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Liberal Education as an Opportunity to Develop Student's Personality in the Study System of Technological University

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Abstract

Manifestation of values of liberal education in technological university studies as one of the possibilities for socializing of technical sciences is analyzed in the article. Socializing of technical sciences leads to assumption for change in technological university. Analysis of scientific literature reveals problems and possibilities of manifestation of liberal education in studies of technological university. Results of research on manifestation of values of liberal education in technological university studies are presented in the second part of the article. The results disclosed the approach of students of technological university to values of liberal education and significance of their manifestation in study process as a pre-condition for success in their future professional career.

Keywords: liberal education, technological university, manifestation of values of liberal education, socializing of technical science studies.

Introduction

Students majoring in engineering should be prepared to live and work as global citizens, understand how engineers contribute to society. They must develop a basic understanding of business processes; be adept at product development and high-quality manufacturing; and know how to conceive, design, implement and operate sophisticated engineering systems of appropriate complexity. They must increasingly do this within a framework of sustainable development, and be prepared to live and work as global citizens. As Crawley (2007) notes, that is a tall task… perhaps even an impossible one.

Aim of the paper is to define students' approach to possibilities of socializing of technical sciences studies in technological university study system.

Objectives of the paper are the following: to disclose possibility for manifestation of liberal education as a means for socializing of technical science studies in technological university study system; to define students' approach to values of liberal education and significance of its manifestation in study process as a precondition for success in their future professional career.

The article analyses manifestation of values of liberal education in studies of technological university, emphasizing the possibilities of liberal education to socialize technical studies. Socializing of technical studies gives premise to change in a technological university. The first part of the paper presents the discussion about engineering education in the light of changing society's requirements as well as components of liberal education conditioned by needs of complex modern world for university graduates. The results of the carried out research on conditions and possibilities for values of liberal education to manifest, are presented in the last part of the paper. The research methods are analysis of scientific literature, written enquiry, statistical data analysis using SPSS 13.0 (mean ranks, z-scales). The results revealed the approach of students of a technological university to the values of liberal education and the significance of their manifestation in study process as a precondition for their successful future professional career.

Liberal education as possibility for socializing of technical science studies

The ground is shifting beneath the contemporary university, and it is time to take stock of its precarious situation. The cultivation of intellect, long having been a central objective of university life, is threatened by political and economical pressures that are redefining and reshaping the functions of higher learning. Politicians, business leaders, academicians, students need to think critically about these educational directions.

As Nussbaum (2003) argues, universities have a variety of roles, but their most crucial one is the nourishing of intellectual life. Once having been accessible almost exclusively to privileged elites, the aca-

demic world is now open to significantly larger proportions of the population. Yet a variety of forces has conspired to shrink the space that the university provides for fostering the life of mind. More than ever, higher education is expected to directly, quickly, and continually yield to the demands of the marketplace. In the eyes of many, economic performance, not intellectual enlightenment, is the main aim of a university.

Preparing graduates for employment is an undeniable part of the university activity, historically it has fulfilled this responsibility fairly well and continues to do so. But in the race for the need for a country/society to become globally competitive, technologically advanced, and proficient at producing "knowledge workers" for the 21st century, something significant is being lost. Universities are narrowing their educational vistas, and government policy is forcing them to do so. The decision-making autonomy that universities require to fulfill a range of cultural, intellectual, community-service, and training functions is quickly eroding. In particular, liberal education is at risk (Heywood, 2005).

"Liberal education" is a frequently used but seldom defined concept. It owes its origins to the philosophers and educators of Ancient Greece and Rome; an, remarkably, it has endured for more than 2 millennia. It is the primary means by which intellectual life has flourished in universities, and over the centuries this has been done in a variety of ways. Indeed, scholars themselves have always disagreed about what liberal education is and how it ought to be pursued, and those debates still go on. The stated goals of liberal education are sometimes so all-encompassing that everything, including job training and applied research, appear to fall within its domain. This is problematic when universities simultaneously proclaim their undying devotion to the ideas of liberal education while marrying more and more of their academic life to the assumed needs of the marketplace. As they feel compelled to respond to what one author has called the new "economic fundamentalism", universities incrementally marginalize the humanities, the social sciences, and the fine arts.

As noted by Axelrod (2002), Nussbaum (2003), there are creative ways to strengthening liberal education and the university as a whole by combining intellectual and employment based education as it is not wrong for students to view the university as a stepping stone to interesting, relatively secure, and well-paying occupations, or important role universities have in preparing graduates for the labour force. But to foster within a university a kind of narrow vocationalism tied to the capricious dictates of the market is exceedingly short sighted and it is culturally costly to the individual and society at large. Among other things, it overlooks the fact that particular intellectual and cultural qualities that liberal education attempts to foster are, directly or indirectly, valuable in virtually all occupations.

As Axelrod (2002) notes, liberal education in the university refers to activities that are designed to cultivate intellectual creativity, autonomy, resilience, critical thinking, a combination of intellectual breadth and specialized knowledge, the comprehension and tolerance of diverse ideas and experiences, informed participation in community life, and effective communication skills.

The purpose of engineering education is to provide the learning required by students to become successful engineers – technical expertise, social awareness and a bias toward innovation (Ollis, Neeley, Luegenbiehl (2004)). This combined set of knowledge, skills, and attitudes is essential to strengthening productivity, entrepreneurship, and excellence in an environment that is increasingly based on technologically complex and sustainable products, processes, and systems. It is imperative that quality and nature of undergraduate engineering education be improved.

In Western Europe in 1980s and 1990s, the proficiencies of engineering graduates of that time were discussed by university program leaders, engineers and governments, lists of desired features of engineers were developed. Common among these lists was an implicit criticism of engineering education for prioritizing the teaching of theory, including mathematics, science, and technical disciplines, while not placing enough emphasis on laying the foundation for practice, which emphasizes skills such as creativity, teamwork, and communications.

As Juceviciene (2003) noted, this criticism revealed the tension between two main objectives not only within professional and university education, but also within engineering education: the need to educate students as specialists in a range of technologies, while at the same time teaching students to develop as generalists in a range of professional, interpersonal, and product, process, and system building skills.

Engineering programs in many universities in various countries across the world that exemplify this tension are the products of the evolution/ development of engineering education over the last 50 years. During those years, programs moved from a practice-based curriculum to an engineering science-based model. The intended outcome of this change was to offer students a rigorous, scientific foundation that would equip them to address unknown future technical challenges. The unintended consequence of this change as noted by Crawley (2007) was a shift in the culture of engineering education that diminished the perceived value of key skills and attitudes that had been es-

sential of engineering education until that time.

During the last decades there were issued a number of documents in connection with the place of liberal education in engineering education and higher education in general. Among them *Declaration of Bologna Process* (1999) states that a bachelor graduate should be able to collect and interpret professional activity information related to present social, ethics and science problems and give evaluation grounding decisions taken; communicate with professional and non-professional environment exchanging information, discussing ideas, problems and decisions made; *Accreditation Board for Engineering and Technology* (ABET 2000) presented engineering criteria where together with other requirements, requirements for liberal education have a very significant place. According to this criteria engineering programs have to demonstrate that their graduates have: an ability to function on multi-disciplinary teams; an understanding of professional and ethical responsibility; an ability to communicate effectively; broad education necessary to understand the impact of engineering solutions in a global and societal context; a recognition of the need for, and an ability to engage in life-long learning; a knowledge of contemporary issues (Ollis, Neeley, Luegenbiehl (2004)).

The World Chemical Engineering Council (2004) produced the list of shortcomings of engineering graduates with respect to important skills engineering graduates should possess leaving university. This list included lack or weak skills of ability to communicate effectively, sense of ethical and professional responsibilities, management skills, effective work in a team, analyzing information, self learning, and creativity. As Crawley et al. (2007) note, this list corresponds to ABET requirements as well as Declaration of Bologna Process of consistent requirements to have abilities to think creatively and critically, to communicate and to work in teams for graduates of universities majoring in engineering programs. UK-SPEC (Engineering Council, (2004)) criteria for engineering programs are focused on list of required learning outcomes such as knowledge and understanding, intellectual abilities, general transferable skills. The *Union of Industrial and Employers' Confederations of Europe* (2005) supporting creation of the European higher education area expressed requirements for graduates to have cross- disciplinary qualifications. Among these *indispensable cross-disciplinary qualifications and competences* are: an appropriate level of verbal and written articulacy in the national language and in at least one foreign language; ability to work in a team; moderation and feedback techniques; presentation techniques; analytical abilities; coherent thinking; general method competence; creativity and flexibility in the application of knowledge, experience and methods; realization competence; entrepreneurial thinking and acting; intercultural understanding and competence; continuous learning ability. The philosophy of CDIO approach to engineering education, described by Crawley et al. (2007), capturing the essential features of a modern engineering education – excitement about what engineers do, deep learning of the fundamentals, skills, and the knowledge of how engineers contribute to society, argues that students should be provided not only with deep learning of technical fundamentals and practical skill sets, but also with learning personal and interpersonal skills, understanding the importance and strategic impact of technological development on society, ability to work in teams and communicate effectively, while always exercising personal creativity and responsibility. As Crawley et al. (2007) note, the task for higher education is to educate students who must be technically expert, socially responsible, and inclined to innovate.

Kreber (2009) argues there is now a growing awareness that in a world characterized by a rapid change, complexity and uncertainty, problems do not present themselves as distinct subjects but increasingly within trans-disciplinary contexts, thereby calling for graduate outcomes that go beyond specialized knowledge as well as higher education is perceived to play a profound role in contributing to a socially responsible citizenry, in preparing students for the complexities and unpredictability characterizing their future professional, civic and personal lives (Barnett, 2000).

How can universities identify the knowledge base and skill set that a liberally educated person must have in the light of our diversity of world views and institutional types? Theories abound as to the core elements of a liberal education, but some principles rise above others to the level of nearly universal acceptance. These include communication skills (writing and speaking), critical thinking, and analytical reasoning. Many scholars add appreciation for diversity, enhancement of self-knowledge or identity, development of a personal code of ethics, appreciation for human creativity, and cultivation of aesthetic taste to the list, development of lifelong learning skills (Association of American Colleges and Universities, 2003; Bauer, Bauer, and Abraham, 2003). The Association of American Colleges (2002), Accreditation Board for Engineering and Technology (ABET) (2000), Crawley, Malmqvist, Ostlund, Brodeur (2007) offered the following list: critical and creative thinking; written and oral communication; quantitative reasoning; understanding diversity; intellectual, ethical, and aesthetic growth; problem solving; preparation for citizenship

and social responsibility; developing self-knowledge or identity; cooperation skills; cultivating foreign language skills.

These ten characteristics listed above are widely accepted as descriptive of a liberal education. Institutions of higher education develop these qualities and impart this knowledge through their entire undergraduate programs, of course, but only the general education programs are required for all students, so theoretically they must contribute substantially to an institution's liberal education goals. A university's faculty members must achieve some level of shared understanding of each area in order to design a coherent education curriculum.

• Critical and creative thinking: This characteristic appears in the literature with greater frequency than any other, although it is not defined with much specificity. In general, students should be able to gather, synthesize, and evaluate information with good judgment and in the context of a well-rounded view of the world. These cognitive competencies and skills represent the general intellectual outcomes of college that permit individuals to process and utilize new information; reason objectively and draw objective conclusions from various types of data; evaluate new ideas and techniques efficiently; become more objective about beliefs, attitudes, and values; evaluate arguments and claims critically; and make reasonable decisions in the face of imperfect information. As Kreber (2009) notes, the goal of higher education is to teach students to use critical thinking in the development of new ideas. Perhaps more than any other single characteristic of liberal education, this quality is the comprehensive purpose of the entire undergraduate curriculum.

• Written and oral communication: Chew (2004) emphasizes the ability to speak and write clearly as fundamental to the definition of an educated person; in fact, breadth of knowledge is of little use – especially in preparation for citizenship and career success – if it is not combined with effective communication skills. An education in the liberal arts not only fosters effective communication by exposing students to art, literature, philosophy, and science, it also connects these communication skills to the purposes of liberal education in the first place: preparation for effective citizenship and living a worthwhile life. Nussbaum (2003) emphasizes communication skills as part of a liberal and general education that "prepare[s] current undergraduates for the life they will lead" (p.165).

• Quantitative reasoning: A liberally educated person should be able to interpret data and make reasonable judgments based on quantitative information (Association of American Colleges and Universities, 2002).

• Understanding diversity: Diversity education is an example of how the meaning of liberal education is constantly evolving. Many scholars now emphasize the importance of liberal education for students, with the understanding that appreciation for cultural diversity is essential to preparation for citizenship and leadership in our society (Nussbaum, 2003).

• Intellectual, ethical, and aesthetic growth: It is difficult to disagree with the virtues of intellectual, ethical, and aesthetic growth, but it is also difficult to define them or assess the student learning associated with them. At the same time, they provide one of the strongest arguments for infusing a general education program with liberal arts ideals, because there is no guarantee that major programs will address features such as arts appreciation or ethical development. These are important features of a well-rounded education program precisely because they are qualities that a society seeks in its leaders.

• Problem solving: The ultimate purpose of liberal education is to prepare students to address the world's problems. Schneider (2003) argues that "the emerging model for a contemporary liberal education takes account of the kind of world students inherit and the knowledge and skills they need to negotiate it" (p. 13). The objective of such an education is to "lead to a more competent, more concerned, more complete human being" (p. 1), or, to understand and deal intelligently with modern life. In theory, an education that provides broad knowledge, fosters values and ethics, and develops skills in critical areas will prepare students for solving problems in their communities, workplaces, and personal lives. As Lagemann (2003) puts it, liberal education "has made [students] both brave and versatile in facing practical problems" (p. 156).

• Preparation for citizenship and social responsibility: This characteristic encompasses and provides a rationale for all of the knowledge and skills associated with liberal education. As it is noted, preparation for citizenship is the oldest standard applied to liberal learning; it has been associated with democracy throughout the history of the Western culture. The challenge institutions of higher education currently face is to extend this franchise to a larger portion of the population than has previously been achieved in democratic societies. Carr (2009) refers to the "citizen-leaders who possess the comprehensive knowledge and virtue needed to build a just, compassionate, economically sustainable democracy" and speaks of the "benefit to the nation when liberal education and commerce [are] equally valued and occupy common intellectual space" (p. 20). Delanty (2002) places a broad education at the foundation of all institutions of our society, when he claims that it is necessary "for

the proper working of our political institutions, for the efficiency of our industries and businesses, for the salvation of our economy, for the vitality of our culture, and for the ultimate good of our citizens as individuals" (p. 4).

• Self knowledge and identity: This characteristic is an outcome of many factors, including the entire undergraduate curriculum, but liberal education should be particularly aimed at achieving this goal. An important part of the reason for helping students to gain a broad knowledge of the world is to assist them in understanding their place in it. This is closely linked with intellectual development, since acquiring a cogent sense of identity requires clear thinking, sound judgment, and exploration of personal values. Liberal learning enhances self knowledge by exposing students to a variety of cultures, philosophies, and modes of inquiry, and by encouraging them to consider meaningful questions about their futures.

• Cooperation skills: This goal is part of the emerging paradigm of liberal education. Leadership theory is increasingly emphasizing the need for a leader to be a communicator, and a team member. As Delanty (2002) notes, when this leadership model is merged with the liberal education agenda of political participation in a democratic society, the definition of good citizenship requires collaboration and cooperation, especially in a pluralistic society. Cooperation is not limited to the citizenship aims of the liberal arts and sciences; it is also linked to intellectual discovery, knowledge of the self, and problem solving. Cooperation skills enable students to become active society's members. This skill is linked to success in the workplace, it is the sort of practical skill that employers desire in graduates.

• Foreign language skills: Foreign language skills have been part of the liberal education ideal for centuries, although their prominence in many education curricula has waned in recent years. Educators originally believed that learning foreign languages trained the mind (intellectual development) and exposed students to philosophy and literature in the language of the authors (aesthetic taste). Recently arguments for foreign language instruction have focused on appreciation of other cultures and preparation for careers in the international business community.

Methodology of the research

In order to inspect manifestation of values of liberal education at a technological university research was conducted to define students' approach to possibilities of socializing technical sciences studies in technological university X.

Methodology of the research is based on the following conceptions:

1. *Knowledge society conception* (Drucker, 1993): disclosing the importance of liberal education for modern society and highlighting the idea that a society becomes knowledge society when success resources and assurance for efficient activity is specialised knowledge the basis of which is general knowledge and the ability to use it.

2. *Deep and surface approaches to learning* (Ramsden, 2003).

3. *Conservative and radical conceptions of liberal education* (Barnett, 1990, 1994). In *conservative* interpretation the word "liberal" is understood as "fitted for freedom". This traditional conception of liberal education is focused on a teacher's as organizer's of studies activity ensuring necessary conditions for students' independence and self-development. The main idea here is wide study content. *Radical* – traditionally this approach to liberal education is considered one of the essential features of higher education that obliged academic community to assure that students have the possibility to become full and equal members of academic community**.** In radical conception liberal education is interpreted as education which produces free citizens, citizens who are free not because of wealth or birth, but because they can call their minds their own. Special attention is paid not only to content of studies but to teaching methods that allow educate a free person.

Quantitative survey was performed using non-standardized questionnaire consisting of 89 questions that were divided into 3 blocks: 1) instructions on how to fill in the questionnaire, 2) block of diagnostic questions (85 closed answer question), 3) block of demographic questions (4 closed answer questions).

In the instruction the aim of the survey was presented, the meaning and significance of the survey for its participants was described expecting to motivate them. Special attention was paid to anonymity of the respondents. All the respondents were given homogeneous questionnaires that allowed comparison of respondents' answers. Student's agreement with statements was evaluated according the following format: *0 – never; 1 – rarely; 2 – do not know; 3 – often; 4 – very often*. Such evaluation allowed calculating means. Total number of primary items was 89.

The diagnostic questions were based on the analysis on scientific literature.

The questionnaires were distributed to 300 respondents in 4 faculties: Faculty of Humanities, Faculty of Social Sciences, Faculty of Chemical Technology, and Faculty of Telecommunications and Electronics. Population of respondents consisted of 4th year bachelor program students from Faculty of Hu-

manities, Social Sciences, Chemical Technology and Faculty of Telecommunications and Electronics in X University of Technology. The total number of respondents was 300, of them 65 in Faculty of Social Sciences, 85 in Faculty of Humanities, 70 in Faculty of Telecommunications and Electronics, 80 Faculty of Chemical Technology, 129 males and 171 females.

Statistical data of the survey was processed by SPSS (*Statistical Package for Social Sciences*) software (SPSS for Windows 13.0) using descriptive statistical methods.

Results of the research

Possibilities of manifestation of liberal education as a means for socializing technical science studies in technological university studies system are grounded by the idea that values of liberal education are one of the main elements in university education because of their significance to modern society.

Figure 1 represents mean ranks of students' agreement to statements expressing manifestation of liberal education in bachelor studies of university X. Attention should be paid to the fact that students from technological faculties (Faculty of Chemical Technology and Faculty of Telecommunications and Electronics) tend to give worse evaluation to conditions for liberal education than students from faculties of Humanities and Social Sciences. When analyzing conditions fostering values of liberal education in X university of technology (Figure 1) it should be said that generally students express wish to be educated liberally as they see value and benefits of liberal education in their future life and career, but university does not fully use the possibilities for liberal education: teaching methods remain conservative, there is lack of partnership relations between students and university teachers, though they are considered to be one of the necessary conditions for liberal education.

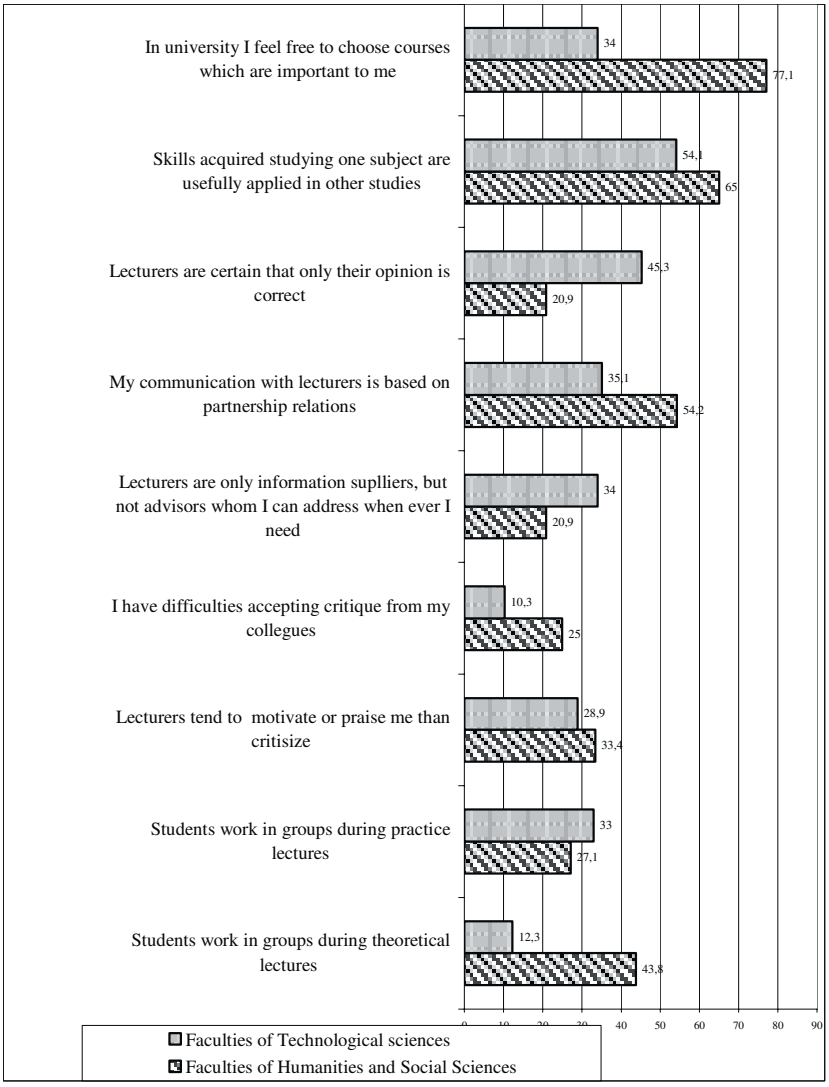

Fig. 1. Conditions Fostering Values of Liberal Education at Technological University X

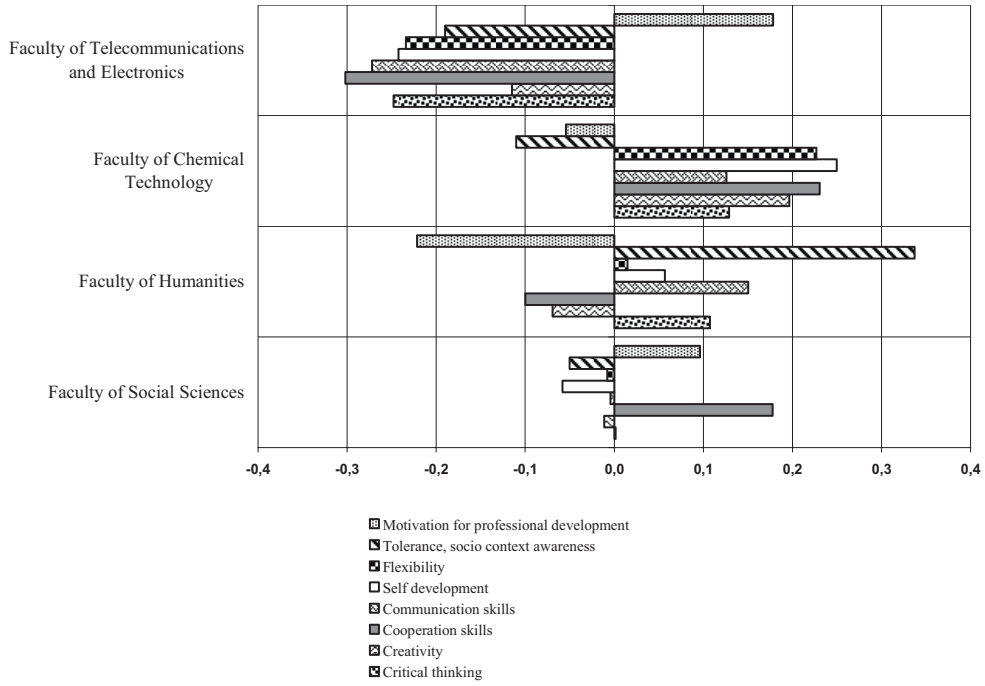

Fig. 2. Conditions Fostering Values of Liberal Education, by Faculties

Figure 2 represents how students from different faculties evaluate development of skills that could be assigned to liberal education at a technological university. These skills stipulated by liberal education were divided into the following diagnostic blocks: motivation for professional development and lifelong learning, tolerance and awareness of socio-context, flexibility, self-development, communication skills, cooperation skills, creativity, and critical thinking.

Answer profiles are marked in scale of standard normal distribution where arithmetic mean is equal to 0, standard deviation is 1. Red color in the figure represents negative (critical) evaluation while green color represents positive evaluation. Students' evaluation of the four faculties is marked in this scale of standard normal distribution according to dimensions listed above.

The lowest manifestation of values of liberal education is present at the Faculty of Telecommunications, in some cases difference between this faculty and other faculties reach 0.6 probit of SD. Attention should be paid to the fact that respondents at the Faculty of Telecommunications give the most positive evaluation to motivation for professional development and lifelong learning skills in comparison to other faculties. But other essential features of liberal education are evaluated more negatively by students from this technological profile faculty that by students from other faculties.

Flexibility and self-development are most positively evaluated by respondents at the Faculty of Chemical Technology (more than +0.2 probit of SD), but respondents at the Faculty of Telecommunications give negative evaluation to possibilities for development of flexibility and self-development (more than -0.2 probit of SD).

An interesting fact is that respondents at the Faculty of Chemical Technology give similar or more positive evaluation to communication and cooperation skills than respondents at other faculties do, but at the Faculty of Telecommunications these values of liberal education are evaluated negatively (-0.3 probit of SD).

Students from Faculty of Chemical Technology evaluated creativity most positively (+0.2), students from Faculty of Telecommunications – most negatively (-0.1). Students from Faculty of Humanities give negative evaluation to creativity. Students from Faculty of Chemical Technology and Faculty of Humanities give most positive evaluation to diagnostic block of critical thinking.

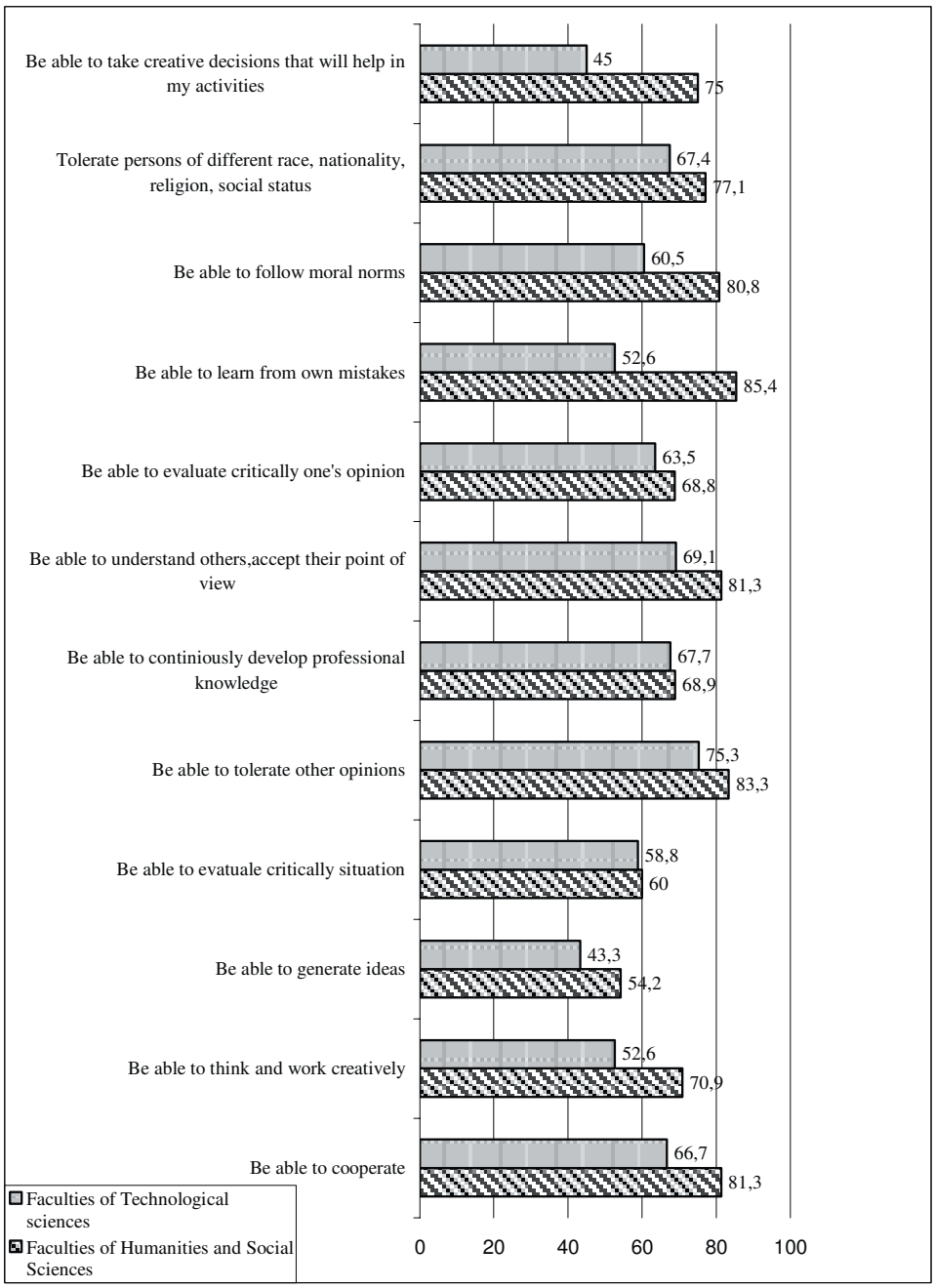

Fig. 3. Significance of Skills Developed during University Studies for Professional Career

Analysis of students' evaluation of statements (Figure 3) shows that students see perspectives to apply skills developed at university in professional career. More than 90% agree on possible application of skills in future career. Presumption can be made that values of liberal education are significant to them. Importance of communication, cooperation, motivation for continuous learning shows that students value ability to be flexible in today's world. Special attention should be paid to the fact that only half of the students from the faculties of technological sciences agreed with the statement on ability to follow moral norms when seeking professional career. This could be explained by the fact that society in general has a very vague idea about importance of moral values, so university could be the place to foster this idea.

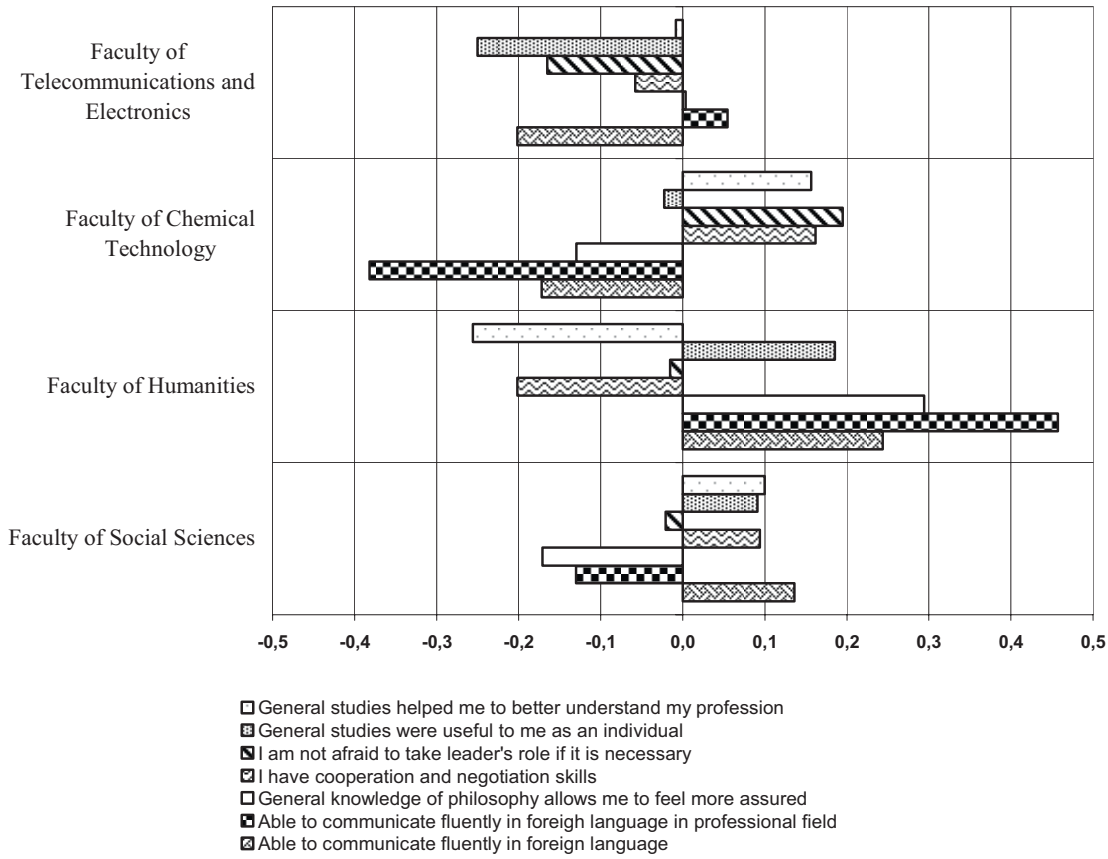

Fig. 4. Evaluation and Importance of Skills Developed in General Studies for Future Career, by Faculties

Evaluating general education at university as one of the possibilities to develop students' personality significant statistical differences among faculties are noticed. In some cases difference is up to 0.8 probit of standard deviation. The obtained statistical data allow proposing that students from the Faculty of Humanities most positively evaluate their ability to communicate fluently and express themselves in foreign language in comparison to students from other faculties. The highest evaluation (+0.4 probit of SD) is given to ability to communicate and express oneself fluently in foreign language in professional field by respondents of Faculty of Humanities. Students from this faculty also give most positive evaluation to ability to communicate and express themselves fluently in foreign language in comparison to other faculties (+0.2 probit of SD).

Students from the Faculty of Chemical Technology give most negative evaluation to their ability to communicate and express themselves fluently in foreign language in professional field (- 0.4 probit of SD).

Respondents from the Faculty of Chemical Technology and the Faculty of Social Sciences give most negative evaluation of general knowledge of philosophy and influence of such knowledge on perception of the surrounding world (more than –0.1 probit of SD), it is obvious and expected that students from Faculty of Humanities most positively evaluated this block (+0.3 probit of SD). Students from Faculty of Chemical Technology (more than +0.1 probit of SD) and students from Faculty of Social Sciences (probit of SD almost +0.1) gave the most positive evaluation to cooperation and negotiation skills.

Respondents from the Faculty of Chemical Technology give most positive evaluation to leadership skills (+0.2 probit of SD), while students from the Faculty of Telecommunications give the most negative evaluation to their leadership skills (–0.2 probit of SD) Respondents of from the Faculty of Chemical Technology give most positive evaluation to the statement that "general studies helped me to better understand my profession" (more than +0.1 probit of SD), while students from Faculty of Humanities give most negative evaluation to this statement (more than –0.2 probit of SD). Respondents from Faculty of Telecommunications give most negative evaluation to studies of general education and their own individual development (more than –0.2 probit of SD).

Conclusions

Possibilities for manifestation of liberal education as a means for socializing technical science studies in technological university study system is grounded by the idea that values of liberal education are one of the main elements of university education because of their significance to modern society: communication, cooperation, critical thinking, creativity, personal development and other transferable skills as well as motivation for lifelong learning became the essential factors in successful professional career. Values of liberal education allow socializing of technical science studies in two aspects: realization of general education study modules in technological university and integration of liberalizing study aims and methods into every professional study module.

The research results showed that students see liberal education benefits to their professional career, but they also notice that possibilities for liberal education in university studies are not used to the full: teaching methods remain conservative, there are no parity relations between students and lecturers what is considered to be one of the conditions for manifestation of liberal education. It should be noted that respondents from technological faculties (Faculty of Chemical Technology and Faculty of Telecommunications and Electronics) tend to give worse evaluation of conditions for liberal education in their studies than students from faculties of Humanities and Social Sciences. As an assumption for successful future professional career students evaluate acquired skills of communication, cooperation, critical thinking, and creativity, but they point out the fact that there is a lack of equal communication with lecturers that in their opinion would enable better development of students' personality.

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Liberalusis ugdymas kaip studento asmenybės vystymo galimybė technologinio universiteto studijų sistemoje

Santrauka

Šiame straipsnyje nagrinėjama liberaliojo ugdymo vertybių raiška technologinio universiteto studijose, akcentuojant liberaliojo ugdymo galimybes techniškųjų mokslų socialinimo, drauge ir studento asmenybės vystymo, aspektu. Siekiama pagrįsti, kad techniškųjų mokslų socialinimas sudaro technologijos universiteto studijų pokyčių – nuo siauro specialisto profesionalo generalisto link – rengimo prielaidas. Remiantis mokslinės literatūros analize, atskleidžiamos liberaliojo ugdymo raiškos problemos ir galimybės technologijos universiteto studijose. Taikant apklausos raštu metodą, siekiama nustatyti technologinio universiteto studentų požiūrį į liberaliojo ugdymo vertybes ir jų raiškos svarbą studijų procese kaip būsimos profesinės karjeros sėkmės prielaidą.

Pirmoje šio straipsnio dalyje apžvelgiamos pagrindinės teorinės nuostatos, leidžiančios pagrįsti technologinio universiteto studijų sistemos pokyčių svarbą. Net radikaliausi specializacijos ir profesionalizacijos šalininkai pripažįsta, kad gamyboje ir versle situacijos, kai neužtenka vien specialybės žinių, o reikia kritinio mąstymo ir įgūdžių, įgytų per liberaliųjį ugdymą, yra neišvengiamos. Chew (2004), Heywood, (2005), Crawley, Malmqvist, Ostlund, Brodeur (2007) teigia, kad šiuolaikinėje profesinėje veikloje, iš esmės keičiantis aplinkai, iškyla vis daugiau su morale ir etika susijusių specifinių problemų, kurias išspręsti reikia ypatingų mąstymo įgūdžių. Specialistui būtinas kritinis mąstymas ir gilus vertybių pojūtis, gebėjimas technines žinias sieti su žmogaus ir visuomenės bendresnio pobūdžio problemų suvokimu. Kreber (2009), nagrinėdamas diplomuotų profesionalų ugdymą universitete, išskiria specialisto kompetencijos bruožus, aiškiai susijusius su liberaliuoju ugdymu: kritinis mąstymas, bendravimo įgūdžiai, socialinio konteksto supratimas, profesinės etikos, profesinio tobulėjimo ir motyvacijos mokymuisi visą gyvenimą lavinimas. Nussbaum (2003) pastebi, kad tik toks ugdymas gali lavinti kiekvieno asmens gebėjimą būti visaverčiu žmogumi, kuris pažįsta save, pats save valdo, geba atpažinti ir gerbti kitus, nesvarbu, kur jie gimę, kokios socialinės klasės jie būtų, kokia būtų jų prigimtis ar etninė kilmė. Modernaus ir sėkmingo gyvenimo esmė, be buvimo aukštos kompetencijos profesionalu, yra įsipareigojimas būti savikritišku, tolerantišku ir pliuralistu, taip pat vystyti gebėjimus kritiškai vertinti save ir kitus. Todėl svarbu lavinti gebėjimą logiškai mąstyti, kad būtų galima patikrinti kitų kalbos argumentavimo nuoseklumą ar faktų pagrįstumą. Remiantis Carr (2009), labai svarbu paruošti piliečius suprasti vienas kitą, jei norima gyventi visuomenėje, kur visi galėtų jaustis laisvi ir būti lygiateisiai, turėtų galimybę išreikšti savo nuomonę ir gyventų vadovaudamiesi tolerancijos principu. Pasak Williams (2003), geriausias būdas mokyti studentus etikos ir dorybių – išmokyti juos kritiškai mąstyti ir priimti etinį sprendimą svarstant konkrečias problemas su realiu pasauliu, nes apmąstymai be veiksmo nėra privalumas. Studentai turi suprasti, kaip žinios ir praktika vienas su kitu yra susiję, kurio jie mokosi, dorybė ir etika yra ne filosofijos savybė, o kiekvieno piliečio atsakomybė.

Axelrod (2002) akcentuoja naudą valstybei, kai liberalusis ugdymas ir ekonomika vertinami vienodai ir užima intelektinę vietą, tvirtindamas, kad „liberalusis ugdymas būtinas tinkamam mūsų politinių institucijų darbui, pramonės šakų ir verslo efektyvumui, ekonomikos gelbėjimui, kultūros gyvybiškumui ir maksimaliai piliečių bei asmenų gerovei“. Delanty (2002) mano, kad liberalusis ugdymas yra visų mūsų visuomenės įstaigų pagrindas. Gebėjimas mąstyti ir siūlyti idėjas, viena vertus, ir bendradarbiavimas su kitais mokslo, ir verslo atstovais, kita vertus, tai lemiamas globalinės ateities veiksnys. Universitetai galėtų sureikšminti savo vaidmenį visuomenėje, akcentuodami liberalųjį ugdymą studijų procese: įgaliodami studentus laisvai pasirinkti, palaikydami lygybe paremtus studentų ir dėstytojų santykius, taikydami aktyvaus mokymo metodus, realizuodami kompetencija paremtas studijų programas ir t. t. Nussbaum (2003) teigia, kad nepaisant populiarios sąvokos, kad universitetai yra įstaigos, teikančios paslaugas visiems visuomenės sektoriams, yra naudingi, atsakingi už rinkos poreikius ir pamažu tampa visuomenės keitimo įrankiu, aukštasis mokslas gali būti plėtojamas ir reikšmingiau – palaikyti aukštesnius siekius prieš didėjantį galingų globalių rinkos jėgų spaudimą. Dėl to liberaliojo ugdymo vertybės tampa tokios svarbios kaip niekada anksčiau, nes tik šios vertybės gali garantuoti tokį piliečių išsilavinimą, be kurio modernus pasaulis neišliks.

Išryškinant pokyčių technologinio universiteto studijų sistemoje svarbą liberaliojo ugdymo aspektu, reikia atsižvelgti į inžinerijos mokslo raidą ir istorinį kontekstą. Daugiau nei 150 m. švietimo institucijos vaidino svarbų vaidmenį formuodamos inžinerinius gebėjimus ir profesinį tapatumą, buvo nuolat diskutuojama ir nesutariama dėl tinkamo požiūrio į inžinerijos mokslą. Nors ir buvo nesutariama dėl inžinerijos mokslo vaidmens, nuo XX a. 7-ojo dešimtmečio antrosios pusės pagrindinė inžinerijos mokyklų filosofija struktūros ir pagrindinio inžinerijos srities mokymo programos turinio atžvilgiu išliko ganėtinai stabili. Per keletą dešimtmečių inžinerijos studijų programose būta tik nežymių pertvarkymų, kurių dauguma skirti nagrinėti techninės inžinerijos temas ir spręsti disciplinų pertekliaus problemas. Inžinerijos moksle daug dėmesio buvo skiriama gamtos mokslams ir techninėms disciplinoms, todėl šis mokslas tapo techninių įgūdžių turinčių darbuotojų mokslu. Tačiau daugelis sutinka, kad inžinerijos moksle trūksta žinių ir didelio inovacinio pajėgumo, turinčio ruošti kūrybingus projektavimo inžinierius, kurie būtų pajėgūs prisitaikyti prie technologijų pokyčių. Remiantis ABET Engineering Criteria 2000 (2004), galima išskirti keletą priežasčių, kodėl būsimieji inžinieriai turi būti liberaliai ugdomi: siekiama patobulinti intelektinę kompetenciją ir plėsti vaizduotės galias; plėtoti tokias asmenybės ir charakterio

savybes, kurios padėtų pasiruošti vadovavimui ir sėkmingai karjerai; praturtinti asmeninį gyvenimą naujomis žiniomis ir įžvalgumu; paaukštinti profesijos standartus ir taip siekti pagarbos visuomenėje; prisidėti prie viešos gerovės kūrimo. Teigiama, kad studentai, baigę inžinierijos programas, privalo gebėti pritaikyti matematikos, inžinerijos ir kitų tiksliųjų mokslų žinias; kurti ir atlikti eksperimentus, taip pat analizuoti ir interpretuoti gautus duomenis; dirbti multidisciplininėse komandose; atpažinti, formuluoti ir spręsti inžinerines problemas; suprasti profesinę ir etinę atsakomybę; laisvai bendrauti. Svarbu taip pat turėti visapusį išsilavinimą, leidžiantį suprasti priimamų sprendimų įtaką globaliniame / socialiniame kontekste; išmanyti šiuolaikines problemas ir savo kuriamos produkcijos moralines pritaikymo pasekmes. Remiantis Amerikos kolegijų ir universitetų asociacijos (AAC & U's) nustatytais standartais, šiame straipsnyje pateikiami kriterijai, kurie įgalina aukštojo mokslo institucijas įvertinti liberaliojo ugdymo efektyvumą: ar intelektinė plėtra skatinama per visas studijų dalykų programas; ar mokymo metodai skatina aktyvumą ir bendradarbiavimą; ar studentai plėtoja gebėjimą sujungti teorijas ir principus su praktine išmintimi ir veikla; ar studentai geba vertinti ir analizuoti įvairias situacijas ir siūlyti alternatyvius įvairių problemų sprendimus. Lagemann (2003) teigia, kad bendras liberaliojo ir inžinerinio išsilavinimo supratimas vyrauja nuo oficialios profesinių interesų organizacijos įkūrimo inžineriniame moksle 1893 m. ir tinkamai išreiškia, kad atitinkamas humanitarinių ir socialinių mokslų inžinerinio lavinimo vaidmuo priklauso nuo tokio pasirinkimo: arba liberalusis ugdymas suprantamas kaip komunikacijos ir kitų įgūdžių, reikalingų inžinieriaus profesijai, įgijimas; arba liberalusis inžinierių ugdymas yra tikslas, grindžiamas liberaliojo ugdymo programos variantais. Abiejų šių pasirinkimų – utilitarinio-profesinio arba kultūrinio išprusimo – grynąja forma reikėtų vengti, kadangi pagal EC 2000 kriterijų geriausias inžinerinio lavinimo pavyzdys – matyti inžinerinį mokslą kaip liberaliojo ugdymo formą.

Antroje straipsnio dalyje pateikiami liberaliojo ugdymo vertybių raiškos technologijos universiteto studijose tyrimo rezultatai, kurie atskleidė technologijos universiteto studentų požiūrį į liberaliojo ugdymo vertybes ir jų raiškos svarbą studijų procese kaip būsimos profesinės karjeros sėkmės prielaidą. Liberaliojo ugdymo raiškos kaip techniškųjų mokslų studijų socialinimo galimybės technologinio universiteto studijose grindžiamos idėja, kad liberaliojo ugdymo vertybės – vienas pagrindinių elementų universitetinėse studijose – itin svarbios šiuolaikinei visuomenei: moderniame multikultūriškame pasaulyje bendradarbiavimo, komunikacijos, kritinio mąstymo, kūrybiškumo, asmenybės vystymo ir kiti perkeliamieji gebėjimai, taip pat mokymosi visą gyvenimą motyvacija tampa pagrindiniais veiksniais siekiant sėkmingos profesinės veiklos. Remiantis liberaliojo ugdymo vertybėmis, techniškųjų mokslų studijų socialinimas galimas dviem aspektais: realizuojant technologinio universiteto studijose bendrojo lavinimo modulius bei integruojant liberalizuojančius studijų tikslus ir metodus į kiekvieną profesijos modulį. Tyrimo rezultatai parodė, kad studentai įžvelgia liberaliojo ugdymo naudą savo būsimai karjerai, tačiau pažymi, kad universitete nėra išnaudojamos liberaliojo ugdymo galimybės: mokymo metodai vis dar lieka konservatyvūs, nėra paritetinių santykių, kurie laikomi viena pagrindinių sąlygų liberaliojo ugdymo raiškai. Kaip būsimos profesinės karjeros sėkmės prielaidą studentai vertina studijų metu įgyjamus komunikacijos, bendradarbiavimo, kritinio mąstymo, kūrybiškumo gebėjimus, tačiau pažymi, kad jiems labai trūksta lygiaverčio bendravimo su dėstytojais, kuris, respondentų manymu, sudaro prielaidas studento asmenybės vystymuisi ir sklaidai.

Pagrindiniai žodžiai: liberalusis ugdymas, technologinis universitetas, studijų sistema, techniškųjų mokslų studijų socialinimas, asmenybės vystymas.

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