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SUSTAINABLE DEVELOPMENT EDUCATION AT POLISH UNIVERSITIES

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ABSTRACT: Purpose: An analysis of education programmes at selected universities in Poland in terms of coverage of subjects related to sustainable development. Methodology: An analysis of information published on the Internet, on the official website of each examined Polish university.
Results: The scope of education on the subject matter related to sustainable development at the nine best Polish universities was presented. The number and names of faculties and majors were indicated (where the main purpose was education on that subject matter and where that subject was taught, but it was not their basic teaching subject). The number of courses and ECTS points allocated to those courses was determined, for each major. Originality: The research results fill in the gaps in available statistics on teaching of courses related to sustainable development at Polish universities. The data can be the basis for comparisons between other periods and drawing of conclusions about the trends of changes in education.

KEY WORDS: sustainable development, education, Polish universities

Introduction

Environmental economics is a relatively young science, still in its development phase. It is a response to the need to expand knowledge and awareness of societies both with respect to the negative environmental impact of human activity aimed at achieving growth and economic development as well as to the possibility of limiting that negative impact. Higher education institutions, as institutions whose one of the main functions, beside conducting research, is teaching activity, should actively support this task by introducing into their education programmes courses directly related to sustainable development.

An individual well-educated in the area of sustainable development should master the art of understanding mutual interrelations and relationships: "environment-society", "environment-economy", "economy-society" (Kiełczewski, Poskrobko, 2009, p. 239). Thus, it is not just a narrow scope of knowledge whose mastering will allow one to become a specialist in this field, but an extensive discipline of science that is based in economics, taking into account not only environmental issues, but also economic and social ones.

That is why, despite that enterprises implementing the basic rules of sustainable development can (and even should) educate their customers with regard to pro-environmental behaviour (Michalik, 2016, p. 21-32), there can be no doubt that the main educational burden falls on universities. They have to educate people who will build those enterprise development strategies which are sustainable from the environmental viewpoint. Similarly, no other institutions but the universities have to form a conviction in a portion of society about the legitimacy of the sustainable development paradigm so that more and more entrepreneurs, even without restrictions resulting from administrative regulations, operate in line with those rules.

There is, therefore, no doubt as to the need that universities have to teach in the field of environmental protection and sustainable development. What is even more, the Decade of Sustainable Development Education was announced in 2005. Its aim was to make fundamental changes in the education system that involved consistent inclusion of the new paradigm of development in educational materials and forms (Borys, 2010, p. 60) – sustainable development. Nevertheless, there are still doubts as to when it is necessary to decide in what way, to what extent and as part of what majors this education is to be pursued. It follows from the above that, even though progress in sustainable development education in Poland is visible, there is no compre-

hensive vision of such education as part of the higher education system (Lorek, 2013, p. 25).

Such an unclear situation, combined with the obvious need to teach in the field of sustainable development, made the author carry out an analysis of the teaching offer of the best Polish universities with respect to this subject matter.

Description of the method of conducting research and assumptions adopted in its performance

Curricula of the nine best Polish universities were analysed. They were selected on the basis of the Times Higher Education 2018 ranking and were as follows:

1) University of Warsaw (UW),
2) AGH University of Science and Technology in Cracow (AGH),
3) Jagiellonian University (UJ),
4) Warsaw University of Technology (PW),
5) Adam Mickiewicz University in Poznan (UAM),
6) Gdansk University of Technology (PG),
7) Nicolaus Copernicus University in Torun (UMK),
8) University of Silesia (UŚ),
9) University of Wroclaw (UWr).

The teaching offer of each university was analysed from the viewpoint of a studies applicant who makes a decision on the choice of their field of education on the basis of generally available information. That is why curricula published on the websites of the universities and/or faculties of a given university underwent analysis. In the case of each university, an analysis was conducted on whether it had a faculty focused on environmental protection. It was assumed that "focus on environmental protection" of a given faculty was expressed by a university by giving the faculty a name that suggested it. If the analysis showed that it had been the case, then the number of such faculties at a given university was determined. In the next step, it was analysed whether there were majors at a given university (at any faculty) where the education programme concerned mainly environmental protection. It was assumed that the programme of given studies concerned mainly environmental protection if a given major had a name that suggested it. If the analysis showed that it had been the case, then their number was determined, counting undergraduate and graduate studies as part of the same major separately. The next step was an analysis of all other majors in terms of occurrence of courses related to environmental protection or sustainable develop-

ment in their programmes. Whether or not a given course included material related to environmental protection or sustainable development was determined on the basis of its syllabus. If the analysis showed that there were such courses, then the number of majors at a given university was determined, as part of which courses related to environmental protection and/or sustainable development (including separately undergraduate and postgraduate studies as part of the same major) were taught. For each major, for which the analysis showed that there were such courses (separately for undergraduate and graduate studies if it was the case for both cycles), the number of such courses and the total number of ECTS points allocated to them were determined.

In a situation when there were inter-faculty studies at a given university, focused mainly on environmental protection, or studies that had majors where courses related to environmental protection were taught, such studies were included in the number of faculties focused on environmental protection, the majors having been included in the appropriate category: majors where the programme concerned mainly environmental protection or majors where the programme had courses related to environmental protection and/or sustainable development.

Results of the conducted research

Among the nine analysed universities, there are seven with faculties focused on environmental protection, which has been shown in table 1.

The AGH University of Science and Technology in Cracow, the University of Wroclaw and the University of Silesia have the most faculties focused on environmental protection (2 each). In the case of the University of Silesia and the University of Wroclaw, one of the faculties at each of them is one offering inter-faculty studies in environmental protection, which results from the methodology adopted in this study. The situation is similar at the University of Warsaw, although inter-faculty studies constitute in this case the only unit focused on environmental protection.

The Jagiellonian University or Adam Mickiewicz University in Poznan do not have any faculties focused on environmental protection which does not mean, however, that those universities do not provide education in this field. Those universities, similarly to the other analysed ones, offer majors where the programme concerns primarily environmental protection, which has been shown in table 2.

Table 1. Names of faculties focused on environmental protection and their number at individual universities*

Item No.	University name	Name of faculty focused on environmental protection	Number of faculties focused on environmental protection
1	University of Warsaw	Inter-faculty Studies in Environmental Protection	1
2	AGH University of Science and Technology in Cracow	Faculty of Geology, Geophysics and Environmental Protection	2
		Faculty of Mining Surveying and Environmental Engineering	
3	Jagiellonian University	-	0
4	Warsaw University of Technology	Faculty of Building Services, Hydro and Environmental Engineering	1
5	Adam Mickiewicz University in Poznan	-	0
6	Gdansk University of Technology	Faculty of Civil and Environmental Engineering	1
7	Nicolaus Copernicus University in Torun	Faculty of Biology and Environmental Protection	1
8	University of Silesia	Faculty of Biology and Environmental Protection	2
		Inter-faculty Studies in Environmental Protection	
9	University of Wroclaw	Faculty of Earth Sciences and Environmental Management	2
		Inter-faculty Institute of Environmental Protection	

* the order of the individual universities in the table results from the order in the Times Higher Education 2018 ranking

Source: the author's own work based on syllabuses of individual universities.

Table 2. Names of majors where the curriculum concerns primarily environmental protection and their number at individual universities*

Item No.	University name	Name of faculty where the major is offered	Name of major where the programme concerns primarily environmental protection	Number of courses related to environmental protection and/or sustainable development	Total number of ECTS points for courses related to environmental protection and/or sustainable development
1	University of Warsaw	Faculty of Biology	Environmental Protection, undergraduate studies	9	43
			Environmental Protection, graduate studies	3	13
		Inter-faculty (Faculty of Chemistry, Faculty of Biology, Faculty of Management)	Environmental Management, undergraduate studies	17	62
		Inter-faculty Studies in Environmental Protection	Environmental Protection, undergraduate studies	20	49
2	AGH University of Science and Technology in Cracow	Faculty of Geology, Geophysics and Environmental Protection	Eco-friendly Energy Sources, undergraduate studies	24	76
			Environmental Protection, undergraduate studies	30	94
			Environmental Engineering, undergraduate studies	20	53
		Faculty of Mining Surveying and Environmental Engineering	Environmental Engineering, undergraduate studies	14	57
			Environmental Engineering, graduate studies	11	40
		Faculty of Mining and Geoengineering	Environmental Engineering, undergraduate studies	15	49
		Faculty of Energy and Fuels	Renewable Energy and Energy Management, undergraduate studies	7	20

3	Jagiellonian University	Faculty of Biology	Ecology and Evolution (in English), graduate studies	12	55
			Natural Resources Management, graduate studies	12	29
		Faculty of Chemistry	Environmental Protection, undergraduate studies	17	47
			Environmental Protection, graduate studies	7	27
4	Warsaw University of Technology	Faculty of Civil Engineering, Mechanics and Petrochemistry in Plock	Environmental Engineering, undergraduate studies	12	40
		Faculty of Building Services, Hydro and Environmental Engineering	Environmental Engineering, undergraduate studies	19	70
			Environmental Protection, undergraduate studies	23	89
			Environmental Engineering, graduate studies	12	26
			Environmental Protection, graduate studies	12	35
5	Adam Mickiewicz University in Poznan.	Faculty of Biology	Nature Protection and Environmental and Forest Education, graduate studies	14	44
			Environmental Protection, undergraduate studies	15	52
			Environmental Protection, graduate studies	7	22
			Environmental Protection (in English)	16	44
		Faculty of Geography	Environmental Management, undergraduate studies	15	45
			Environmental Management, undergraduate studies	7	28

6	Gdansk University of Technology	Faculty of Chemistry	Green Technologies and Monitoring (in English), undergraduate studies	10	38
			Green Technologies and Monitoring (in English), graduate studies	9	32
			Green Technologies and Monitoring, undergraduate studies	15	53
			Green Technologies and Monitoring, graduate studies	7	25
		Faculty of Civil and Environmental Engineering	Environmental Engineering, undergraduate studies	10	33
			Environmental Engineering, graduate studies	7	22
7	Nicolaus Copernicus University in Torun	Faculty of Biology and Environmental Protection	Environmental Protection, undergraduate studies	15	49
			Environmental Protection, graduate studies	7	22
		Faculty of Law and Administration	Environmental Protection Law, graduate studies	9	45
8	University of Silesia	Faculty of Earth Sciences	Environmental Risk Engineering, undergraduate studies	14	46
		Inter-faculty Studies in Environmental Protection	Environmental Protection, undergraduate studies	17	66
			Environmental Protection, graduate studies	10	32
9	University of Wrocław	Faculty of Biological Sciences	Environmental Management, undergraduate studies	22	59
			Environmental Management, graduate studies	16	53
		Inter-faculty Institute of Environmental Protection	Environmental Protection, undergraduate studies	20	62
			Environmental Protection, graduate studies	28	68

* the order of the individual universities in the table results from the order in the Times Higher Education 2018 ranking

Source: the author's own work based on syllabuses of individual universities.

The number of majors, where the programme concerns primarily environmental protection, does not have to translate into a teaching offer that enables one to acquire the most extensive knowledge in this area. It may only indicate that there is an extensive offer addressed to students regarding those subjects, but not necessarily indicating that specialist knowledge gets passed on during those courses. That is why it is advisable to subject individual universities to closer scrutiny. For analysis purposes, it was calculated that the average number and the median of the number of courses for majors shown in table 2 were 13.95 and 14.00 respectively, whereas the average number and the median of the number of ECTS points were 45.57 and 45.00 respectively.

UW offers one major which offers only three courses related to environmental protection and/or sustainable development and merely 13 points have been allocated to them, these being the lowest values in this ranking. At other universities, many majors can be found whose names do not indicate a close connection with environmental protection while offering more environmental courses and more ECTS points allocated to them. At the same time, UW offers its students a major with 17 courses that are connected with a relatively large number of ECTS points, significantly above the average and the median – as many as 62.

In the case of AGH, among the indicated majors, both those that have 7 environmental courses and 20 ECTS points (which is one of the lowest scores in the ranking) and those that offer 30 or 24 courses and 94 and 76 ECTS points respectively are offered, which puts them at the top of the ranking. Five out of seven majors are characterised by a number of courses and ECTS points no smaller than the average and the median for all analysed majors.

UJ offers majors with a relatively small number of environmental courses. Only one major out of four is above the average and the median, offering 17 courses. Two majors offer a higher than average and median number of ECTS points – a major, where this value is relatively high (55), offers just 12 courses related to environmental protection.

In the case of PW, two majors out of five are clearly leading with regard to sustainable development, and the number of courses/points assigned/allocated to them is significantly above the average and the median, being equal to 23/89 and 19/70 for the first and second major respectively. The other three majors have their number of courses and ECTS points below the average and the median.

In the case of UAM, two majors offer a small number of courses and ECTS points compared with other universities (significantly below the average and the median). Two majors, both in the number of courses and ECTS points allocated to them, show scores close to the average, although one major is

characterised by a number of ECTS points that considerably exceeds the average (52), with the number of courses close to the average.

PG is a university offering a lot (6) of majors related to environmental protection compared with other universities, albeit those are usually majors that are at a statistically average level or below it. Only in the case of one major, the number of ECTS points is higher than the average and the median (53), with the number of courses (15) only slightly above the average and median values.

UMK, both in terms of the number of courses related to environmental protection and the number of ECTS points allocated to them, does not significantly exceed the average values in the case of any major. Two out of five majors show scores considerably below the average and the median with regard to the number of courses.

UŚ offers relatively few (just three) majors, but one of them is characterised by values that significantly exceed the average and the median in terms of the number of courses (17) and, most of all, the number of ECTS points allocated to them (66). The second major is characterised by average values, whereas the third one – by values considerably lower than the average.

UWr's teaching offer includes four majors and, despite that their number is relatively small compared with other universities, all significantly exceed the average. The number of courses is from 16 to 28, whereas the number of ECTS points ranges from 53 to 68, with values (28 and 68) describing one major being among the highest ones in their categories.

All analysed universities, except for majors where the studies programme concerns primarily environmental protection, provide education in the field of sustainable development as part of other majors that are not directly related to environmental protection. Table 3 shows cumulative data for individual universities whereby majors, courses or ECTS points presented in Table 2 have not been included.

A clear leader in the number of majors, whose programme has environmental courses, is PW offering as many as 29 such majors. However, this does not translate into the highest values in terms of courses related to sustainable development or the total number of ECTS points for those courses. UWr leads the way in both those categories, offering 118 courses (AGH, which is second in that category, has 69 courses) and 319 ECTS points (AGH, which is second, has 193 points).

Table 3. Number of majors, number of courses and total number of ECTS points, which have not been included in table 2, for courses where the curriculum has courses related to environmental protection and/or sustainable development at individual universities*

Item No.	University name	Number of courses at a given university where the programme has courses related to environmental protection and/or sustainable development	Number of courses related to environmental protection and/or sustainable development	Total number of ECTS points for courses related to environmental protection and/or sustainable development
1	University of Warsaw	11	21	78.5
2	AGH University of Science and Technology in Cracow	18	69	193
3	Jagiellonian University	2	2	6
4	Warsaw University of Technology	29	62	146
5	Adam Mickiewicz University in Poznan.	7	31	107
6	Gdansk University of Technology	13	23	81
7	Nicolaus Copernicus University in Torun	12	30	108
8	University of Silesia	14	53	169
9	University of Wroclaw	17	118	319

* the order of the individual universities in the table results from the order in the Times Higher Education 2018 ranking

Source: the author's own work based on syllabuses of individual universities.

Conclusions

One can encounter many problems and limitations in teaching in the field of sustainable development at Polish universities. One of the most important ones is lack of systematisation of basic concepts related to environmental economics. This problem, although important from the viewpoint of organisation of studies programmes, did not have any negative effects on the results

of conducted analysis, since the study did not systematise courses, but just counted them and the points allocated to them if the content of a syllabus indicated the presence of environmental problems as part of a given course. Thus, there are situations that courses having the same or very similar programmes have completely different names as well as that courses given the same names have significantly different programmes.

The situation with majors is similar. Majors given the same names have considerably different studies programmes at different universities. Additionally, there are cases that one university offers at different faculties majors that have the exact same name, and also in this case, the study programmes are different. On the one hand, it can be assumed that this results in extended teaching offer of a university, which gives students the opportunity to focus their environmental knowledge in a specialised way, this being important in the case of students who have clearly defined study goals. On the other hand, however, it can be interpreted as duplicating the didactic offer in the case of those students who do not analyse in depth the study programme of a given major when choosing it. An important argument in favour of keeping such a division may be the fact that individual faculties at the same university can have different reputation on the labour market and thus be considered more elite, and their graduates can count on better employment conditions.

Some students choosing their major and/or university will expect the programme offer to be prepared in such a way that environmental material only supplements the basic majors assumed by the student. However, other students will expect as much environmental knowledge passed on in a given course of studies as possible. That is why, when evaluating universities and majors in terms of diversity of their teaching offer, the number of majors and courses is important, and from the viewpoint of consolidation of knowledge and the amount of knowledge that can be acquired – the number of ECTS points. At the same time, it should be noted that the same number of ECTS points is often allocated to very different numbers of courses as part of one major. Thus, a student ought to additionally take into account the fact that, as part of the same number of ECTS points, they have a choice between majors offering various courses with an extensive context of the subject of sustainable development (a large number of curses) or very specialised courses that offer detailed knowledge, but present a narrow scope of this field (a small number of courses).

There is also a group of students who do not look for environmental courses in studies programmes at all. For such students, the offer of all universities is very extensive, of course, but what can be a positive thing is the fact that universities often introduce courses related to sustainable development to programmes of studies specialising in completely different fields.

The number of hours of and points for such courses is often very small and undoubtedly does not make it possible to discuss in depth all subjects related to sustainable development. Nevertheless and at the same time, the number of hours is usually sufficient to signal to students the basic issues faced by today's economy focused on growth. This can raise possible doubts in students as to some majors and the ways economic growth is taught, which in turn can be an impulse to take up broader studies in the field of environmental protection and sustainable development.

At the same time, it should be noted, that all nine analysed universities give students the opportunity of education in the field of environmental protection and sustainable development. Each university has majors specialising in those problems and each of them provides education in the area of sustainable development as part of majors not directly related to environmental protection as well. Therefore, a conclusion can be drawn that the best universities in Poland perform a mission consisting in educating in the field of sustainable development both through specialist education in this subject matter (in the case of majors dedicated to this subject) as well as through building of ecological awareness among students pursuing other majors.

Literature

Albareda-Tiana S. et. al. (2018), *Implementing the sustainable development goals at University level*, "International Journal of Sustainability in Higher Education" Vol. 19 No. 3, p. 473-497, DOI: 10.1108/IJSHE-05-2017-0069

Borys T. (2010), *Dekada edukacji dla zrównoważonego rozwoju – polskie wyzwania*, „Problemy Ekorozwoju" Vol. 5 No. 1, pp. 59-70

Dumitru D.E. (2017), *Reorienting higher education pedagogical and professional development curricula toward sustainability–a Romanian perspective*, "International Journal of Sustainability in Higher Education" Vol. 18 No. 6, p. 894-907, DOI: 10.1108/IJSHE-03-2016-0046

Farinha C.S. et. al. (2018), *Education for sustainable development in Portuguese universities: The key actors' opinions*, "International Journal of Sustainability in Higher Education" Vol. 19 No. 5, p. 912-941, DOI: 10.1108/IJSHE-09-2017-0168

Kiełczewski D, Poskrobko T. (2009), *Dydaktyka ekonomii zrównoważonego rozwoju*, „Problemy Ekologii" Vol. 13 No. 5, pp. 238-239

Kościelniak C. (2014), *A consideration of the changing focus on the sustainable development in higher education in Poland*, "Journal of Cleaner Production" Vol. 62, p. 114-119, DOI: 10.1016/j.jclepro.2013.06.006

Kostrzewa K., Piasecki R. (2009), *Approaches to Sustainable Development in Poland*, "L'Europe en Formation" Vol. 2, pp. 181-196

Leal Filho W. (2017), *Implementing Sustainability in the Curriculum of Universities*, Springer

Leal Filho W. et. al. (2015), *The future we want: Key issues on sustainable development in higher education after Rio and the UN decade of education for sustainable development*, "International Journal of Sustainability in Higher Education" Vol. 16 No. 1, p. 112-129, DOI: 10.1108/IJSHE-03-2014-0036

Lorek A. (2013), *Edukacja dla zrównoważonego rozwoju na przykładzie Uniwersytetu Ekonomicznego w Katowicach*, „Studia Ekonomiczne" Vol. 131, pp. 23-31

Lozano R. et. al. (2015), *A review of commitment and implementation of sustainable development in higher education: results from a worldwide survey*, "Journal of Cleaner Production" Vol. 108, p. 1-18, DOI: 10.1108/IJSHE-07-2017-0114

Michalik A. (2016), *Dydaktyka ekonomii zrównoważonego rozwoju jako jeden z aspektów strategii przedsiębiorstwa*, „Acta Scientifica Academiae Ostroviensis" Vol. 8 No. 2, pp. 21-32

Scoullos M. et. al. (2017), *Learning for and about sustainability in higher education – a regional perspective based on experiences from the Baltic and the Mediterranean*, "International Journal of Sustainability in Higher Education" Vol. 18 No. 6, p. 877-893, DOI: 10.1108/IJSHE-03-2016-0056

Wals A. E. (2014), *Sustainability in higher education in the context of the UN DESD: a review of learning and institutionalization processes*, "Journal of Cleaner Production" Vol. 62, p. 8-15, DOI: 10.1108/IJSHE-07-2016-0142