations that its exams were "outdated" and, unlike the new tests, "unscientific" in nature, the Council engaged a group of psychologists to develop a "modern" methodology. A commission set up for this purpose, which included Brigham and Yerks, developed the Scholastic Aptitude Test (SAT), which was first put into practice in 1926. In 1930, Brigham moved to the Council, where he further improved the SAT. As one of the primary developers and promoters of mental ability group testing, he not only claimed that these tests could measure intelligence (which he considered permanent and unchanged), but he also believed that this innate level of intelligence is influenced by racial and ethnic origin [12].

By the end of the 1930s, Brigham and other experts in the field of testing were already playing a key role in the Council. They have long complained that the existing system of examinations based on written work is too subjective, that the method of their assessment is too complex, that it lacks the accuracy and objectivity inherent in technical methods. Despite the respect enjoyed by the system by teachers across the country, testing experts said that from a psychometric point of view, it was far less reliable than new tests based on multiple-choice questions [13].

In 1941, World War II changed the situation. The mass conscription of young men for military service influenced the circumstances in such a way that there simply was no time for traditional writing exams for those who would like to enter college. Therefore, the written examinations according to the Council method were abandoned, and tests to check the level of knowledge based on the choice of answer options were introduced.

After forty-one years of honorable service in the American education system, the scheme of written examinations, checked and evaluated by teachers, has become a thing of the past. The era of objective testing, based on the choice of answer options, technically effective, reliable, psychometrically accurate, with automatic calculation of results, has arrived. Some educators hoped that this was an emergency measure, introduced only before the end of the war [14]. But it turned out differently. Supporters of the former system did not believe that a simple choice of answer to a question from several options could adequately replace the written work in which the entrant had to demonstrate knowledge of the subject [15].

However, after the war, the main purpose of the Council changed. From an organization that set educational standards by coordinating the cooperation of schools and universities, it

has become a testing agency. In 1948, the Council helped to establish the Educational Testing Service, which undertook to develop a test program for admission to universities. If the founders of the Council emphasized that their examination system was based on clear standards of school curricula, now the organization, together with the ETS, stated that the new tests had nothing to do with standards or curricula. In the 1940s and 1950s, the leadership of the Council insisted that this structure consciously relinquished its role as a developer of criteria and became an "impartial assessor" of students' abilities [16].

The Scholastic Aptitude Test, or SAT, which has become the basis of the admissions procedure almost everywhere in the United States, is not related to the school curriculum at all. Council leaders have repeatedly emphasized that this test is not intended to influence the nature of education in American schools. In this way, the Council founders' (Butler and Eliot) dream was brought an end.

The Council's abandonment of its role as "legislator" of curriculum standards has created a vacuum at the very core of the American education system. However, recently, federal and state authorities have begun to take steps to fill it. The historical data give further information that president Bill Clinton persuaded Congress to pass the law called the "Goals 2000", which allocated money to the states to develop standards and exam methodology [17]. The additional important step was done by president Bush Junior, who passed the "No Child Left Behind Act" through Congress, requiring states to introduce compulsory annual exams in reading and mathematics for pupils from third to eighth grades. Moreover, the research analysis grounds, that the search for ways to reform the system of education in order to overcome the total "de-enlightenment", ignorance and lack of culture of American students continues [18]. Therefore, the most traditional and, at the same time, modern, in education philosophy and management is the study of socialization as the process of transferring social information, experience, behavioral, ideological values, and culture accumulated in society.

5 Conclusion

An increasing number of supporters in management, philosophy of education, pedagogy, and sociology in developed countries are gaining the view that society needs a person who is characterized by activity, dynamism, the ability to navigate quickly in difficult situations, independence in decision-making of problem-based tasks, and a sense of responsibility for personal function [19]. The voices advocating the formation of an "effective citizen" as an important condition for strengthening modern society are becoming louder and louder. In this regard, the problem of individual behavior, and the search for forms and means to give it the right direction, is especially acute.

Optimization of education involves the development as a subject of civil society socialization, forming a mechanism of self-regulation in communication. That is why civil society has a difficult relationship with the system of external regulation, the government system, political structures. At the same time, the subject of socialization itself, with its inherent differentiation, is internally contradictory.

In the interests of optimizing the impact of the environment on the individual, it is necessary, on the one hand, not to absolutize the possibility of regulating this complex, diverse system of communication, and on the other hand, not to rely entirely on spontaneity and self-regulation of socialization. Society is formed gradually, as well as the civic independence of its members.

To emerge as a person, an individual's learning process must be inextricably linked with moral education, the formation of such moral qualities that would help him take a worthy place in public life, make moral choices, determine behavior, and take personal life positions [20]. The task of forming these qualities in people in all regions of the modern,

interdependent world is becoming increasingly important and has acquired the status of a truly universal social and moral need.

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