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TECHNICAL AND TECHNOLOGICAL FACTORS AND SOCIAL INTERACTION AS A PRIORITY IN SHAPING MODERN UNIVERSITY FACILITIES

CZYNNIKI TECHNICZNE I TECHNOLOGICZNE ORAZ INTERAKCJA SPOŁECZNA JAKO PRIORYTETY W KSZTAŁTOWANIU WSPÓŁCZESNYCH OBIEKTÓW UNIWERSYTECKICH

Abstract

Present day universities are modern buildings accommodating new functions, facilitating social interactions, supporting learning by means of informal contacts and promoting interdisciplinary cooperation, etc. Among other issues, the fundamental aspect of modern university facilities is the interface between theoretical knowledge and practice. The author has made an attempt at defining the nature of a modern university. What are the technical and technological solutions that enable the creation of a contemporary work environment? How should university facilities be formed and organized in terms of the functions that encourage the transfer of knowledge? The discussed issues are based on the author's own research and on the studied examples of the most modern Polish university facilities.

Keywords: university facilities, work environment, social spaces, technological aspects

Streszczenie

Współczesne uniwersytety, to nowoczesne obiekty, w których znajdują się nowe funkcje umożliwiające interakcje społeczne, sprzyjające m.in. edukacji poprzez kontakty nieformalne i współpracy interdyscyplinarnej itp. Istotą współczesnych uniwersytetów jest między innymi łączenie wiedzy teoretycznej z praktyką. Niniejszy artykuł jest próbą zdefiniowania, czym jest współczesny uniwersytet. Jakie obecne rozwiązania techniczne i technologiczne budynków umożliwiają kształtowanie nowoczesnych środowisk pracy? Jak powinny być kształtowane obiekty uniwersyteckie pod względem funkcjonalnym, aby sprzyjać przekazywaniu wiedzy? Materiał oparty jest na badaniach własnych oraz poznanych przykładach najnowszych polskich obiektów uniwersyteckich.

Słowa kluczowe: obiekty uniwersyteckie, środowisko pracy, przestrzenie społeczne, aspekty technologiczne

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1. Introduction

For several years Poland has witnessed a dynamic development of the infrastructure of tertiary education. The changes were initiated at the end of the 20th century when Polish universities underwent complex renovation schemes, followed by introducing new functions into their facilities. The factors that spurred the transformations comprise: legislator changes in the sector of Science and Higher Education, adoption of new curricula (the Bologna process) [1, 2], changes in the organizational structure, quantity of staff and students, and finally, in the manner of the educational process, the complexity of teaching activities, cooperation with external partners, new objectives and tasks set for tertiary education (continuous learning), technical and technological advancement, including IT, IBS and BMS implementation.

2. A modern university. Changes in higher education and their impact on the new quality of university facilities

There have been significant changes in the Polish education system following the reforms of science and tertiary education [1], changes in curricula in compliance with the Bologna process [3] and restructuring of universities. The teaching staff are presently faced with higher requirements concerning the quality of their professional output. Thus, moving goalposts enforces the improvement of the work mode, cooperation with external partners, interdisciplinary research and consequently, intra-faculty and broader external collaboration. The dynamic advancement of information technology has significantly influenced the research and teaching methods, introducing new manners of learning and offering new supporting tools. Present-day scientific activity requires interdisciplinary research and teaching has become more practical than theoretical, enforcing new relations and interactions occurring in the space of university facilities and adopting a fresh approach towards shaping their space. Communication, cooperation, joint undertakings and initiatives have changed their character and the process of knowledge acquisition is not only taking place in lecture rooms and classes, but everywhere.

In accordance with the principles adopted by the Member States, the manners of teaching and learning have changed, resulting in the demand for new quality of space and infrastructure of university facilities.

The scope of the paper is limited to these technical, technological and functional elements of university facilities that have a direct impact on the quality of the work environment. The main users of the facilities are students and academic staff and accordingly, these two target groups are considered in the author's research.

The needs of the former group is almost intuitively understood; the latter does not always seem so obvious. According to worldwide research, social interaction is very important to the academic environment [4] and social contacts occurring in the university space enhance the level of knowledge and education by exchange of ideas [5, 6]. Hence, the chief role of university buildings is to secure the work conditions in consideration of the following aspects: proper selection of the functional space, comfort of work in view of functionality, comfort of work in view of social relations, standard of technical and technological systems

(IBS) customized to the needs of a given organization, standard of technical equipment, research tools and apparatus, access to the functions of the building that are essential for conducting research works, availability of the equipment and tools for students to support the teaching process, ergonomic solutions in the furnishing of the interiors, proper microclimate of functional zones and rooms¹.

3. Technical and technological factors determining the new quality of work in university facilities

Recently erected university facilities in Poland are examples of providing good quality standards². After numerous modernization schemes of older university buildings, new facilities have been constructed, offering good quality and functional comfort. The author's studies carried out at several new and older university facilities and university space³ indicate that the new facilities enable faster development of the already existing universities by providing additional space and new functions, and highlighting the prestige of a given university. The respondents who are not professionally involved in architecture and other related fields have an intuitive impression that the new buildings are better, more attractive and positively contribute to the image of the university (above 80% of the respondents⁴). Aesthetics and prestige are important in the face of competition among universities however, the crucial aspects seem to be spatial flexibility of the new facilities and availability of equipment, securing better work conditions for several years. These features supported by IT, enable decent work conditions and good results. This does not necessarily mean that old buildings are bad, but their poor flexibility hinders the implementation of changes.

One of the best examples of the university facilities in Silesia studied by the author, is the Faculty of Theology at the University of Silesia (2004)⁵, where innovative functional and spatial solutions of classrooms, offices and multi-functional public space secure good quality of work and social space (Ill. 1, 2). The building is also advanced in terms of intelligent systems. While considering IBS in relation to the comfort of work, the microclimate of particular functional zones should be mentioned. People feel best in constant ambient temperature and when given an option of airing the rooms. The interviews with users of university facilities prove that people feel comfortable in proper temperature and having the possibility of individual temperature reduction by for example, opening or closing the windows. These findings are confirmed by the results of research conducted by Tymkiewicz J. [8, p. 232], who in the course of analyzing the above mentioned facilities of the Faculty of Theology, indicated the problems involved in the impossibility of opening the

¹ Systematized on the bases of the author's research (2007–2012).

² Approximate date based upon the date of commissioning the new buildings of the University of Silesia in Katowice (Faculty of Law and Administration (2003), Faculty of Theology (2004), and Wrocław University of Technology (Integrated Student Centre (2007)).

³ Studies carried out by the author since 2007 described in the publications specified in References.

⁴ The author's studies carried out at the Campus of the University of Silesia in Katowice (2012).

⁵ The author's studies conducted at the Faculty of Theology of University of Silesia in Katowice (2008).

windows by the users themselves and inadequate set-up of the air conditioning parameters. Unfortunately, users are not always offered the option of adjusting the microclimate in modern university buildings.

Another aspect of the microclimate conditions is proper lighting of rooms and workplaces. The lighting conditions depend on the systems installed in the interiors, façade systems adjusted to the functional layout of the building, internal functions and geographical orientation [7, 8]. As far as the results of the author's own studies are concerned, it seems relevant to mention the Integrated Student Centre at Wrocław University of Technology (C-13) (Ill. 3). The building is appealing in view of its functions and applied technological solutions, surrounded by facades that look like old generation computer perforation cards. It has become a token of the student environment and a landmark of the facilities of the University of Wrocław, photogenic in day and at night. The interiors hold modern flexible public spaces that may be used for various purposes and that are crowded by students. However, in the course of the conducted interviews, students complained about the light in the interiors (Ill. 4). Some parts are excessively lighted and due to round windows installed at random, the light does not always fall at the right place. The parts of the building that are too exposed to sunlight are subject to big contrast and condensed dazzle. Other interesting phenomena have also been observed, but their nature is more aesthetic than functional. It may be concluded that facades should be designed to facilitate undisturbed work in the building, both as far as the microclimate (airing, temperature, light, acoustics) and the functionality of use are concerned. The aesthetics of the facades should follow the functional layout of the interiors [8, p. 104].

A similar design has been implemented in the Library of the University of Silesia and University of Economics in Katowice (Ill. 5, 6), but due to obscuring of the walls and windows (openings) by bookshelves, the above mentioned effects do not have such negative impacts as in the case of building C-13. Currently, in view of providing "comfortable" workplaces, the design of "appropriate" facades poses a big challenge.



Ill. 1. Faculty of Theology, University of Silesia in Katowice (2004). Entrance facade (photo D. Winnicka-Jasłowska, 2013)



III. 2. Faculty of Theology, University of Silesia in Katowice (2004). Interior entrance space
(photo D. Winnicka-Jasłowska, 2013)



III. 3. Integrated Student Centre at Wrocław University of Technology (C-13) in Wrocław (2007)
(photo D. Winnicka-Jasłowska, 2013)



III. 4. Integrated Student Centre at Wrocław University of Technology (C-13) in Wrocław (2007).
Student's public zone
(photo D. Winnicka--Jasłowska, 2013)



Ill. 5. Library of the University of Silesia and University of Economics in Katowice (2012)
(photo D. Winnicka-Jasłowska, 2013)



Ill. 6. Library of the University of Silesia and University of Economics in Katowice (2012).
Interior public space
(photo D. Winnicka-Jasłowska, 2013)

4. New types of space and new role of old functions

Recently, traditional lecture rooms are becoming less important than generally accessible spaces, referred to as public or social spaces. Worldwide changes in the approach to university education resulted in new functions of the university space. Spaces of typically academic nature should be adjacent to less obvious and previously marginal functions, such as the cafeteria or sitting rooms. The spaces that were previously used for catering or waiting for lectures and classes are nowadays not functioning as purely academic, but as places for education through informal contacts. Cafeterias and similar outlets are meeting places for students and staff and are becoming more important in the hierarchy of university space than previously. The academic landscape involves a combination of the functions in the building to enable the learning process to take place everywhere and the arrangement of seminar and lecture rooms to support social contacts that promote knowledge acquisition [5].

University halls and corridors are crowded by students who consciously occupy this “students’ space” for gatherings, meetings, resting, waiting for classes, learning, working on-line, etc. Hence, in the design solutions of university facilities, such type of space is intentionally increased and includes the corridors which are not only used for moving around,

but also for gathering before lecture rooms. The buildings of Integrated Student Centre in Wrocław and the Academy of Music in Katowice, are examples of such functions of space. The latter building has been modernized and extended to provide public space in the form of an atrium which is a central place connecting the “old” building with the “new” extension⁶.

Each university building should have integration and social space, where as far as the space of the student campus is concerned, this function may be served by a university library as for example, the new Library of the University of Silesia and the University of Economics in Katowice opened up in 2012. The Library integrates the student environment with university teaching and research staff. From the point of view of the users of other faculty buildings, it is well located. It has a modern public space in the form of an entrance hall connected with a cafeteria and exhibition foyer. The hall is adjacent to two exterior pre-entrance squares designed as a meeting and resting place for the academic environment.

5. University offices and didactic rooms. Demand for creating efficient workplace for the teaching and research staff and students

The approach to university office design has also changed, but it is difficult to give a precise time and direction to this change. Surely, this process is determined by many economic, cultural and social aspects. For dozens of years, the offices of research and teaching staff functioned in accordance with the same previously adopted pattern, where their main focus was on individual work and limited contacts with colleagues and students. In contrast, a modern office of a research and teaching worker has a new form, due to the awareness of the specific needs and nature of teacher’s and researcher’s work. These days the office of academic staff has different functions and should meet the following demands: ease research work, reflect the rank of the university institution, provide the staff with a sense of allegiance by the comfort and layout of the interiors, enable contact with other team members. According to the findings of the studies on the academic staff value, the following aspects of their working environment were noted: opportunities for formal and informal communication, privacy of work that requires concentration, acoustic insulation securing the confidentiality of conversation, visual privacy, high quality of the work environment, proper heating and ventilation, high aesthetic appeal, modern interior arrangement, comfortable furniture, place for relaxing and resting away from the office desk with possibility of contact with colleagues, convenient place for storing materials within reach of the work stand, availability of individual space for projecting research and teaching materials [11]. The current design trend in Western Europe and the USA are combined offices, i.e., joining smaller rooms, for one or two staff members for individual work, with bigger rooms for team work and contact with co-workers. In Poland, the prevailing model is still a corridor office, which does not provide sufficient space for team work and informal contacts. This problem is encountered even in new facilities. An interesting solution is to join offices with an internal corridor and provide direct access to seminar rooms (Faculty of Theology, University of Silesia).

⁶ The building of the Academy of Music In Katowice has been broadly described by the author [10, p. 251].

Modern lecture rooms, classrooms and seminar rooms have a certain flexibility of arrangement. On the bases of a common module, rooms are designed to enable free space arrangement in view of new manners of teaching. The old model has been subjected to alterations depending first and foremost, on the following factors: type of university and study discipline, methods of working with students devised and proved by a given university or faculty, student-professor relations, use of practical methods of knowledge transfer (classes in laboratories, technological halls, collaboration with external partners). The above factors have an impact on the arrangement of rooms, their size, furnishing and location in the building. In the phase of architectural programming, it is essential to analyze the options of connecting functional zones. The relations among the zones depend on the planned use of the building (rent of its parts, organization of conferences and exhibitions, etc.) and possible development extension phases. Furthermore, they should be legible to each user, which is one of the elements of the way finding strategy, easily locating the destination and information. The best solutions for the comfort of use, visual information, ease of understanding the spatial layout and moving around the building are proposed.

6. Conclusions

Dynamic advancement of Information Technologies has an impact on education and forms of teaching instruction. Traditional lecture rooms and class rooms do not suffice. Working on the internet with access to thousands of servers, changes the image of the modern university. Also, cooperation between various fields of science and growing awareness of the demand for interdisciplinary research have caused the evolution of research work places, which change their shape and profile.

The processes connected with education and research work have become more complex. The advancement of engineering and information technologies has influenced the modes of teaching and learning and modernized the supporting and aiding tools. Nowadays, science is interdisciplinary, which results in new relations and interactions in the space of buildings. The process of knowledge acquisition can take place anywhere. Modern buildings should be designed to enhance the development of science and consequently, improve the level of education and research.

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