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Academic autonomy and perspectives of interdisciplinary research: mathematical analysis of law

SUMMARY

Academic autonomy as institutional and individual self-determination in the sphere of education and scientific research faces a wide range of challenges, caused by the fundamental changes in the life of contemporary society. Both primary and secondary schools are expected to provide knowledge and training, necessary for human development, respecting the choices of students and their parents. High expectations for the quality of curriculum and the impact of science are prescribed by modern standards of the human economy, unifying the global world. Such expectations are often reflected in legislation, policies, and regulations imposed in reaction to activities of different pressure groups, blaming teachers, scholars, and universities for the lack of sufficient integrity and capacity to satisfy public demand. Measures to defend academic autonomy (particularly in legal studies) are proposed, such as socialization and popularization of education and science, public discussion of knowledge policies, interdisciplinary research and training targeted at solving practical problems of public interest, and strengthening critical thinking with a deeper usage of mathematical methods.

Key words: academic autonomy, interdisciplinary research, legal studies, mathematical methods, knowledge policies.

Introduction

Academic institutions, such as schools and universities, are traditionally known as treasuries of knowledge, gathered by many generations of scholars due to empower young people and reveal to them moral and legal limits of own freedom. Philosopher Immanuel Kant famously wrote in the "Critique of Practical Reason": "Two things fill the mind with ever-increasing wonder and awe the more often and the more intensely the thought is attuned to them: the starry sky above me and the moral law within me." This moral law is inherent self-rule, capacity to make decisions and control own life, denoted by the term *autonomy*: in Greek, *αὐτο* means own and *νόμος* means law.

According to Kant's explanations: "The autonomy of the will is the sole principle of all moral laws and the duties they prescribe... Independence from material conditions and desires is a general principle of morality. This independence is freedom in a negative aspect, while the inherent law of pure practical reason is the positive aspect of freedom..."

Reason and practical knowledge determine the will towards purpose and means to achieve it by further actions... The autonomy of free will in moral law... also is a duty to respect the autonomy of rational beings... not using these beings merely as means but simultaneously recognizing their own purposes."¹

Any rational concept of positive freedom objectively pursues universality, because an autonomous person recognizes the autonomy of other persons in moral reasoning and seeks a balance between freedom of own and others, respecting the golden rule of treating others as you expect to be treated. John Rawls, using Kant's notion of autonomy to define justice as equal distribution of liberty and wealth, in the book "A Theory of Justice" argues that any status quo can be shifted towards justice by the deliberations of one or more persons¹. Hence, autonomy can be ascribed to an individual, group or institution. Also, individual and group autonomy can be practiced within the institution, academic in particular. Human beings are reasonable ones (*Homo Sapiens*), born with free will and with equal rights, as stated in the Universal Declaration of Human Rights. Interestingly, the Latin word *nation* means birth and traditional Renan's concept of nation refers to the common will of people to recognize and develop common heritage²; thus, declaring human rights common heritage of humankind as "brotherhood", "human family" (see Preamble and Article 1 of mentioned Declaration³), United Nations de-facto proclaimed global nation of the whole human race, living on the Earth – this planet is, of course, common land of humankind.

Universities are institutions of upbringing next generations of the human race in a way they will be able to understand and enjoy human rights. Rawls emphasized the role of moral education as education for autonomy, learning principles of justice, such as the Kantian concept of justice as fairness. Autonomy is vital for the university as a space of moral education, for the students trained to think independently, and for the teachers who give a model of autonomous reasoning for students. Among examples of different ways to justice, Rawls mentioned state subsidizing of universities.

Of course, investing public funds in education, the people have a legitimate interest to know how effective is spending of those funds. But sometimes political pressure with demands of accountability crosses the line, invading the realm of academic autonomy: dictating formal standards of educational and scientific research assessment, deciding instead of teacher and student what and how should be learned, even telling scholars how many and how long papers they must publish, in what sort of journals it must be published etc.

In this article, I research and discuss academic autonomy in the complex contemporary world, threats to it and ways to preserve it, especially in legal studies. I argue that modern complexities demand pragmatic approach and interdisciplinary research, such as mathematical analysis of law, helping to design methods to check, how fair and balanced is current legal regulation of education and science.

¹ J. Rawls, *A Theory of Justice: Revised Edition*, The Belknap Press of Harvard University Press, Cambridge 1999.

² E. Renan, *Qu'est-ce qu'une nation?*, Maisson, Paris 1882.

³ *Universal Declaration of Human Rights*, 1948.

Academic autonomy in a complex world

Fundamental changes in the life of contemporary society create a wide scope of challenges, as well as opportunities, for academic autonomy. For example, technologies of unified high-stakes testing and bibliographic indexes of scholarly publications with metrics of quotations completely reshaped our understanding of efficient performance in education and scientific research.

Fortunately, autonomy still recognized as a fundamental principle in education. Furthermore, a concern of maximal possible autonomy of a person within a family and school from an early age is usual for modern upbringing.

Comparing educational legislation in Ukraine and Poland, I found that Ukrainian law on education even guarantees autonomy for schools of all levels, when Polish legislation guarantees the only autonomy of higher education institutions.

According to the Education Act of Ukraine⁴, autonomy is the right of an educational agency to self-government in the order and within the limits specified by the law, which includes self-determination, independence, and responsibility in decision-making on academic (educational), organizational, financial, personnel and other matters.

Higher Education Act of Poland⁵ states, that the university is autonomous in all areas of its operation under the terms of the law; universities shall be guided by the principles of freedom of teaching, scientific research, and artistic creation.

However, last time we observe an increasing amount of state policies, limiting academic autonomy as institutional and individual self-determination in the sphere of education and scientific research.

External testing institutions launched both in Ukraine and Poland by the government. In Poland, it is a complex system (egzaminy zewnętrzne), introduced in 1999. In Ukraine, it is an external independent educational assessment of basic schools graduates as criteria for admission to high school introduced in 2004, and unified professional admission trial for bachelors of law before the magister study, introduced in 2015.

Technologies of high-stakes testing in educational assessment have a long history in the UK and USA. Variety of different research critically analyzes these technologies.

American researcher Zachary Stein argues that educational measurement, taken as a priority instead of upbringing, distorts educational process systematically with harm to the autonomy of students, teachers, and administrators in unacceptable ways, and many standardized testing practices violate the basic civil rights⁶.

As explains Farrall et al.⁷ with references to earlier book of Timmins⁸ and Home Office RDS research paper⁹, politics of school financing based on testing and ratings in UK

⁴ *Education Act of Ukraine*, 2017.

⁵ *Higher Education Act of Poland*, 2005, ed. 2017.

⁶ Z. Stein, *Social Justice and Educational Measurement: John Rawls, the history of testing, and the future of education*, Routledge, London 2016.

⁷ S. Farrall et al., *Thatcherite Ideology, Housing Tenure and Crime: The Socio-spatial Consequences of the Right to Buy for Domestic Property Crime* [in:] "The British Journal of Criminology" 2016, 56(6), pp. 1235–1252.

⁸ N. Timmins, *The Five Giants*, Harper Collins, 2001.

⁹ D. Berridge et al., *The independent effects of permanent exclusion from school on the offending careers of young people*, Research, Development and Statistics Directorate of the UK Home Office, 2001.

encouraged teachers to exclude children in order to increase school examination performance, causing rampant crime as result of involvement in anti-social behavior thousands of excluded pupils thrown at the streets.

Disadvantages of school testing in the USA reflected even in popular culture. The “Standardized Testing” episode of the satirical television show “Last Week Tonight with John Oliver” reached near 14 million views on YouTube, claiming that “American students face a ridiculous amount of testing,” “In a New York almost 30 different test questions have now been declared invalid because they are confusing or have too many errors, and 6 questions already pulled from English exam related to a bizarre passage about talking pineapple,” “Something is wrong with our system if an instruction for test administrators assumes that some number of students will vomit; testing supposed to be the assessment of skills, not a rap battle,” asking “If standardized tests are bad for teachers and bad for kids, who exactly are they good for?” and pointing at big companies, lobbyists and sellers of the tests, usually full of mistakes – wrongfully concealed from exposure and correction by the confidentiality agreements and rules of testing.

So, it seems that, despite declared aim to make education more accountable, the system of high-stakes testing itself lacks accountability and efficiency. Indeed, the technology of testing is useful for teachers to check the knowledge of students, but politicized use of this technology to increase governmental control over universities conflicts with the fundamental principle of academic autonomy and endangers the very purpose of education.

Also, controversial policies emerged in the sphere of scientific research assessment. Scientists are obliged to publish papers in particular journals to get the funding for research and make an academic career. Last time a bad habit has spread to call by pejorative terms such as “trash” any scientific journals, which isn’t listed by the databases Scopus or Web of Science. Scholarly publishers with no links with these databases found themselves labeled as “predators.” Scientists nowadays more talk about ratings than about research. Citation indexes may be a useful instrument of research management, but definitely can’t be the purpose of scientific research.

In both examples, with testing and citation indexes, one tendency is observed. A competition between peers (students, teachers, and scientists), encouraged by financial and administrative measures or coercively imposed by authorities, deprives people in the academy of choice and personal development for the benefit of ruling elite, characterized by high cohesion at the fringe (or beyond the fringe) of corruption. The elite doesn’t compete for survival like masses of people and constitutes a compact social ecosystem closed for the eyes of people, including elitarian education. A paradox is, such wild and unjust elitism widely practiced under the slogans of equality and social justice, with the creation of political pressure groups demanding radical restrictions of academic autonomy.

Legislation, policies, and regulations – at least formally – are imposed in reaction to activities of different pressure groups, blaming teachers, scholars, and universities for the lack of sufficient integrity and capacity to satisfy public demand. The disturbing effectiveness of political pressure on academy objectively demonstrates that the academy still isn’t prepared to face complexities of the modern world.

High expectations for the quality of curriculum and the impact of science are prescribed by modern standards of the human economy, unifying the global world. Science and education must support knowledge, training, and technologies necessary for human development, respecting individual choices. It is public demand that the academy must satisfy to preserve the autonomy if not going to become a toy of elites in the cynical game of monopoly and populism.

A pragmatic approach to complexities and interdisciplinary research

In the editorial of *Nature* scientific magazine, issued in 2015 and dedicated to interdisciplinary research, the next statement made: “To solve the grand challenges facing society – energy, water, climate, food, health – scientists and social scientists must work together”¹⁰. In this way, editors help us to recall that bureaucratic criteria of academic integrity, such as ratings and formalities, have no deal with true academic integrity as the complexity, accessibility and practical usefulness of the whole scope of knowledge gathered by the scholars. To be independent and successful in the complex world, serving needs of society, the academic institution must mobilize all interconnections in scientific knowledge for the empowerment of the human mind.

Practical usefulness is important, even for fundamental research, because the demonstration of success helps academia to oppose destructive reforms. The practice remains the final criteria of the real worth of knowledge. Philosophy of pragmatism, equating all phenomena to its practical performance, must be taken seriously. To overcome dispersion of knowledge among narrow disciplines and prevent bureaucratic manipulations à-la „divide and rule,” we can use the formula of pragmatic social cohesion based on mutual recognition of autonomy, as proposed psychologist William James: „The community stagernates without the impulse of the individual. The impulse dies away without the sympathy of the community.”¹¹.

So, to preserve academic autonomy, a strong academic community must be built on the fundament of scientific knowledge, individual initiative, and pragmatism. All actors must be encouraged to count on themselves but reach success together, supporting individual initiatives for the common good. It is important to understand nature of academic success, supporting individual initiatives, which is the true impact of science and education – not high ratings and mountains of paperwork, but social benefits and reforms as a result of the fair collection, dissemination, and application of robust scientific knowledge.

Legal science has a tradition of multidisciplinary research. Seeking and systematizing case-law, jurists become historians. Well known fact, that founder of citation analysis Eugene Garfield used a system of legal citations as the model for the first bibliographic citation indexes¹². Statistics widely used in criminology; physics, chemistry and biology used in criminalistics. Theory of probability from the very beginning of its development used to resolve legal problems and design better legislation. Economic analysis of law in the first half of 20 century helped the USA to overcome an economic crisis, introducing elements of the welfare state. Mathematics widely recognized as the universal language of contemporary science, so the first step to promote interdisciplinary research in the field of law must be a deeper intertwining of law and mathematics.

¹⁰ *Why interdisciplinary research matters* “*Nature*” 525, 305 (17 September 2015).

¹¹ W. James, *Great Men, Great Thoughts, and the Environment*. Lecture delivered before the Harvard Natural History Society, “*Atlantic Monthly*”, October, 1880.

¹² E. Garfield, *Citation Indexes for Science: A New Dimension in Documentation through Association of Ideas*, “*Science*” 1955, 122 (3159), p. 108–111.

Mathematical analysis of law

The idea of mathematical analysis of law isn't new for jurists, unlike the mathematicians. When I asked Fields medalist Efim Zelmanov about this idea at the conference "Modern Problems of Mathematics and its Application in Natural Sciences and Information Technologies" (FMI50) in Chernivtsi, where I presented two-agents model of personal and group autonomy in distributive justice¹³, professor Zelmanov only advised me to take constitutional norms as the axioms for mathematical analysis of law. Analyzing advice, I found quotes from the works of U.S. Supreme Court justice Oliver Wendell Holmes Jr.: the man of the future is the man of statistics and the master of economics, but the provisions of the Constitution are not mathematical formulas; the life of the law has not been logic, it has been experience; a Constitution is not intended to embody a particular economic theory; it is made for people of fundamentally differing views. I agree completely with Holmes's notion of law over ideologies, but, in my view, this notion doesn't prohibit a design of more balanced constitution with the use of mathematical methods.

Mathematical methods traditionally used in jurisprudence. It is a well-known fact that Themis, goddess of justice, usually depicted with hand scales. Such a symbol means that justice is about proper measurement, about balance. Apart from judging disputes about quantity, a scales also used in trade, but justice can't be confused with trade, and mathematical analysis of law is approach fundamentally different than an economic analysis of law. Money can't be the universal and absolute measure of legal fairness, but it is true, that sometimes money can be a measure of freedom and responsibility, as author show in the published example of the linear model of personal autonomy¹⁴.

In the pioneering work "On the art of conjecturing in jurisprudence," Bernoulli calculated a probability of honest testimony of a witness before the court¹⁵. In the treatise "Researches into the Probabilities of Judgments in Criminal and Civil Cases," Poisson calculated possibilities of wrongful conviction and proper judgment with different numbers of judges or jurors¹⁶. Contemporary models of risk assessment in criminology, for example, models of criminal careers help the lawyers to define limits of mercy and proper punishment for crime.

Mathematical methods may be applied to analyze legal texts. Even sketchy calculations can lead to interesting conclusions. It can be demonstrated, using a simple quantitative comparison of educational legislation. In the Education Act of Ukraine rights (права) mentioned 70 times, duties (обов'язки) mentioned 86 times. In the Education Act of Poland rights (prawa) mentioned 54 times, duties (obowiazki) mentioned 130 times. This comparison between laws of Ukraine and Poland shows that both laws characterized by a tendency to the imbalance between rights and duties (towards duties), and in Polish law such imbalance

¹³ Y. Sheliashenko, *Two-Agent Model of Personal and Group Autonomy in Distributive Justice* [in:] *Modern Problems of Mathematics and its Application in Natural Sciences and Information Technologies (FMI50): Conference Proceedings*, Chernivtsi 2018, p. 131.

¹⁴ Y. Sheliashenko, *Computer Modeling of Personal Autonomy and Legal Equilibrium*, "Advances in Intelligent Systems and Computing" 2018, 765, pp. 74–81.

¹⁵ N. Bernoulli, *Dissertatio Inauguralis Mathematico-Juridica de Usu Artis Conjectandi in Jure*, Mechel, Basel 1709.

¹⁶ S. Poisson, *Recherches sur la probabilité des jugements en matière criminelle et en matière civile*, Bachelier, Paris 1837.

is deeper than in Ukrainian law, especially in the context of abovementioned difference in guaranteeing autonomy in the basic education. This observation highlights an interesting problem for further research.

Conclusion

In the face of challenges of the complex contemporary world, education and science must preserve academic autonomy becoming more complex and practically effective, developing interdisciplinary research. Pragmatic integrity of the academy includes robustness and honesty. It is unethical and inappropriate when legal scholars become propagandists of unreasonable, unlawful, and unjust policies enacted without their expertise. The duty of jurist before the science and the nation is to advise politicians, judges, civil servants, how to develop reasonable law, resolving conflicts and disputes wisely. Autonomy is vital for academic life to make a positive impact on society and preserve scientific knowledge, keeping it useful, uncorrupted by ideological or other distortions. As a basic level of impact, voices of the scientific community must speak publicly, told people how to apply knowledge. Socialization and popularization of education and science, public discussion of knowledge policies, focus on interdisciplinary research and training targeted to solve practical problems of public interest will lead to the development of academic autonomy. Need for autonomy isn't the only feature of academic life but a common global trend in human development. Human value is growing with individual skills and competence to be successfully autonomous in different spheres of life. Deeper usage of mathematical methods in law is necessary because mathematics is the universal language of science and because it strengthens critical thinking, one of the key skills for a lawyer. Also, robust mathematical models can help to design feasible policies, good legislation, and fair judgments.

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STRESZCZENIE

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Autonomia akademicka i perspektywy badań interdyscyplinarnych: matematyczna analiza prawa

Autonomia akademicka jako instytucjonalne i indywidualne samostanowienie w sferze edukacji i badań naukowych stoi przed szerokim zakresem wyzwań, wywołanych przez fundamentalne zmiany w życiu współczesnego społeczeństwa. Zarówno szkoły podstawowe, jak i średnie powinny zapewniać wiedzę i szkolenia niezbędne dla rozwoju człowieka, szanujące wybory uczniów i ich rodziców. Wysokie oczekiwania dotyczące jakości programu nauczania i wpływu nauki są określone przez nowoczesne standardy ludzkiej gospodarki, jednocząc świat globalny. Takie oczekiwania są często odzwierciedlone w prawodawstwie, polityce i przepisach wprowadzanych w reakcji na działania różnych grup nacisku, obwinianie nauczycieli, naukowców i uniwersytetów za brak wystarczającej uczciwości i zdolności do zaspokojenia popytu publicznego. Proponuje się środki mające na celu obronę autonomii akademickiej (w szczególności w badaniach prawnych), takie jak socjalizacja i popularyzacja edukacji i nauki, publiczne dyskusje na temat polityki wiedzy, interdyscyplinarne badania i szkolenia ukierunkowane na rozwiązywanie praktycznych problemów związanych z interesem publicznym oraz wzmocnienie krytycznego myślenia za pomocą głębszego wykorzystania metod matematycznych.

Słowa kluczowe: autonomia akademicka, badania interdyscyplinarne, studia prawnicze, metody matematyczne, polityka wiedzy.

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