SUSTAINABILITY COMPETENCIES FROM THE UNIVERSITY DISCOURSE

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Abstract: *The subject of the research is focused on identifying the conditions that determine university's specific response to sustainable development, as well as on identifying the characteristics of a transformative university, and the obstacles in the process of creating a sustainable university. Given the importance of educating the future decision makers, the paper is particularly focused on the problems and the possibilities for developing the competencies for sustainable development within the higher education.*

The originality of the paper is found in its wholesome overview of the universities' response to the sustainable development challenge and in the identification of possible barriers that the universities face when striving to sustainability. The special value of the paper is in the analysis of the models for sustainable development competencies which should help to further understand these models and the possibilities for their application in university's teaching practice.

Keywords: *Sustainable development, University, Transformation, Barriers, Competencies*

1. INTRODUCTION

Over the last few decades, the concept of sustainable development has become a global challenge for contemporary education (Bonnett, 2016; Wright, 2009). Integrative approach to economic, social and ecological goals, reconciliation with nature, critical and creative thinking, participation and action-oriented learning, justice, responsibility, human rights, peace, security, partnership and solidarity are the key words when it comes to education for sustainable development and the future educational policy of each society. The university is recognized as the key factor when it comes to responding to the challenges of sustainable development. Modern universities represent "small cities" which can directly or indirectly affect the environment and the sustainable development given their size, population and activities, (energy consumption, waste etc.). At the same time, their mission of creating and transmitting knowledge through research and education of the future decision makers is a condition required for the change of the existing mental models and transformation of the society towards sustainability.

The role of universities in achieving the goals of sustainability is promoted both in academic discourse and at the policy level, ever since the Rio Conference (1992) and Agenda 21, and further through the Millennium Development Goals (UN, 2000), The United Nations Decade of Education for Sustainable Development 2005-2014 (DESD), up until Agenda 2030 and other documents. Numerous declarations (e.g. Talloires (1990), Halifax (1991), Copernicus Charter (1994), Lüneburg (2001), Graz (2005), Bonn (2009), Abuja Declaration on Sustainable Development in Africa (2009), Turin Declaration on Education and Research for Sustainable and Responsible Development (2009), etc.) have encouraged reflecting on models and ways of im-

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plementing sustainable development in universities, both in teaching and research activities, as well as when it comes to the university management and community action. Despite their differences, these declarations generally require the following from the universities: sustainable physical operations; academic research in the field of sustainability; working on environmental literacy; cooperation with other universities and countries; development of an interdisciplinary curriculum; establishment of partnerships with the government, NGOs and industry; as well as public informing (Wright 2002). In addition, a large number of declarations and other documents emphasize that universities have a moral obligation to act towards a sustainable society, especially when it comes to "greening" the campus and educating the teachers for sustainable development (Lozano et al, 2013).

2. METHODOLOGY

The specific situation of the global pandemic crisis caused by the coronavirus influenced the authors' decision to conduct a desktop research. For the purpose of collecting data, Internet and desktop research was made, which was then followed by interviews with key informants from Serbian universities. The interviews were conducted by e-mail or via telephone. In addition, information collected from the interviews was compared with both the literature data, as well as the international documents.

The search for literature was conducted via ISI, Google Scholar and KoBSON databases. The research is especially focused on the sources and the documents published after the Rio conference and the adoption of Agenda 21. The following key words were used: "sustainable university", "education for sustainable development", "transformative university", "competencies for sustainable development", "greening the campus", "HE for ESD declarations", "green curriculum", "barriers to higher education for sustainable development". The collected literature covered various topics whose selection led to the papers listed at the references section. The analysis of these papers helped establish three directions of the research, which served as the basis for defining the following research tasks: (1) to identify the factors that impact the transformation of a university into a "sustainable university", (2) to identify the barriers of such transformation, and (3) to determine principal characteristics of competence models in the education for sustainable development by their comparative analysis.

3. RESEARCH RESULTS

3.1. The factors of the transformation of a university into a "sustainable university"

In the contemporary socio-economic context universities have a deep moral responsibility in creating a just and sustainable future (Cortese, 2003), as well as an obligation to implement the changes that lead towards sustainable development (Svanström et al., 2008). Numerous universities accepted public commitment to work on their transformation into "sustainable universities", by signing international and national declarations. However, sustainability in higher education is a fairly new area of research. Most of the research to date have focused on: environmental management (Lozano, 2011), carbon management plans and greening of university campus (Atherton & Giurco, 2011); descriptive case studies and examples of good practice of universities (Cleaves et al., 2009); embedding sustainability in specific courses; theoretical developments on teaching and learning approaches towards sustainability; and university and policy analysis (Cebrián, 2018; Cotton et al., 2009; Wright, 2010).

Based on the results of these research, it can be concluded that the transformation towards a sustainable university is noticeable in those universities that have focused their business on environmental management (especially the application of ISO 14001), carbon management and emission reduction, energy saving, waste management and other activities related to the fight against climate change (Lozano, 2011; Atherton & Giurco, 2011; Button, 2009; Cleaves et al., 2009). In addition, this transformation is also reflected in the developed social responsibility within corporations (Nejati et al., 2011), hiring environmental managers and creating university's strategies, policies and sustainability plans (Sterling et al., 2013), cooperating with both local and wider communities, public sharing of information and reporting on the undertaken activities (such as universities' websites, media, etc.). Also, those universities that strive to sustainability are experiencing changes in decision-making processes, and are therefore becoming some kind of "learning organizations" that engage various stakeholders in their decision-making and actions (students, educators, staff, researchers, managers and executive groups, benchmarking agencies, external bodies, local community, NGOs and businesses amongst others) (Temple, 2010).

Considering the fact that monitoring, benchmarking and assessment are an integral part of the change towards a sustainable university, various tools have been developed, some of which are Auditing Instrument for Sustainability in Higher Education (AISHE) (Roorda, 2001); Graphical Assessment of Sustainability in Universities (GASU) tool (Lozano, 2006); The Sustainability Tracking, Assessment & Rating System (STARS) (AASHE); Sustainability Assessment Questionnaire (SAQ) (ULSF) and the Sustainability Tool for Auditing University Curricula in Higher Education (STAUNCH) (Glover et al., 2011).

Kościelniak (2014) believes that the transformation of a university into a "sustainable university" should be considered in regard to the university's mission, education and research, management, regional mission, as well as in regard to the individual activities and contributions of the staff, the students and the researchers. The key characteristics of a sustainable university are: (1) transformative education that will prepare students to face complex challenges of sustainability; interactive learning and the development of critical thinking skills; (2) transdisciplinary research and studies; (3) education and research orientation towards solving social problems - the ability of students to respond to modern age problems and challenges; (4) network that connects different expertises of the entire university and provides rational, efficient and meaningful resource management; (5) leadership, mission and vision that promote the changes that are necessary for the transformation of universities into "sustainable universities". (van Weenen, 2000; Leal Filho, 2000; Adomssent, 2006; Adomssent et al., 2007; Max-Neef, 2005; Wals & Corcoran, 2006).

Given that the universities' activities are mostly focused on education (van Weenen, 2000), the implementation of education for sustainable development in higher education study programs represents an important determinant of sustainable universities (Lambrechts et al., 2013). It has become clear that the education for sustainable development requires changes not only when it comes to the university's operations, that is the adoption of sustainable practices in the functioning of the campus, but also in regard to the curricula and the daily practice of academics. In addition, the universities are facing challenges, such as requiring that interdisciplinary learning and civic activism become the rule, instead of the exception; that the campus operations become linked to the formal curriculum; that the concepts of sustainability interconnect with every discipline; as well as that such educational goals become supported by research within the faculty, which should allow students and other staff to participate (Everett, 2008).

The evaluation of teaching contents within higher education, which took place during the UN Decade of Education for Sustainable Development (DESD), has shown that most activities which are related to the implementation of education for sustainable development had been realized from the perspective of environmental education. The progress made in regard to professional education of environmental protection experts is indisputable, as well as in regard to introducing special subjects related to environmental protection in various faculties' study programs (Nikolić et al., 2015). However, there is still a lack of wider implementation of education for sustainable development. Environmental content should be expanded to issues such as poverty reduction, civil society, peace, ethics, responsibility, democracy, governance, justice, security, human rights, health, gender equality, cultural diversity, rural and urban development, economic development, consumer patterns etc. In some universities, study programs which are focused on environmental protection are gradually opening up to the contents of those scientific disciplines that belong to social sciences and humanities. However, it can be concluded that there is still a lack of a holistic approach, which would integrate all relevant content related to the environmental protection and sustainable development in an inseparable whole and connect them to the interests of various stakeholders in the higher education system (Nikolić et al., 2017). The new paradigm of "sustainable universities" should address the weaknesses and the shortcomings of traditional higher education. The universities need to become the agents of social change in the fight against climate change and in ensuring sustainable development. In such manner, higher education can make its contribution to the transformation of society towards sustainable development and vice versa – sustainable development has a reciprocal effect on education with the potential to improve and transform the university and the education system as a whole (Zilahy & Huisingh, 2009).

3.2. The barriers regarding the transformation of a university into a "sustainable university"

The complexity of the issue of sustainable universities stimulated the research of the barriers and the obstacles that appear in the process of transforming the universities. The most important obstacles that the universities face when implementing sustainable development are: financial constraints (Barnes & Jerman, 2002); lack of funds and other resources (Kanyimba & Coetzer, 2011); economic development slowdown and budget reduction for universities (Velazquez & Munguia, 1999); resistance of administration (Velazquez et al., 2004); staff overload (Orr, 2000); weak connections between different parts of academic community and lack of universities' initiatives, especially in less developed countries (Kanyimba & Coetzer, 2011); deficit of binding policies that support the implementation of sustainable development in the universities (Whitmer et al., 2010); misunderstanding of the concept of sustainable development, i. e. lack of awareness of its purpose, consequences and implications for the universities (Leal Filho et al., 2017). According to the *Decade of Education for Sustainable Development Report* (UNESCO, 2012), the main obstacles for the transformation of universities into "sustainable universities" are the lack of resources, leadership, incentives and knowledge.

Some authors point out that the formation of sustainable universities is accompanied by institutional barriers, such as: lack of administrative support, lack of research and development, lack of legislation and state guidelines, lack of environmental committees, lack of infrastructure and technology (Leal Filho et al., 2017; Kanyimba & Coetzer 2011).

According to Velazquez et al. (2005) interdisciplinary research is one of the most difficult tasks for the university, while Capdevila et al. (2002) point to a weak link between the teaching

process and the research – higher education process is rarely supported by research, therefore remaining abstract and theoretical.

In the context of education for sustainable development, the biggest problem is the conservatism of universities and their resistance to change (Lozano et al., 2013), i.e. the fact that the higher education institutions are still basically traditional (Torres et al., 2017), and whose educational organization implies a division into highly specialized areas of knowledge and traditional disciplines (Cortese, 2003). Sustainable development, on the other hand, imposes the need for a holistic and integrative approach in order to perceive complex difficulties in the relationship between men, society and nature from the perspective of different disciplines (Milutinović & Nikolić, 2014). Because of the complexity of sustainable development issues, there is a need for cooperation and communication between the disciplines (Bosselmann, 2001), i.e. for interdisciplinary learning and research (Howlett et al., 2016), the integration of different subjects and disciplines, and the connection between the teaching and the real problems and people (Lambrechts et al., 2013). This requires some changes in teaching in order for students to become able to "translate" acquired knowledge into positive actions regarding sustainable future at a global level (Wright, 2009).

The lack of teachers' understanding of the concept of sustainable development, the lack of abilities and skills for implementing the contents and the topics of sustainable development (Kanyimba & Coetzer, 2011); and the lack of a holistic approach in integrating sustainability into the university curricula (Leal Filho et al., 2017) are the barriers that particularly complicate the universities' transformation. Teaching and learning in the context of sustainability require a wholesome experience: "discovery learning rather than reproductive learning; investigative learning rather than linear transport of content, exploring reality rather than reading books; active learning rather than passive reception of information; productive action rather than reproduction of facts; gaining experience rather than acquiring knowledge" (Bosselmann, 2001, p. 176). Therefore, there is a need for application of different pedagogical approaches and strategies that will serve in function of developing the competencies for sustainable development of future professionals and decision makers in various human activities.

As stated by Svanström et al. (2008), it is necessary to provide capacity building for the educators who have to be equipped with the knowledge about sustainability and education for sustainable development, because it is a prerequisite for integrating sustainable development into their courses with adequate teaching methodologies. In this regard, the competency models which will be presented below, can serve as a significant guideline in the teachers' education for sustainable development.

3.3. The competence models in the education for sustainable development

The competence models can be understood as an "inventory" of desirable competencies of teachers that will contribute to their improvement in the field of sustainable development, both in terms of knowledge and in practical action and cooperation, as well as when it comes to their personal characteristics, such as their values and emotions. The basic characteristics of the following three competence models are briefly presented below: The CSCT Competence Model, The KOM-BiNE Competence Model and The ECE Competence Model. In addition, the competencies (general and specific) that the given models promote are presented through a comparative overview, with the aim to gain a deeper understanding of them, and thus facilitate their application in the "education of educators" in the field of sustainable development.

The CSCT Competence Model. Within the CSCT (Curriculum, Sustainable Development, Competencies, Teacher Training) Competence Model the teacher is observed from three points of view: as an individual, as an actor in an educational institution and as a member of a society (Bertschy et al., 2013). Such perception of teachers indicates that it is not enough for a teacher to only have the competencies necessary for the classroom and the teaching management, but also the competencies related to the entire educational institution, as well as those necessary for achieving external interactions (Steiner, 2010). In order to encourage sustainable development within each level of action, the teacher needs to have specific competencies, which are presented through these five domains: (1) *knowledge* (creating an appropriate environment for teaching the issues regarding sustainable development, contributing to the creation of a program that integrates sustainable development into the entire school curricula, cooperating with organizations which promote sustainable development, etc.); (2) *systems thinking* (thinking in models and patterns, encouraging students to respect biological, social and cultural diversities, using existing networks for education for sustainable development, etc.); (3) *emotions* (expressing and managing one's own emotions, stimulating positive feelings, acting as a mediator in resolving the conflicts, etc.); (4) *ethics and values* (encouraging the students to reconsider their own beliefs and assumptions, developing the students' critical understanding of sustainable development, focusing on understanding the values, the rights and the responsibilities that are a part of the European citizenship concept, etc.); (5) *action* (imagining an alternative future, organizing and monitoring the learning process, strategical thinking and acting, etc.) (Sleurs, 2008). In addition, the model presents some general competencies, which also refer to the already mentioned levels of teachers' activity (Ibid.): *thinking and envisioning* (teacher as an individual); *teaching and communication* (teacher in an educational institution) and *cooperation and networking* (teacher in the society).

The KOM-BiNE Competence Model. The KOM-BiNe Competence Model (Kompetenzen für Bildung für Nachhaltige Entwicklung) focuses on the team of teachers/educators of education for sustainable development, and the reason for this is because "in a complex field like ESD it is not possible for one single person to command all the competencies required" (Steiner, 2010, p. 10). The core of the model contains highly personal competencies (Steiner, 2010) divided into four areas: *knowing* (acquiring general knowledge on sustainable development and ESD; linking contents from different disciplines, etc.); *acting* (being familiar with and further developing the methods and strategies for the application of knowledge; teachers are oriented towards the action and the contextualization of contents); *feeling* (the ability to empathize; believing that teamwork can contribute to sustainable development; teachers show enthusiasm for ESD and inspire others to do the same); *valuing* (values propagated by teachers themselves; educational goals that are promoted; values that express attitudes and beliefs). The middle layer of the model includes *communicating* and *reflecting* that connect the core with the outer layer. The communication is a prerequisite for the competencies of the outer layer, while it is less important for the individual areas (the first layer). Reflection, as a means of critical observation of oneself – one's knowledge, skills, values and feelings, is equally important for the core and the outer layer. The outer layer includes: *visioning* (developing visions for the future through questions such as How do we want to live sustainably?); *planning* and *organizing* (setting the goals, reflecting on the given possibilities, implementing ideas); *networking* (building and maintaining the networks within and outside the organizations) (Rauch & Steiner, 2013).

The ECE Competence Model. The ECE Competence Model is a catalogue of competencies in education for sustainable development that focuses on educators in general rather than exclu-

sively on teachers. These competencies should be understood as guidelines rather than minimal standards (Bertschy et al., 2013). The model contains of four competence fields: *learning to know* (understanding local and global social challenges and the potential role of educators and learners), *learning to do* (developing practical skills and action competence related to ESD), *learning to live together* (developing partnerships and a respect for interdependence, pluralism, mutual understanding and peace) and *learning to be* (developing personal qualities and greater autonomy, judgment and personal responsibility in relation to sustainable development). In each of these competence fields, the competencies are grouped around three essential characteristics of education for sustainable development: a *holistic approach* that includes integrative thinking, inclusivity and dealing with complexities; *envisioning change* that involves learning from the past, inspiring the present action and exploring the alternative futures; and *achieving transformation* of what it means to be an educator, transformation of pedagogy (transformative approaches to teaching and learning) and transformation of the education system as a whole (UNECE, 2011).

3.4. The comparative analysis of the competence models

Each of the analyzed models includes the competencies in the domains of knowledge, action and cooperation/networking.

Knowledge. CSCT and KOM-Bine competence models emphasize the need for the teacher to be familiar with the concept of sustainable development and the education for sustainable development, as well as to develop the awareness of cultural dependencies regarding knowledge. In the ECE Competence model, the competencies in the domain of knowledge are presented in a broader way, i.e. they do not relate specifically to the need for teachers to know the concept of sustainable development, but to gain a broader understanding of the challenges that are facing society, as well as of both their and the students' roles in facing these challenges. Thus, the teacher should understand the functioning and the interrelationship of the society, the economy and the environment; the connection between current actions and the sustainable future; the basic causes of unsustainable development; the necessity to transform educational systems; the importance of preparing the students to face challenges, etc. (UNECE, 2011).

Action. In the domain of action, all three models emphasize critical thinking, orientation towards problem-solving and forming an idea about a sustainable future. The CSCT and ECE models also have some other competencies in common, those related to seeing the environment as a learning opportunity, participatory education; identification of the future consequences of one's own decisions and actions; monitoring the learning process; being aware of the need for change. In addition, the common competencies of the CSCT and KOM-BiNE models are the acceptance of responsibility and teamwork.

Cooperation. The cooperation within the CSCT model is presented as a general competence. According to Steiner (2010), the collaboration with partners inside and outside the school is necessary in order to create learning opportunities based on the real life situations and social problems. It is based on the skills such as communication, conflict solving, teamwork, planning and organization (Ibid.). The KOM-BiNE competence model also assumes the collaboration within and outside the organization. As stated by Rauch & Steiner (2013), such networking is crucial for the ESD competencies of teachers. This competence is also based on communication skills and the ability to resolve conflicts, as well as on tolerance, respect for diversity, etc. (Ibid.).

The need for cooperation is recognized in the ECE model in the competencies from the *learning to live together* domain, particularly in those competencies that point out that the teacher should work with others in a way which: actively involves different groups from all generations, cultures, places and disciplines; encourages negotiation of future alternatives; challenges the unsustainable ways of acting within educational systems and institutions etc. (UNECE, 2011).

In addition, each of the models emphasizes the need for visioning, for creating ideas about an alternative, sustainable future that would serve as a basis for designing the changes necessary in the present. Furthermore, each of the models orientates towards the change, by emphasizing the importance of reflecting about what has already been achieved, planning the necessary changes and implementing them actively.

The CSCT and KOM-BiNE models emphasize the values and emotions, while the competencies in the domain of *learning to be* represent the specificity of the ECE model. These competencies describe a teacher as someone who: takes into account different disciplines, cultures and attitudes; is motivated to implement positive changes both locally and globally; questions the assumptions on which the unsustainable practice is based, etc. (UNECE, 2011). The specificity of the CSCT model is in the competencies in the domain of *systems thinking*: resisting the tendency to simplify problems and search for quick solutions; developing students' empathy through their identification with others; being aware that schools are a part of local, national and global systems etc. This model separates the *teaching competence* as a general competence, emphasizing that the education for sustainable development requires a different, constructive approach to teaching (Sleurs, 2008). Constructivism helps the teachers to understand that "acquiring competencies is a self-steered and active process, which can be fostered but not created" (Sleurs, 2008, p. 27).

All of the above, including the need to acquire knowledge in the field of SD and ESD, indicates that all models emphasize the personal dimension, the importance of developing personal competencies and self-improvement. On the other hand, there is a need for cooperating with others, which is especially emphasized within the KOM-BiNE model, given that it is aimed towards a team of teachers.

Alongside the already mentioned, other model specifics are reflected in the following competencies: choosing the goals of the education for sustainable development in accordance with prior knowledge and the abilities of students; contributing to the integration of sustainable development into the curriculum; acting as an "agent for changing"; (CSCT); managing the complexities; acting independently and confidently; (COM-BiNE); connecting the students with their local and global fields of influence; understanding the importance of scientific evidence in support of sustainable development (ECE), etc. (Sleurs, 2008; Rauch & Steiner, 2013; UNECE, 2011).

4. CONCLUSION

The overall presence of the sustainable development issues generated new challenges for universities - they are required to change their way of functioning and the activities they perform, i.e. to transform and to become "sustainable universities". The analysis of relevant sources has shown that the basic characteristics of a transformed/"sustainable university" are reflected in "greening" the property and caring about the universities' functioning in terms of energy saving, waste management, reduction of harmful emissions etc. A "sustainable university" is also

characterized by the changes within the research and the teaching processes. In other words, it is required for the research and the teaching processes to integrate sustainable development in a way that enables to apply the results of the research focused on sustainable development in the teaching practice at universities. However, the universities' response to the challenges of sustainable development is accompanied by numerous obstacles and barriers: financial and administrative barriers, lack of awareness of the need for integrating sustainable development into the university practice, lack of appropriate legal and regulatory guidelines, resistance to change, lack of competencies, etc.

The analysis of the obstacles and barriers indicates that the universities should: (1) incorporate sustainable development as an idea into their strategic plans; (2) integrate the sustainable development issues into the everyday teaching; (3) design their own waste recycling plans and establish efficient alternative energy initiatives; (4) inspire and promote the idea of sustainability and environmental awareness and actively work on the transformation of the society, both inside and outside their own campuses; (5) actively promote the education of teachers in the field of sustainable development.

Starting from the fact that the teachers are in direct interaction with the students, i.e. the future experts and decision makers in the field of sustainable development, the conclusion is logical: educating the teachers about sustainable development is a prerequisite for educating the students about sustainable development. Therefore, the competence models are an important guideline for the teachers' education in the field of sustainable development. Comparative analysis of the available competence models, The CSCT Competence Model, The KOM-BiNE Competence Model and The ECE Competence Model, showed that the key areas of the education of teachers for sustainable development are: the competencies in the domain of *knowledge* about sustainable development and education for sustainable development; the competencies related to supporting the teachers' *acting* in favor of sustainable development; the competencies for establishing *partnerships* with actors significant within and outside the institution in which the teacher is employed; but also the competencies that require a continuous *reflection* and *envisioning* a sustainable future. The models indicate that there is a need for developing teacher competencies that cover not only the teachers' performance in the classroom, but also a wide range of skills, abilities and knowledge related to integrating sustainable development into their beliefs, on one hand, and to cooperating with the others on the path to sustainability, on the other.

In order for the transformation of a university towards sustainable development to be possible, there is a need for introducing incentive mechanisms, such as legal obligations in the field of teachers' education for sustainable development, and also the establishment of a system for assessing the achievements of the universities in the field of sustainable development.

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