Dorota GAWRYLUK • Izabela BIAŁA • Magda GAWRYCHOWSKA

CONCEPT OF POCKET GARDENS ON THE CAMPUS OF BIALYSTOK UNIVERSITY OF TECHNOLOGY AS A RESULT OF A SURVEY OF THE ACADEMIC COMMUNITY

Dorota **Gawryluk** (ORCID: 0000-0002-5429-6658) – *Bialystok University of Technology, Faculty of Civil Engineering and Environmental Sciences*
Izabela **Biała** – *Bialystok University of Technology, Faculty of Civil Engineering and Environmental Sciences*
Magda **Gawrychowska** – *Bialystok University of Technology, Faculty of Civil Engineering and Environmental Sciences*

Correspondence address:
Wiejska Street 45a, 15-351 Bialystok, Poland
e-mail: d.gawryluk@pb.edu.pl

ABSTRACT: Green areas of university campuses are an important resource for them, performing a variety of functions important for the functioning of the university, the well-being of the academic community, the environment and the green system of the city. The purpose of this study was to determine the preferences of the academic community, with particular emphasis on students, as to the functionality that campus green spaces should fulfil today. The methodology of the research work included a diagnostic survey method, the technique of which was surveying, and the tool was a survey questionnaire. Analysis of the results of a survey conducted among students at the Bialystok University of Technology (Bialystok, Poland) made it possible to determine the needs and expectations regarding the development of campus green areas. The concept of pocket gardens accommodates responses and solutions to students' expectations. The analysis of the student community's opinions served to implement the tasks of the "My Green Polytechnic" strategy conducted on the Bialystok University of Technology campus. The results of the survey and the experience of its implementation can be useful to various institutions in making decisions on green space management.

KEYWORDS: pocket garden, university campus, sustainable development, green spaces, social research

Introduction

The area of a university campus can be compared to a city, where green spaces are the main centre of activities of the academic community, including work and education, rest, physical activities, recreation, and local events (Zachariasz, 2008). Above and beyond this, these areas have a positive impact on the surrounding ecosystem. Campuses, like cities, play a key role in creating environmental awareness and social responsibility. By promoting sustainable development, they create a better perspective of the future, in which there is a harmonious connection between humans and nature.

Pocket gardens are public green spaces located in small areas, usually among dense development, often in the centre of a city. They are mainly intended for the local community, performing many functions, i.e. supplementing urban green areas, improving microclimate, being a meeting place for local residents, and recreation (Krzysztofik & Galoch, 2022). In the face of climate change, which translates into increasingly higher temperatures in urban areas, pocket gardens are becoming oases of solace. Bialystok is actively striving to gradually increase the area of green spaces in urban areas. "Pocket parks", due to their small size, offer the possibility of locating them in different parts of the city, allowing easy access to green areas for residents (Jarocka et al., 2021).

A definition of pocket gardens can be found in Nowaczyk (2017), who notes that the concept of creating pocket parks originated in the US, from urbanised areas where there was a lack of green spaces in the centre of cities. The problem of a lack of green space led people to seek out small oases, unused plots of land and wasteland. Pocket parks can also be part of larger development projects, such as inner courtyards. Such enclaves also become refuges for insects, birds and small rodents. Typically, pocket parks are small (up to a few hundred square meters in size) and serve different functions. When creating them, mainly greenery elements are taken into account, but also elements of small architecture. Aptly, pocket gardens are also described by Blake (2021) as "urban open space on a very small scale". More accurately, in the context of their size, they are characterised by Sołtysik (2023): "They are mostly small in size (up to 0.5 hectares) and have an extensive functional program, with attractive greenery and small architecture"(Praveena & Sreetheran, 2021). They usually range in size from 300 to 1,000 m2 (Szymańska, 2021), Dong for the Ministry of Housing and Urban-Rural Development of the People's Republic of China reports a size of 400 to 10,000 m^2 (Dong et al., 2023). Understood in this way, pocket gardens can be a starting point for deploying green spaces with small areas on university campuses.

The overall goal of this study is to influence the improvement of green space development on the campus of the Bialystok University of Technology (Poland), serving to enhance the well-being of the university community, with particular attention to the needs and expectations of students. Pocket gardens on campus may be the answer to this need. The article focuses on analysing students' opinions, needs and expectations about campus development, which serves to define guidelines for a functional program for pocket gardens. The topic is timely due to the ongoing sustainability strategy "My Green Polytechnic" (Bialystok University of Technology) based on a report in which the PB academic community, that is, "Respondents cited care and concern for human health (68.45%) and concern for future generations (64.51%) as the most important reasons for protecting the environment". Considerations are carried out in terms of the idea of sustainable development as a comprehensive combination and balancing of three analyses: social, environmental, and economic (Trojanowska, 2018).

An overview of the literature

A review of the literature indicates that the issue of green space development on campuses, including the inclusive use of pocket gardens, is multifaceted.

The issue of pocket gardens is analysed by researchers through the prism of many criteria: from the impact on the urban greenery system to the diverse functional offer of recreation and leisure areas (Hussein et al., 2022), the promotion of healthy lifestyles (Peschardt, 2014), to the building of biodiversity (Ikin et al., 2013), the improvement of the climate (Hou et al., 2022) and thus the positive impact on social activation (Elmaghraby, 2019) and on the sense of well-being of users.

DOI: 10.34659/eis.2024.88.1.740

Researchers devote their works to case studies of pocket gardens in various cities, e.g. Cracow (Labuz, 2019), Łódź (Czembrowski, 2016) Poland, Detroit (USA) (Luks, 2001), Western European cities (Sroka & Musiał, 2016). There are interesting conclusions concerning the inclusion of pocket gardens in the green structure of the city positively influencing the activation of adjacent residential areas (Dai & Wang, 2022). The issue of social inclusion is also raised, which is significantly related to the issue of ensuring accessibility to pocket gardens (Xu et al., 2018). As Biernacka (2020) points out, the growing importance of access to green spaces is increasingly being recognised, especially in urban areas. Bajwoluk and Langer (2022) demonstrate the vital importance of the pocket garden system for the local and supralocal scale of the green space system using the example of Krakow. Their findings can serve other cities as well as other urban complexes such as campus complexes.

Increasing importance is being given to green spaces on university campuses. Numerous Polish and foreign universities are developing strategies for sustainable development that include concern for green areas as one of the priorities of their activities, which is reflected in university rankings, e.g. UI Green Metric, QS World University Sustainability, THE Times Higher Education (Politechnika Białostocka, 2023b; Politechnika Białostocka, 2023c).

According to Xaveer De Geyter, a Belgian architect and urban planner (Sikorski et al., 2020), the function of university campuses in society is crucial and continues to grow. They serve a dual role as engines of social change and places for reflection and experimentation (Perkowska-Klejman, 2019). Due to the growing environmental awareness, the evolution of attitudes towards campus towns, and the emergence of many university areas that are examples of improperly developed areas, there is a growing number of publications, debates and workshops on this issue.

Many universities around the world have recognised the need for new educational spaces, such as nearby open areas, to support student-centred pedagogy and foster collaborative initiatives. On-campus pocket gardens play an important role in encouraging participation in a variety of learning activities, both formal and informal, and allow interaction with the surrounding landscape, thereby supporting the learning process (Salih et al., 2021).

Researchers are conducting an analysis on the use of space on university campuses to tailor these areas to the individual needs of space participants. "A study of the urban typology of campuses in Poland shows that most of them are groupings of buildings built in an uncoordinated manner to meet the immediate needs of universities" (Żabicki, 2016). This suggests that the development of these campuses was often not planned in a coherent and long-term manner, which can lead to problems with the organisation of university space and its functionality. On the other hand, we find examples of the adaptation of the greenery of university facilities to urban space, e.g. gardens on the roof of the University Library, which create space not only for students but have also become one of the attractions of the capital (Lorens & Martyniuk-Pęczek, 2010). Similarly, campuses newly designed after World War II, such as the Wroclaw University of Technology, focus on providing sustainable and aesthetically pleasing green space that fosters social interaction. One should also not forget about campuses located in historic building complexes, such as the Cracow University of Technology and the University of Warsaw (Lorens & Martyniuk-Pęczek, 2010). In such cases, historic architectural and green space elements are integrated into a modern layout, creating unique and attractive learning and meeting places. In each of these examples, the priority is to understand the needs of the student and academic community, which is a key element of successful campus design. In the context of this analysis, it is crucial to understand that the priority is to consider the needs of space users as a general idea related to participatory urban planning. Given that it is the academic community that will be the main recipient of changes, social analysis will be the first determinant.

Salih et al. (2022) conducted a similar analysis of space at Putra University in Malaysia to the one described, this study primarily covers the social context of the analyses. The authors emphasise the timeliness of the topic due to the fact that many universities still focus mainly on traditional indoor teaching and lack outdoor educational programs that meet modern academic standards. Therefore, this study aimed to identify factors influencing students' social learning experiences, especially in the context of using nearby pocket parks on campus. It showed that pocket gardens have a number of functions, from psychological and social to spatial and ecological.

DOI: 10.34659/eis.2024.88.1.740

Research methods

The study area is the main campus of the Bialystok University of Technology, located on Wiejska Street in Bialystok, where green space accounts for 60% of the total area of 26.69 hectares (Figure 1). It is adjacent to the south to the attractive natural area of the Zwierzyniecki forest, which then transitions into a larger forest complex, including a reserve. The campus itself, meanwhile, is characterised by a rather monotonous selection of greenery, dominated by extensive lawns.

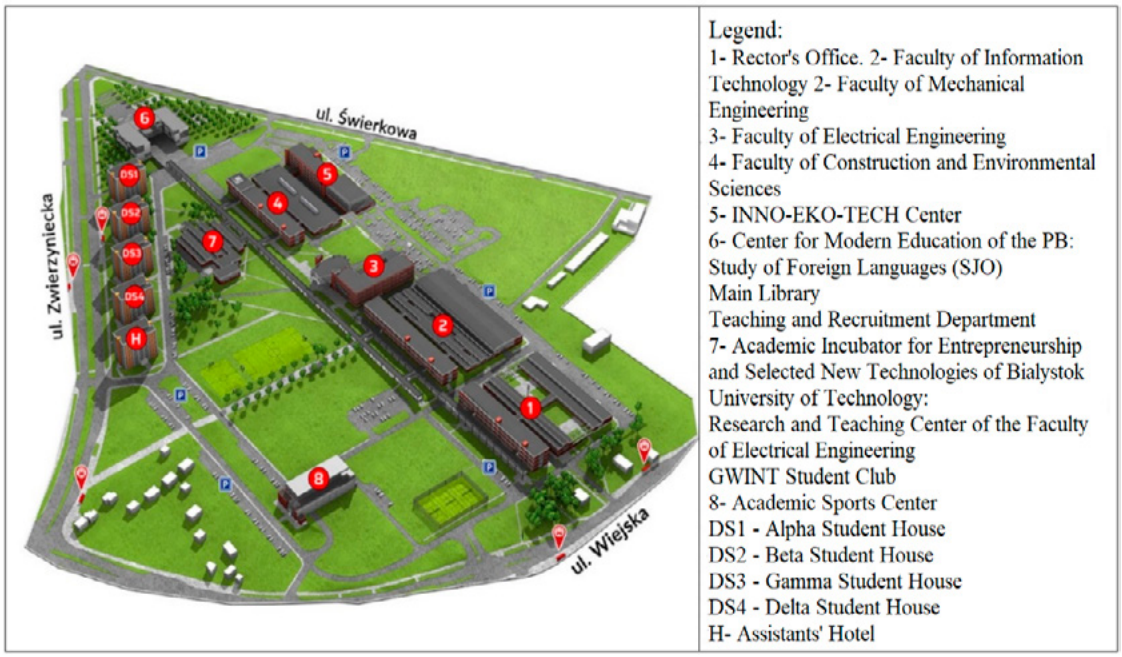


Figure 1. Plan of the Bialystok University of Technology campus

Source: authors' work based on Politechnika Białostocka (2024).

The research was carried out on the basis of a diagnostic survey using a survey technique conducted among the PB academic community in July 2023. The survey was conducted online. Its purpose was to find out the respondents' opinions on the current and future development of greenery on the PB campus and, ultimately, to determine the location of pocket gardens of up to several hundred square meters and their functional programs.

The selection and formulation of the survey questions were also influenced by the conclusions of research conducted among students of the Silesian Voivodeship on their assessment of the value of urban forests (Sobol & Skubala, 2022) and the experience of Matel and Poskrobko (2019) related to the results of declarative research on ecological behaviour.

The questionnaire consisted of 15 questions – 14 closed questions, of which 3 with the possibility of an additional answer and one open question. In the first part of the survey, the questions focused on the current status of the campuses' land use, covering their location, transportation accessibility, parking availability, traffic routes (for vehicles and pedestrians), green areas, and landscaping facilities. The second part of the survey focused on respondents' preferences for future campus development, including the introduction of pocket gardens. The topic of smoking zones in public spaces on campus was also addressed. The survey group consisted of students from all six departments and three parts of the PB campus. 201 students took part in the survey, including 63.7% men and 35.8% women, which corresponds to the approximate gender distribution among students at the technical university.

The results of the survey were analysed socially (assessing the well-being of students in the green campus space and thus determining the expectations and preferences of students regarding the functional organisation of green areas on campus), and spatially (in terms of the potential of campus

DOI: 10.34659/eis.2024.88.1.740

areas regarding the location of pocket gardens, and zones with different functionalities, e.g. zones for smokers, additionally the development of parking places). The entire study was summarised by SWOT analysis, as one of the fundamental tools used in strategic management. Conclusions from the above analyses served as design guidelines for the concept of location and design of pocket gardens, for which exemplification was carried out in the form of a garden in front of the Faculty of Electrical Engineering, the first stage of which in the form of planting plants was implemented in October 2023.

Results of the research

The results of the research have been grouped in relation to the various analyses: social, spatial and SWOT.

Social analysis

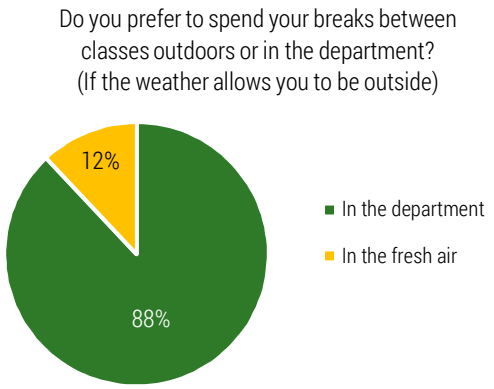
In today's technologically oriented world, people often lose touch with places where they can experience relaxation because they are unaware of where such tranquillity is available (Trojanowska, 2023). Conducting a survey among the academic community targeted by the functional program of pocket gardens helped identify important functions for users (such as recreational space, meeting place, environmental education, improvement of air quality, and aesthetics of the place).

The key question of the survey in terms of social issues concerned the issue of how students spend their breaks between classes. The vast majority of respondents (88.1%) prefer to spend their breaks outdoors (Figure 2a). Such a high result suggests that students show a need to enjoy the outdoors between classes, which are mostly held in closed spaces. At the same time, in the next question, the majority of respondents (73.3%) specified that they prefer to spend their breaks as close to their faculty as possible (Figure 2b).

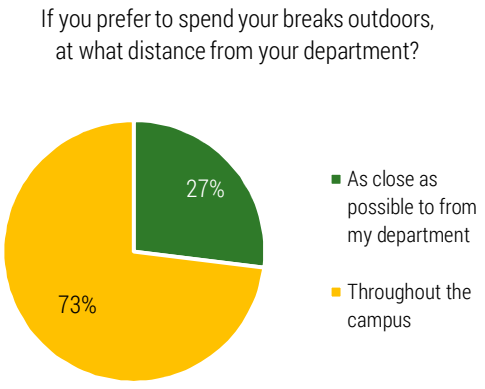
When asked about the creation of more common areas, respondents, as much as 91%, confirmed the need for more of them (Figure 2d). The quantitative results of the survey also indicated the main facilities expected by students. These include facilities such as benches and rest areas (88%), tables and picnic areas (68%), drinking water access points (49%), hammocks or swings (47-37%) and chargers (52%), but also functional spaces (about 30% of indications), i.e. coworking spaces or a street workout zone. The responses given confirm the need to arrange spaces for relaxation, allowing people to spend time together relaxing or working outdoors. Individual responses in the form of comments from respondents did not affect the essential results, and their content fits in with the essential functions outlined above.

In addition, respondents were asked about their preference for separate smoking areas and the nature of these spaces. 52.7% of respondents declared themselves non-smokers who believe that smoking zones should be separated, while 20.4% of those who declared themselves smokers also support the separation of smoking zones (Figure 2c). Many believe that such a zone should be open or in the form of a shed, which may be due to the desire for social integration and the desire to be outdoors (52.5%) (Figure 2E). At the same time, a significant percentage of people (22.5%) support the idea that it should be an enclosed space, which may increase protection from the impact of tobacco smoke on other campus users. The remaining 25% of respondents did not express a clear opinion on the matter. The results present a diversity of opinions among the Bialystok University of Technology student community regarding the nature of the smoking area. Therefore, understanding these different perspectives becomes crucial for further designing the campus infrastructure with the needs of both smokers and non-smokers in mind.

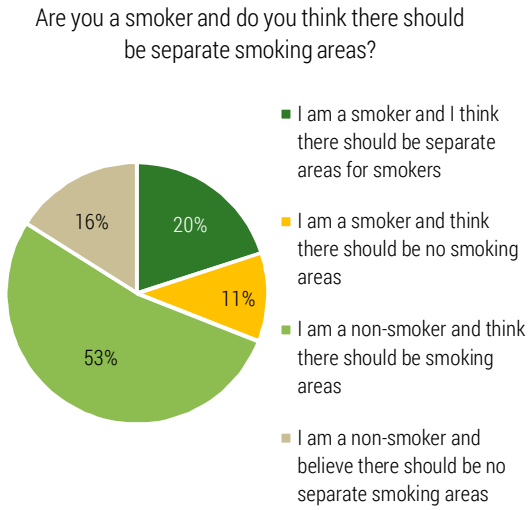
DOI: 10.34659/eis.2024.88.1.740



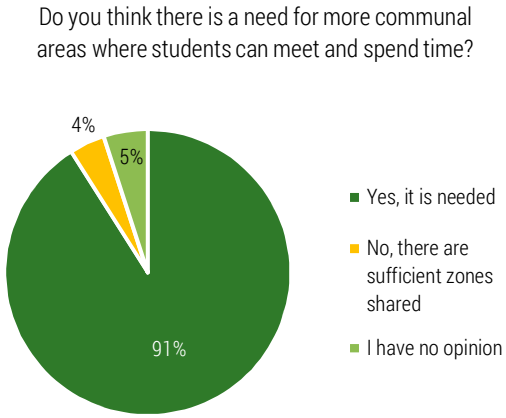
A



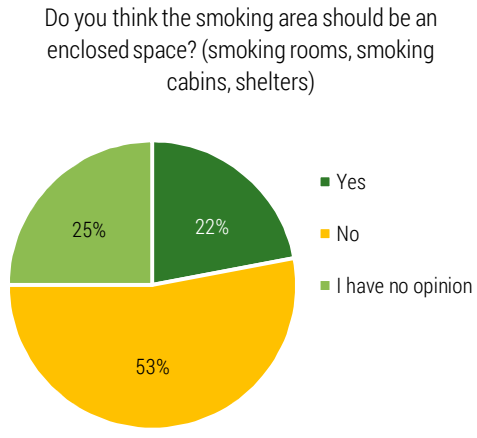
B



C



D



E

Figure 2. Survey results related to the social analysis

DOI: 10.34659/eis.2024.88.1.740

Spatial analysis

Thoughtful implementation of the pocket gardens concept on a university campus is crucial to meeting the needs of the university community. Students responding to the survey questions identified areas that should be improved.

To the question "Do you think the greenery on the Bialystok University of Technology campus is sufficiently well organised?" the vast majority of students (89.1%), despite being satisfied or dissatisfied with the current state of the greenery, believe that it is insufficiently well organised (Figure 3A). The unanimity of students on the issue of insufficient greenery organisation indicates the need for action and specific areas for improvement.

The question regarding the areas that should be upgraded first provided the opportunity to select multiple answers. The results indicate that most attention was focused on squares and courtyards (59.7%) and spaces around buildings (55.7%). Interest in alleys and paths (44.8%) underscores the need to improve the accessibility of pedestrian infrastructure. A small percentage of respondents (5%) believe there is no need to improve any green space on campus.

Students were asked to identify suggestions for completing the functional development of the campus. Here are examples of initiatives proposed by students: "rest areas, food centers, places with access to electrical outlets, benches with backrests, outdoor study areas, education on smoking prevention, tables for playing chess, walls (walls, is the colloquial name for a meeting place for students, on the Bialystok University of Technology campus), designated by the student club "Gwint", deck chairs, tables, more ashtrays". These ideas reflect the diverse needs of the student community, looking forward to creating a space that integrates, relaxes and supports a variety of activities.

The authors of the survey, looking for areas on campus that could be turned into green spaces, asked questions about the location of parking lots. The students asked mostly (77.1%) do not want parking spaces to be converted into green spaces (implicitly, they do not want to organise parklets) (Figure 3d). When asked: "If you came to the university by car, what would be able to convince you to change your mode of transportation?" the most frequently selected alternatives were:

- offering preferential public transportation tickets for students (39.3%),
- a biker station on campus (25.4%),
- improving the availability and frequency of public transportation around campus (24.9%),
- creation of safe and convenient bicycle paths and facilities for cyclists, such as bike racks and showers (19.9%).

A significant number, 35%, said that nothing would convince them to give up their personal car.

In the context of the survey on Green Spaces on the Bialystok University of Technology campus, it is important to note the question, "Do you know what pocket gardens are?" Surprisingly, as many as 65.7% of participants answered in the negative (Figure 3c). The survey gave participants a definition of pocket gardens in the body of the following questions. This led as many as 88.6% of respondents to believe that locating such gardens on campus would be of value to the academic community (Figure 3b). This significant support indicates a positive attitude toward the concept of using undeveloped spaces for green enclaves.

DOI: 10.34659/eis.2024.88.1.740

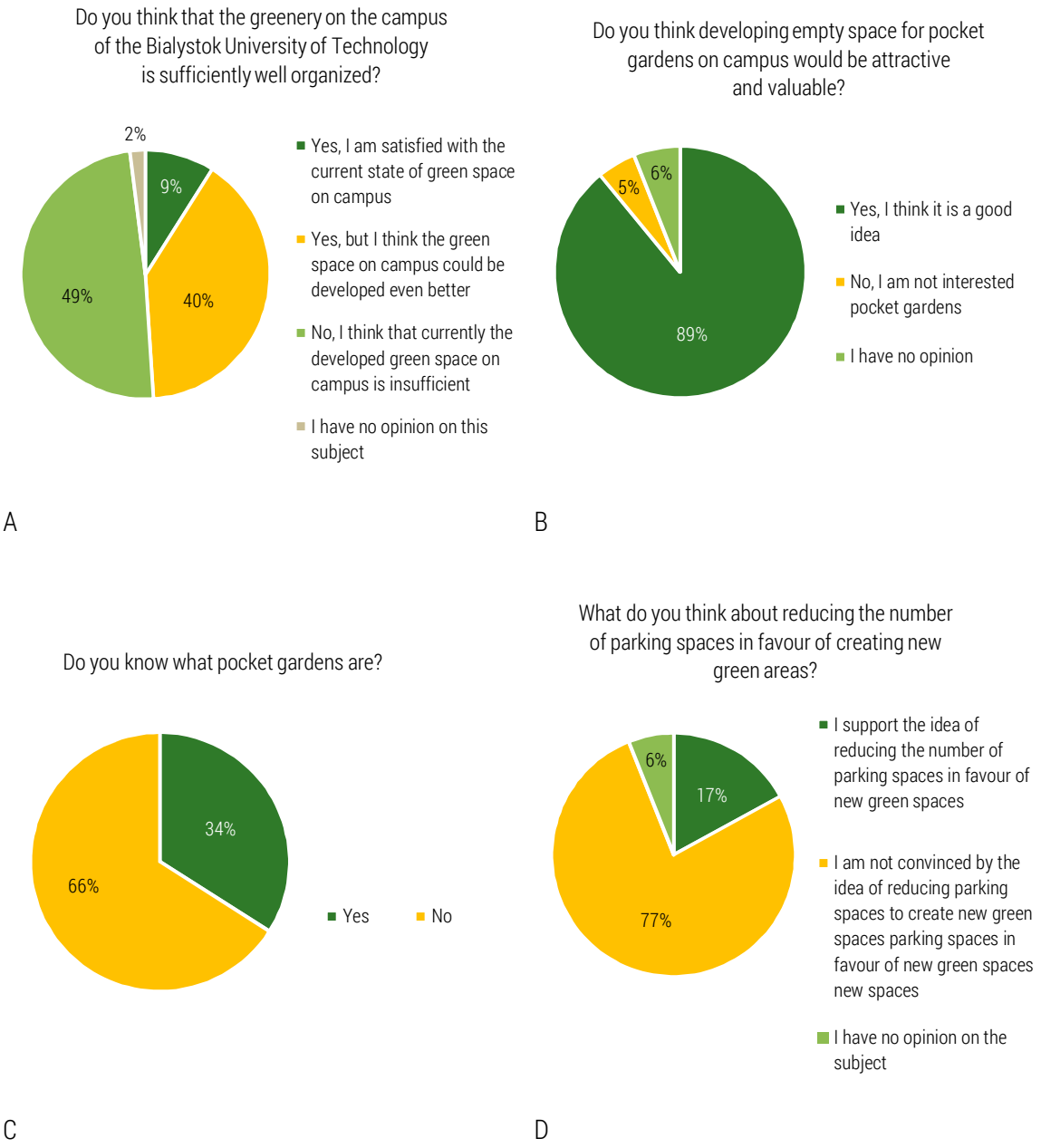


Figure 3. Survey results related to the spatial analysis

SWOT analysis

The SWOT analysis of the Bialystok University of Technology campus area was conducted in the context of the survey findings and the topographical and climatic conditions of the study area. This analysis provides a solid basis for the development of specific strategies and actions to maximise the potential of the Bialystok University of Technology campus area for the creation of attractive, functional pocket gardens.

DOI: 10.34659/eis.2024.88.1.740

Table 1. SWOT analysis of the Bialystok University of Technology campus space

Strengths	Weaknesses
• availability of undeveloped spaces • proximity to university buildings • positive attitude of the community • diversification of the area • sustainable development initiatives • environmental awareness of the community • openness to student initiatives • improvement of the quality of student life	• changing climatic conditions • low community awareness of pocket gardens • possible conflict with existing infrastructure • seasonality of university activity • potential problems with illegal use • high competition for space
Opportunities	**Threats**
• partnerships with local businesses • creating a unique identity for the campus • developing a community space • integration with academic programs • enhancing the attractiveness of the campus • promotion of sustainable lifestyles	• increase in maintenance costs • phenomenon of vandalism • limited community activity • competition for space • problems with management of water resources • insufficient funding • neglect of space due to other priorities

The availability of undeveloped space and proximity to university buildings provides the foundation for the successful implementation of pocket garden projects. This, combined with the positive attitude of the university community, creates favourable conditions for active participation in these initiatives. The diversification of the site opens the door to a variety of projects while existing sustainability initiatives and the community's high environmental awareness create a favourable ground for green solutions. Additionally, openness to student initiatives and the prospect of improving the quality of student life are key elements that can positively influence the acceptance and involvement of the academic community.

Poland's variable weather, characterised by erratic climatic conditions, can challenge maintaining vegetation in pocket gardens. The community's low awareness of pocket gardens and possible conflict with existing infrastructure (especially parking areas) require effective educational efforts and analysis of projects for integration with existing campus structures. The seasonality of the university's activities may affect the variable intensity of the use of pocket gardens, which is another challenge to consider.

Among the opportunities identified in the context of pocket garden projects are partnerships with local businesses that can financially and logistically support project implementation. Creating a unique campus identity, developing a community space, and integrating with academic programs represent opportunities to enhance campus appeal. Increasing campus attractiveness, promoting sustainable lifestyles and increasing maintenance costs can contribute to the long-term success of pocket garden projects.

The phenomenon of vandalism and limited community participation in maintaining pocket gardens pose real threats, requiring effective safety and education strategies and the involvement of the entire university community as well as those outside who use campus green spaces. Competition for space, water management problems and insufficient funding are issues that require special attention and a planning approach.

The conclusions of the SWOT analysis provide a comprehensive look at the potential of pocket garden projects on the Bialystok University of Technology campus and identify key areas that require attention and further action.

The spatial distribution of the Bialystok University of Technology campus is a key element that affects the daily life of the academic community. Taking into account the distribution of permeable and impermeable surfaces, as well as students' preferences, proposals for the location of pocket gardens near university buildings have been marked (Figure 4). The location of pocket gardens was proposed on both landscaped and previously undeveloped areas. It should be mentioned that extensive green areas in the form of extensive lawns on campus offer great potential for creating pocket gardens; however, due to the cyclical cultural events held there, the areas were not considered.

DOI: 10.34659/eis.2024.88.1.740

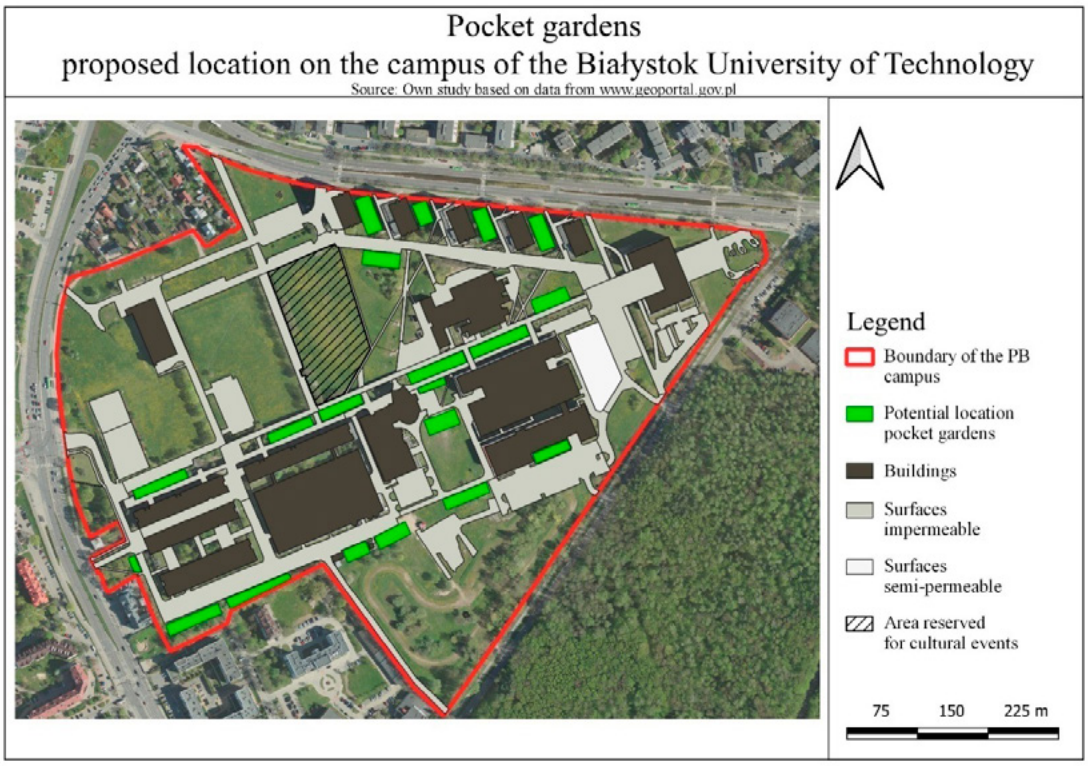


Figure 4. Pocket gardens – proposed location on the Bialystok University of Technology campus
Source: author's own work based on Geoportal (2024).

The proposed location of pocket gardens on the campus of the Bialystok University of Technology also serves a teaching function. Practical classes, e.g. establishing and caring for greenery, as well as didactic classes of other disciplines in the open air can be carried out on their premises. In addition, such space can also be used for didactics and the exchange of experience with the city community.

Discussion

It is difficult to agree that Żabicki's opinion (2016) on the uncoordinated process of campus building applies to Bialystok University of Technology, where successive campus landscaping projects have been repeatedly developed and adapted, taking into account changing conditions and needs (Politechnika Białostocka, 2023a). Conducting the survey, to which this article is devoted, is also a stage aimed at coordinated efforts to consciously introduce pocket gardens into the campus green system.

The respondents' answers obtained are in line with the experience of functional programs for Krakow pocket gardens presented by Bajwoluk and Langer (2022). In addition, location proposals for the PB campus analogous to those in Krakow confirm the beneficial impact of pocket gardens both on the local scale of the campus itself, as well as the supralocal scale of incorporating campus greenery into the surrounding neighbourhood of parks and residential areas (Dai & Wang, 2022), and thus the integration of the academic and urban communities.

Analysing campuses as a specific form of public space, it can be assumed that the same design principles apply to them as to urban spaces. The functionalities of pocket gardens expected by PB students, i.e., to be used as places for meetings, recreation and relaxation, and social interaction, correspond to the results of studies conducted by Xu et al. (2018), Czembrowski (2016), Elmaghraby (2019), Sroka and Musial (2016).

The garden area offers its users a harmonious combination of learning and relaxation, creating a green space that promotes activity and relaxation and improves the microclimate of the urban environment. The didactic value of gardens emphasised by Salih et al. (2021) or Geyter described as even

DOI: 10.34659/eis.2024.88.1.740

a space for experimentation (Sikorski et al., 2020) did not resonate among respondents' answers. In their statements, students pointed out that pocket gardens could also be a place for personal coworking or street workouts. The compiled summary of functionalities proposed for the development of pocket gardens on campus is presented in Table 2. Note that it does not exhaust all possible development elements, which should be determined individually for each garden. The compiled summary can serve as preliminary guidelines for the functional program of pocket gardens on the university campus.

Table 2. Guidelines for the design of pocket gardens obtained from the results of surveys of the PB academic community and the literature on the subject

Type of element	Findings from surveys	Subject literature
Location near faculty buildings	yes	
Small infrastructure elements (benches, table, swings) for recreation	yes	yes
Roofed elements of small architecture	yes	yes
Smoking areas	yes	
Drinking water access points	yes	
Device charging stations	yes	
Wi-fi access	yes	
Coworking spaces	yes	
Street workout	yes	
Gastronomy	yes	
Didactic elements		yes
Additional vegetation, botanical garden	yes	yes
Water retention		yes
Water reservoir		yes
Inclusion in the structure of the city		yes
Inclusion in the process of establishing the garden – participation, prototyping, research		yes

At the same time, it is worth noting that the results obtained regarding PB students' evaluations are analogous to Sobol and Skubala's (2022) conclusions regarding the evaluation of urban forests by young people (students) in the Silesian Voivodeship. Greenery resources are underestimated. In the Bialystok reality, they are noted as in need of care and better management. However, the bulk of attention is focused on green spaces adjacent to the university buildings in the immediate vicinity.

When formulating the questions, the authors of the survey sought new possibilities for locating greenery on campus, such as parklets set aside from transportation spaces. The results of the survey confirmed the significant importance of the issue of parking spaces on campus. A significant percentage of students who oppose the conversion of parking spaces into green/recreation areas was observed. At the same time, the result confronted with the result of the question on the desire to spend break time outdoors (88.1% yes) in the immediate vicinity of the building (73.3% yes) and the evaluation of the current insufficient development of green areas (89.1% yes), indicates declarative research on ecological behaviour as Matel and Poskrobko (2019) wrote about it.

DOI: 10.34659/eis.2024.88.1.740

Conclusions

In general, the results of the study indicate the need for better management of the green areas of the PB campus, which is in line with the initiatives of numerous universities around the world, stemming from the 2030 Agenda, sustainable development, concern for the environment and the well-being of members of the academic community.

The detailed conclusions of the work concern the preliminary guidelines for the functional program of pocket gardens on the university campus, which should consider and include the following conditions and elements: location near faculty buildings, small infrastructure elements (benches, tables, swings) for recreation, roofed elements of small architecture, smoking areas, drinking water access points, device charging stations, wi-fi access, coworking spaces, street workout, gastronomy, didactic elements, additional vegetation, botanical garden, water retention, water reservoir, inclusion in the structure of the city, inclusion in the process of establishing the garden – participation, prototyping, research.

Such a stated attitude of students requires further education on sustainability, especially in the context of limited campus space, future investment plans of the university, or concern for the well-being of all members of the academic community.

An extension of this theme should be the university's cooperation with the city to expand public transportation offerings with the academic community in mind, especially in the context of Bialystok being the largest academic city (Bialystok Development Strategy) in the northeastern region of Poland.

The research results have already been and will continue to be used in the process of developing the PB campus area, arranging greenery, including establishing pocket gardens with functional programs and locations that suit the academic community and, at the same time, improving the quality of the campus environment. The results of the survey can be used by other universities in Białystok and other academic centres to build a favourable environment on their campuses.

Acknowledgements

This work was supported by the Bialystok University of Technology and financed by the Ministry of Science and Higher Education of the Republic of Poland (grant number WZ/WB-IIL/2/2023).

The contribution of the authors

Conceptualization, D.G., I.B. and M.G.; literature review, D.G., I.B. and M.G.; methodology, D.G.; writing, D.G., I.B. and M.G.; formal analysis, I.B. and M.G.; conclusions and discussion, D.G.

The authors have read and agreed to the published version of the manuscript.

References

Bajwoluk, T., & Langer, P. (2022). Impact of the "Krakow East–Bochnia" Road Transport Corridor on the Form of the Functio-Spatial Structure and Its Economic Activity. Sustainability, 14(14), 8281. https://doi.org/10.3390/su14148281

Balai Kerishnan, P., & Maruthaveeran, S. (2021). Factors contributing to the usage of pocket parks – A review of the evidence. Urban Forestry & Urban Greening, 58, 126985. https://doi.org/10.1016/j.ufug.2021.126985

Biernacka, M. (2020). Przegląd i ocena wybranych wskaźników dostępności i atrakcyjności miejskich terenów zieleni. Acta Universitatis Lodziensis. Folia Oeconomica, 2(347). ISSN 0208-6018 e-ISSN 2353-7663. http://dx.doi.org/10.18778/0208-6018.347.04

Blake, A. (2021). Pocket Parks. depts.washington.edu/open2100/pdf/2_OpenSpaceTypes/Open_Space_Types/pocket_parks.pdf.

Czembrowski, P. (2016). The Economic Valuation of Urban Green Spaces as a Voice in the Debate Over Their Role in Sustainable Cities. Economic and Environmental Studies, 16(3), 365-375.

Dai, W., & Wang, Z. (2022). Research on the Application of Computerized Parametric Design in the Site Selection Analysis of Pocket Park Design. *Proceedings of the 2022 2nd International Conference on Computer Technology and Media Convergence Design,* Dali, China, 320-326. https://doi.org/10.2991/978-94-6463-046-6_38

De Geyter, X., Gheysen, M., De Boeck, L., Suzuki, Y., & Aureli, P. V. (2002). AFTER-SPRAWL: research for the contemporary city. NAI publishers & deSingel; Rotterdam & Antwerpen. ISSN: 90-5662-265-x.

Dong, J., Guo, R., Guo, F., Guo, X., & Zhang, Z. (2023). Pocket parks – a systematic literature review. Environmental Research Letters, 18(8), 083003. https://doi.org/10.1088/1748-9326/ace7e2

Elmaghraby, M. A. (2019). Urban Pocket Parks Promoting Quality of Life and Mitigating UHI Impacts – A Case Study of "Al Zawya Al Hamra" District. Journal of Urban Research, 34(1), 56-77.

Geoportal. (2024). *Geoportal.* www.geoportal.gov.pl (in Polish).

Hou, J., Wang, Y., Zhou, D., & Gao, Z. (2022). Environmental Effects from Pocket Park Design According to District Planning Patterns – Cases from Xi'an, China. Atmosphere, 13(2), 300. https://doi.org/10.3390/atmos13020300

Hussein, H., KhaiJhung, L., & Zhang, H. (2022). Green Pause in a City: Design elements of a pocket park in Kuala Lumpur. Environment-Behaviour Proceedings Journal, 7(19), 191-200. https://doi.org/10.21834/ebpj.v7i19.3206

Ikin, K., Beaty, R. M., Lindenmayer, D. B., Knight, E., Fischer, J., & Manning, A. D. (2013). Pocket parks in a compact city: How do birds respond to increasing residential density? Landscape Ecology, 28, 45-56. https://doi.org/10.1007/s10980-012-9811-7

Jarocka, K., Kraśnicki, P., & Skoczko, K. (2021). Białystok jako zielone ekocity. INNOVATIONS – SUSTAINABILITY – MODERNITY – OPENNESS. Środowisko. Seria monografii: Tom 42. Białystok: Oficyna Wydawnicza Politechniki Białostockiej. https://doi.org/10.24427/978-83-66391-75-8

Kerishnan, P. B., & Maruthaveeran, S. (2021). Factors contributing to the usage of pocket parks – A review of the evidence. Urban Forestry & Urban Greening, 58, 126985. https://doi.org/10.1016/j.ufug.2021.126985

Krzysztofik, S., & Galoch, A. (2022). Pocket parks in Łódź as an element of improving urban resilience in the city centre. Builder, 303(10), 52-55. https://doi.org/10.5604/01.3001.0015.9892

Labuz, R. (2019). Pocket Park – a new type of green public space in Kraków (Poland). IOP Conf. Series: Materials Science and Engineering, 471, 112018. https://doi.org/10.1088/1757-899X/471/11/112018

Lorens, P., & Martyniuk-Pęczek, J. (2010). *Problemy kształtowania przestrzeni publicznych.* Gdańsk: Wydawnictwo Urbanista. (in Polish).

Luks, J. (2001). Focus Hope: A Pocket Park Study, Detroit, MI. Inquiry: The University of Arkansas Undergraduate Research Journal, 2, 96-102.

Matel, A., & Poskrobko, T. (2019). Could survey technique or other research conditions "change" our ecological behaviour? – Testing response bias in consumer research. Economics and Environment, 71(4), 16. https://ekonomiaisrodowisko.pl/journal/article/view/55

Nowaczyk, M. (2017). Katalog metod i form humanizacji przestrzeni miejskich. Zeszyty Naukowe Uczelni Vistula, 57(6), 42-55. (in Polish).

Park, B. J., Tsunetsugu, Y., Kasetani, T., Kagawa, T., & Miyazaki, Y. (2010). The physiological effects of Shinrin-yoku (taking in the forest atmosphere or forest bathing): Evidence from field experiments in 24 forests across Japan. Environmental Health and Preventive Medicine, 15(1), 18-26. https://doi.org/10.1007/s12199-009-0086-9

Perkowska-Klejman, A. (2019). *Poszukiwanie refleksyjności w edukacji. Studium teoretyczno-empiryczne.* Warszawa: Wydawnictwo Akademii Pedagogiki Specjalnej. (in Polish).

Peschardt, K. K. (2014). *Health Promoting Pocket Parks in a Landscape Architectural Perspective* [Doctoral dissertation]. University of Copenhagen.

Pistelok, P. (2022). Wybrane aspekty dyskusji na temat istotności zieleni w mieście. Problemy Rozwoju Miast, 73(09), 1-12. (in Polish).

Politechnika Białostocka (2023a). *Moja Zielona Politechnika.* https://pb.edu.pl/moja-zielona-politechnika/ (in Polish).

Politechnika Białostocka. (2023b). *Politechnika Białostocka czwartą uczelnią w Polsce w rankingu UI GreenMetric.* https://pb.edu.pl/2023/12/07/politechnika-bialostocka-czwarta-uczelnia-w-polsce-w-rankingu-ui-greenmetric/ (in Polish).

Politechnika Białostocka. (2023c). *Politechnika Białostocka w rankingu QS World University Sustainability 2024*. https://pb.edu.pl/2023/12/27/politechnika-bialostocka-w-rankingu-qs-world-university-sustainability-2024/ (in Polish).

Politechnika Białostocka. (2024). *Miasteczko akademickie – plan przestrzenny.* https://pb.edu.pl/uczelnia/mapa-kampusu/miasteczko-akademickie-plan-przestrzenny/ (in Polish).

Praveena, B. K., Streetheran, M. (2021). Factors contributing to the usage of pocket parks – A review of the evidence. Urban Forestry & Urban Greening, 58, 126985. https://doi.org/10.1016/j.ufug.2021.126985.

Salih, S. A., Ismail, S., & Ismail, N. A. (2021). On-campus Rocket Parks for Enhancing Outdoor Learning Experience in Malaysian Universities. International Journal of Academic Research in Business and Social Sciences, 11(10), 831-846. http://dx.doi.org/10.6007/IJARBSS/v11-i10/11453

Salih, S., Ismail, S., Ismail, N. A., Ujang, N., & Asif, N. (2022). Factors Influencing Social-Learning Experience in Nearby Pocket Parks on Campus Ground. Research Square, 1-17. https://doi.org/10.21203/rs.3.rs-1194205/v1.

Sikorski, M., Jackowski, S., & Matysiak, K. (2020). *Przestrzenie uniwersytetu. Trendy. Wizje. Standardy projektowania.* Warszawa: Wydawnictwo Uniwersytetu Warszawskiego. (in Polish).

Sobol, A., & Skubała, P. (2022). Students' perceptions and their derived satisfaction of urban forests in the most industrialised region of Poland. Economics and Environment, 77(2), 126-143. https://doi.org/10.34659/2021/2/16

Sołtysik, A. (2023). Krajobraz wielu zmysłów na przykładzie parków kieszonkowych w Krakowie. Rozwój Regionalny i Polityka Regionalna, 15(64), 135-150. https://doi.org/10.14746/rrpr.2023.64.09 (in Polish).

Sroka, W., & Musiał, W. (2016). Rolnictwo i gospodarstwa rolne na obszarach miejskich i podmiejskich – konceptualizacja oraz przesłanki rozwoju. Folia Pomeranae Universitatis Technologiae Stetinensis. Oeconomica, 84, 123-134. (in Polish).

Stańczyk, A. (2022). *Betonoza – co oznacza pojęcie betonoza?* https://szybkagotowka.pl/Finanse/betonoza/ (in Polish).

Szymańska, P. (2021). *Są tworzone na potęgę i opanowują coraz więcej miast w Polsce! Czym są parki kieszonkowe?* https://natemat.pl/380199,park-kieszonkowy-co-to-jest (in Polish).

Trojanowska, M. (2018). *Eko osiedla: Kształtowanie zrównoważonych osiedli miejskich na przykładzie doświadczeń francuskich.* Bydgoszcz: Wydawnictwo Uczelniane Uniwersytetu Technologiczno-Przyrodniczego. (in Polish).

Trojanowska, M. (2023). *Projektowanie zielonych przestrzeni publicznych.* Warszawa: Wydawnictwo Naukowe PWN. https://doi.org/10.53271/2023.066 (in Polish).

Ulrich, R. S. (2008). Biophilic theory and research for healthcare design. In S.R. Kellert, J.H. Heerwagen & M.L. Mador (Eds.), *Biophilic design: The theory, science, and practice of bringing buildings to life* (pp. 87-106). Hoboken: John Wiley.

Urząd Miejski w Białymstoku. (2023). *Raport o stanie miasta Białegostoku za 2022 rok.* https://www.bialystok.pl/pl/dla_mieszkancow/rozwoj_miasta/raport-o-stanie-miasta.html (in Polish).

Xu, C., Haase, D., & Pauleit, S. (2018). The impact of different urban dynamics on green space availability: A multiple scenario modeling approach for the region of Munich, Germany. Ecological Indicators, 93, 1-12. https://doi.org/10.1016/j.ecolind.2018.04.058

Żabicki, P. (2016). Urbanistyka i architektura szkolnictwa wyższego w Polsce w kontekście idei zrównoważonego rozwoju. In K. Pobłocki & B. Świątkowska (Eds.), *Architektura Niezrównoważona* (pp. 134-153). Warszawa: Fundacja Bęc Zmiana. (in Polish).

Zachariasz, A. (2008). Ogród publiczny w centrum miasta – przemiany funkcji i formy. Czasopismo Techniczne Architektura, 105(4-A), 296-304. (in Polish).

Dorota GAWRYLUK • Izabela BIAŁA • Magda GAWRYCHOWSKA

KONCEPCJA OGRODÓW KIESZONKOWYCH NA KAMPUSIE POLITECHNIKI BIAŁOSTOCKIEJ JAKO REZULTAT ANKIETY SPOŁECZNOŚCI AKADEMICKIEJ

STRESZCZENIE: Tereny zieleni kampusów uczelni są istotnym ich zasobem, pełniącym różnorodne funkcje ważne dla funkcjonowania uczelni, dobrostanu społeczności akademickiej, środowiska naturalnego oraz systemu zieleni miasta. Celem pracy było ustalenie preferencji społeczności akademickiej ze szczególnym uwzględnieniem studentów, co do funkcjonalności jakie współcześnie powinny spełniać tereny zieleni kampusu. W ramach metodologii pracy badawczej zastosowano metodę sondażu diagnostycznego, z techniką ankietowania narzędziem kwestionariusza ankietowego. Analiza wyników ankiety przeprowadzonej wśród studentów Politechniki Białostockiej (Białystok, Polska) pozwoliła ustalić potrzeby i oczekiwania dotyczące zagospodarowania terenów zieleni kampusu. Koncepcja ogrodów kieszonkowych mieści w sobie odpowiedzi i rozwiązania na oczekiwania studentów. Analiza opinii społeczności studenckiej posłużyła realizacji zadań strategii „Moja Zielona Politechnika" prowadzonej na kampusie Politechniki Białostockiej. Wyniki przeprowadzonych badań oraz doświadczenia z ich wprowadzania mogą być przydatne różnym instytucjom w podejmowaniu decyzji dotyczących zagospodarowania zieleni.

SŁOWA KLUCZOWE: ogród kieszonkowy, kampus uczelni, zrównoważony rozwój, przestrzenie zieleni, badania społeczne

DOI: 10.34659/eis.2024.88.1.740