



Green University Garden Towards Region Sustainability

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Abstract Growing actions on putting into practice the policy for improving sustainable development gives universities great variety of opportunities on implementation of different 'green' technologies in their campuses. Campus greening is the first step towards sustainability. The purpose of this article is to present existing approaches on the categories of sustainable campus initiatives, their significance for complete region development and the state of the environment. On the example of the inner garden of Volgograd State University, the authors describe the importance of greening the external campus sites for minimization of the negative environmental and health affects for students and faculty staff. The green initiative reflects the institution's function as center of technological and social regional development. The green garden can reduce stress and also provide an esthetic sense by involving attractive surroundings. The impact of climatic zone on emerging of appropriate management and maintenance systems, meaningful comparison with the past landscape solutions are also reviewed in the present article. By implementing green technologies, the university shows its prudence and readiness to behave responsibly, sensibly and maturely in response to sustainability issues of the present and the future.

Keyword:

green campus, green technologies, sustainability, green campus affect, eco-friendly community.

1. Introduction

In the current ecological conditions, the function of an active agent of nature can only be performed by an eco- friendly person who represents the result of the historical and social development of society and the bearer of environmental consciousness. The ecological consciousness, according to the Russian thinker and natural scientist Vladimir Vernadsky, is based on the idea of the unity of humanity of mankind with living matter and the biosphere as a whole: "Human being and humanity are most closely associated with living matter that inhabits our planet ... Human lives in the biosphere and from we cannot

deny it "[1]. Therefore, the results of human activities should be associated with the consciousness of the unity and equality of all people, the unity of man and nature.

Various initiatives on "sustainable development" (in its contemporary meaning) which are put into a university have come from 1990s, mainly from Northern American universities. Significant contribution to the urban development of the campus was made by Frederick Lo Olmsted - the founder of the American landscape. He defined the campus countryside as respectful, while the planning structure was not regular, but landscape and clearly followed changes in natural relief [2]. The great impact of policies of nations, different declarations, claims and statements have resulted in those sustainable initiatives. As for today, green campus policy becomes the natural responsibility of any higher educational institution and is adopted internationally.

Sustainability should be intrinsic to the institutional mission and therefore implemented in different formats to all campus operations. Universities have a crucial role in educating and disseminating sustainable ideas among future generations. They, in turn, will spread the ideas further, become policy-makers and implement their initiatives from regional to global level. The functioning of a university campus is a model and example for any other institutions, residents and administrations to promote sustainability around the globe.

2. Problem Statement

Concerns on population growth and resource scarcity and shortage come from the 17-18 centuries while thinkers were worried about the matters. A century after, when the affect of hazards to health due to industrial processes became obvious, the meaning of sustainability issues turned to the ones we have today. It was in 1980 when the term "sustainable development" turned public when presented in the "World Conservation Strategy". However, it was only focused on ecological sustainability but not broaden it to the social and economic issues [3]. The most frequently used definition of the term is of Gro Harlem Brundtland who was the Prime Minister for Norway in 1987 and chaired the World Commission on Environment and Development (WCED). It published the report "Our Common Future" where Brundtland defined sustainable development as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [4].

Thus, the term embodies an ecological goal with social, economic and environmental aspects. The advantage of this understanding is that it includes forward-moving power of the tech-advancement, changes in people's lifestyles, cultural peculiarities and institutional reorganization [3].

Further, numerous national and international conferences started to be held. The largest meeting was conducted by the UN Conference on the Environment and Development (UNCED) in Rio de Janeiro (Brazil) in 1992. It gathered about 8 thousand participants and resulted in *Rio Declaration on Environment and Development*, *Agenda 21* and *Forest Principles* as well as in some legally binding agreements. Then in 1997 a Kyoto Conference on Climate Change led to the emerging of the well-known Kyoto Protocol. The new millennium was marked by signing the UN Millennium Declaration where the MDGs (Millennium Development Goals) were derived from. By signing the document, all 191 UN member states agreed to combat poverty, hunger, disease and maintain education, environmental sustainability and gender equality as well [5].

In 2015 the UN member states adopted the 2030 Agenda for Sustainable Development

with 17 SDGs (Sustainable Development Goals) at its heart. These are the call to a global partnership that must provide people and the whole planet with shared peace and prospering for many years to come but only in case if all the countries are sincere about the achievement of the abovementioned goals.

Sustainable development was primarily viewed within the ecological aspect and afterwards the social and economic ones. Plenty of conferences, summits and meetings have been held resulting in various declarations, agreements and resolutions on environmental problems. Universities of around the globe started supporting and following the global goals. At first, they are concentrated on greening territories, improving landscapes and the interior. Then the realization of a greater potential, universities introduce their best practices within education and research processes. Hence, the educational aspect is emerging. HEIs are now not limited with the environmental development of their campuses. Their initiatives are also focused on educational and research activities. Thus, the notion 'sustainable campus' with a much wider definition arises. In Asia it was Hokkaido University that was the first to pay attention to sustainability and put its initiatives into practice at the campus [5, 6]. Turning to sustainable architecture today affects the typology of all buildings and complexes, radically changing designing modern educational complexes within the means environmental construction and widespread use of the benefits of the native placement and landscaping of campuses, which reflects the relevance of the present research.

3. The Role of Universities

To achieve the desirable sustainable future, it is necessary to change the mindset of individuals and organizations. It is a HEI that disseminates the ideas to young generations who will further carry them throughout their lives and lives of others. Undoubtedly, that is a long process with many challenges ahead. The efforts should be aimed at transformation of education at all levels. While composing the present article, we are sticking to the opinion that green campus is a basis, a starting point for sustainable campus initiatives implementation. It is the place which significantly affects and is affected by students and faculty staff.

Growing actions on putting into practice the policy for improving sustainable development gives universities great variety of opportunities on implementation of different 'green' technologies in their campuses. Campus greening is the first step towards sustainability which the institutions should be responsible for. They should realize that it is a broad area compiling the set of interrelated factors ranging from natural environment to social and economic systems.

In fact, 'green campuses' can be divided into several types. The first is a 'green campus' in its direct meaning which includes greening territories in- and outside a university, changing infrastructure for the better environment. The next type combines the first one and educational aspect with the process of "greening" courses, lectures and other teaching materials. From our point of view, this mostly refers to the sustainable campus rather than to green campus which is a subpart of the first. Alongside the implementation of eco-initiatives to the infrastructure, this approach includes the educational process with its strategies and practices. Another 'green campus' type is equal to a sustainable campus in its essence. The additional components to the previous ones are self-consciousness, finding research sustainable solutions, strong interaction between universities, companies and society for reaching sustainability.

In this article the authors look into the first basic type of ‘green campus’ among the mentioned above which covers a green infrastructure, greening territories in reference to Volgograd State University. It should be first stressed that eco-initiatives may depend on the type of HEI, climate zone it is located, current environmental situation of the region as well as its economic potential. What can be appropriate and effective to one institution is not to the other. Each should adapt to the surrounding conditions and alert its policy according to it. For instance, in terms of reducing energy consumption and implementation of renewable energy technologies, some places are best suitable for wind energy (Murmansk or Orenburg) and some are for solar (the south regions of Russia with long natural illumination). The same situation is with other countries as well as other aspects.

Volgograd State University is located in Volgograd (Russia), the city of steppe or prairie region which is characterized with the climate that is too dry to support a forest but not dry enough to be a desert. We have a huge seasonal temperature and precipitation difference as well as great fluctuation between days and nights. Looking back, to the historical background of the university location, it should be noted that it is built on the site of violent and sanguinary battles. There was nothing but empty space, weaponed and ruined soil and heart-burning memories. “Lysaya Gora” (literary “Bold Mountain”) bears and preserves the historical memory of the war. In 1970s it was decided to inhale this place with life and always inquisitive minds.

Volgograd State University is quite young. This May it has celebrated its 40th anniversary. Only by comparison we may evaluate the progress of what have been done. Looking to the past, to the early decades of the University campus development, it gets obvious that plenty of efforts were made to its flourishing. Speaking about the VoISU history, it should be mentioned that the main campus was only built in 1990. Since those times the HEI’s administration, faculty staff and students dedicated a part of their university life to campus advancement.

When students first arrive on campus, most of them leave their homes for the first time and that refers not only to the ones from other regions or countries, but also to locals. This is a starting point for them to explore and wonder about their own values. If a campus becomes an example of sustainability and eco-friendly site with a variety of green initiatives and implemented technologies and consciousness of all university residents, a new generation of environmentally sensitive grown-ups may become socially and environmentally responsible citizens [3].



Figure 1. VoISU inner garden in 1990s



Figure 2. VoISU inner garden in 2020

The University has a special *territory maintenance unit* which is responsible for the territorial greening, maintenance and enhancement. It's a well-known fact that green campus creates the space for the student's thinking and knowledge and in a healthy and safe environment. It gives them relax, rest and recovery. The inner garden of VolSU represents the combination of all these conditions.

Figures 1 and 2 clearly demonstrate great transformations of the inner garden of Volgograd State University since the times of its creation. It now features a great variety of forest and plant vegetation, fully open spaces and sites for biodiversity (e.g. Peregrine Falcons, who have become the symbol of the University).

The territory of the inner garden apart from another campus sites is covered with about 60 per cent of different vegetation. Most of them are conifers in forms of small and medium sized shrubs and trees, annuals and perennials. Small flowering plants grow and bloom over the spring and summer. Some of the bushes are deciduous and some are evergreen of 1 - 1.5m in height. The garden grows firs, junipers and yews which even in cold and snowy winters delight and refresh the eye. The symbols of coming spring like Forsythia, Spiraea and unique for Volgograd urban landscapes Red-leafed apple trees adorn the territories. The local steppe climate results in great efforts of planting and growing. It dictates the special conditions of caring, maintenance and watering to each of the species.

The inner garden is designed in a way that students and university staff can escape from the tough daily teaching and learning routine. It has numerous fixed benches with several street-lamps for night lightening. Due to the construction of the whole building, it fully receives the natural light all day long and shady place are suitable for shade-requiring plants.



Figure 3. Inner garden of VolSU (overview)

4. Summary

Through the use of structured strategies for sustainable development, universities can actively create eco-campuses that not only reduce the environmental burden on the city, but also can influence public opinion and behavior of citizens in order to develop environmentally responsible behavior and activities. Universities are therefore critical stakeholders for success. Eco-innovations comprise a concentration of humanistic, environmental-friendly and legislative ideas (the human right to a clean environment). VolSU initiatives carry a great innovative potential and can contribute to the formation of a

green infrastructure, ensuring the improvement and green development of the city and the region as a whole.

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