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QUALITY EVALUATION OF THE BUILT ENVIRONMENT IN VIEW OF E-LEARNING REQUIREMENT

Dariusz MASŁY

Faculty of Architecture, The Silesian University of Technology, Akademicka 7, 44-100 Gliwice, Poland
E-mail address: dariusz.masly@polsl.pl

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Abstract

Current status of e-learning is discussed in the paper, together with the reasons for abandoning the traditional functional model of tertiary schools, advantages of e-learning, as well as threats and challenges involved in this concept. An attempt was made at indicating the possibility of utilizing the methodology of quality analyses in architecture to connect the concept of "distance learning" with the physical built environment.

The system of tertiary education is facing the challenge of accommodating one of the most important needs of our modern knowledge-oriented society, which is continuous learning and development. Hence, e-learning should become a part of the educational offer, as it constitutes a contemporary, interactive process of the transfer of knowledge based on information, electronic and communication technologies.

The assessment of the quality of the built environment is a key element in determining the right proportions in the functional model of tertiary schools in the nearest future. On the one hand, the methodology of quality analyses makes it possible to describe the changes in the structure and organization of tertiary schools, newly emerging needs and requirements on the part of both students and teachers. On the other hand, the methodology serves as a tool for systematizing the knowledge of organizational, behavioral, functional, technical or even economic relations and for converting such knowledge to design guidelines useful in architectural practice.

Streszczenie

W opracowaniu zostały przedstawione informacje na temat stanu wiedzy w zakresie zdalnego nauczania. Odpowiedziano na pytanie, czym jest zdalne nauczanie w chwili obecnej, przybliżono przyczyny odchodzenia od tradycyjnego modelu funkcjonowania szkół wyższych, korzyści płynące z wprowadzenia *e-learning'u* oraz zagrożenia i wyzwania z nim związane. Podjęto również próbę wskazania możliwości wykorzystania metodologii badań jakościowych w architekturze jako sposobu powiązania idei „zdalnego nauczania" z fizycznym środowiskiem zbudowanym.

System edukacji na poziomie akademickim powinien odpowiedzieć na jedną z podstawowych potrzeb współczesnego społeczeństwa opartego na wiedzy, konieczność nieustannego dokształcania się. Wprowadzenie zdalnego nauczania do oferty edukacyjnej szkół wyższych jest próbą sprostania temu wyzwaniu. *E-learning* jest nowoczesnym i interaktywnym procesem przekazywania wiedzy z wykorzystaniem technologii informatycznych, elektronicznych i komunikacyjnych.

Kluczem do okreœlenia prawidłowych proporcji w sposobie funkcjonowania przyszłych szkół wyższych jest ocena jakości środowiska zbudowanego. Z jednej strony metodologia badań jakościowych pozwala określić zmiany zachodzące w strukturze i sposobie organizacji szkół wyższych, nowe potrzeby i wymagania nauczycieli akademickich oraz studentów. Z drugiej strony metodologia ta jest sposobem usystematyzowania wiedzy o występujących zależnościach organizacyjnych, behawioralnych, funkcjonalnych, technicznych a nawet ekonomicznych oraz przełożenia tej wiedzy na wytyczne projektowe dla praktyki architektonicznej.

Keywords: **Quality analyses; POE; Distance learning; E-learning; Tertiary schools.**

1. INTRODUCTION

The way we live, work and learn is subject of continuous change. Social, cultural and technological transformations occurring with astonishing regularity at the turn of the 20th/21st century have marked unprecedented changes in the history of mankind. According to Wheeler [1] this also concerns tertiary schools, as their traditional modes of functioning can-

not survive faced with alternative educational methods that are increasing in popularity, in line with global developmental directions. Tertiary education systems should comply with the needs of modern IT society, should be updated and upgraded in consistence with technological innovations. Wheeler described seven basic causes that have spurred the abandonment of the traditional functional model of tertiary education [1]:

– development of learning aided by modern information, electronic and communication technologies (ICT);
– unfavorable economic conditions for traditional tertiary schools;
– increasing competition;
– increased need of flexibility;
– demand for diverse and specialized knowledge and comprehensive offer of university curricula;
– attrition of research and teaching staff at universities;
– globalization.

Unfavorable economic conditions for tertiary schools – state subsidies are gradually reduced, the market share of private schools that charge fees is increasing, the demographic process indicates to decreasing natural growth, and, consequently, increased percentage of old people in populations. The societies of the developed world are getting older. In face of these facts it may be assumed that the demand for education will decrease year by year, whereas the expectations of potential students will be greater. Only high-quality, attractive, rich in substance, technologically advanced and flexible educational offers have chances of succeeding.

Increasing competition – so far the majority of tertiary schools functioned on regional, or a little wider national level. Only few, renowned universities operated on the international or global level. Such limitations were an outcome of very big costs of studying abroad. However, thanks to modern ICT even the best universities have nowadays opened up to global societies. The constraints of accommodation or time zones have disappeared. In consequence, the best institutes acquire new students and financial means thanks to which they can develop further, make their offer even more attractive, expand their technological infrastructure by creating international networks of subsidiaries and partnership universities. Recently a new trend of founding mega-universities has been observed [1], the most recognized one of which is the British Open University. Less renowned regional universities, faced with new challenges may still keep up with the market leaders by offering alternative, more open and flexible forms of learning.

Increased need of flexibility – one of the most basic qualities of an open society, which is a model for all developed countries, is the need of continuous self-development. Accordingly, a new powerful target audience has emerged for tertiary schools – people who are professionally active and interested in flexible learning forms, as well as in flexible modular programs enabling the division or spread of study courses in time.

Demand for diverse and specialized knowledge and comprehensive offer of university curricula – attempts at matching the educational offer of traditionally functioning universities to the market demand have in many cases only increased difficulties, as universities are unable to secure the required number of specialists who could teach some specific courses, and sometimes the number of students interested in a particular course is too small to make an economically feasible decision of running it.

Attrition of research and teaching staff – academic teachers, instead of being employed on permanent contracts, are predominantly offered fixed-task agreements for definite periods of time that do not guarantee financial stability, and, in the long-run, poor or no prospects of further professional development and quality improvement. The best staff members "run away" to more lucrative sectors, such as commercial services, consultancies or industrial enterprises.

The introduction of distance to the educational offer of tertiary schools is an attempt at defending their position against inevitable changes and their response to the demand generated by the information technology society. It is also a transitory stage on the way to the creation of a virtual university, where the learning process shall not be limited by the constraints of time and space. Wheeler [1] enumerates five key strategies that will make it possible for traditionally functioning universities not only to survive, but also to prosper and develop:

– cooperation,
– consistent investments in new technologies,
– development of human resources infrastructure,
– wide access to the educational offer and search for new niche markets,
– specialization.

Cooperation – close cooperation among tertiary schools shall provide adequate variety of curricula, research potential and intellectual capital in the form of available human resources.

Consistent investments in the new technologies – technology is the carrier of knowledge, the foundation securing the connection between teachers and learners.

Development of human resources infrastructure – the development of human resources, apart from traditional fields of science and engineering should also include trainings in modern ICT equipment, multimedia techniques of presentations and internet discussions and distance teaching methodologies.

2. WHAT DOES E-LEARNING STAND FOR?

Electronic learning, the term derived from English, is a modern and interactive process of the exchange of knowledge by means of information, electronic and communication technologies. It enables effective instruction administered to large number of people, also in the distance mode, while securing high-quality teaching standards.

Wheeler [2] suggests that the letter "e" that is the first component of the term embodies four essential qualities of the concept of e-learning:

– electronic,
– extended,
– enhanced,
– everywhere.

2.1. Electronic learning

The media were once described as the way of introducing the whole world to the classroom. Nowadays this idea must be revised – the multimedia have a potential of moving the classroom to any place in the world [2].

Information technologies and communication technologies are basic catalysts in a process of revolutionizing tertiary education. Distance teaching and learning have become possible thanks to wide availability of PCs, computer networks (the internet), cellular technologies and satellite communication. E-learning takes advantage of all these available media and technologies, relying, among others, on:

– data transfer and access systems – Internet, intranets, extranets;
– satellite communications;
– information carriers – magnetic tapes, audio-video, CDs, DVDs, BlueRay, Flash memory cards;
– interactive television;
– computer communication in the form of e-mails, discussion forums, audio and video conferencing.

It should be emphasized that nowadays it is the Internet that constitutes a key component of e-learning. The most popular methods of knowledge transfer by means of the Internet [3] include:

– **Asynchronous method** – the contact between the teacher and the student is executed by exchange of messages, mainly text messages, sent at any time, by e-mail, communicators, discussion forums. Discussion forums also make it possible to hold conferences devoted to a particular subject, such conference is spread in time and the participation is voluntary.

– **Synchronous method** – the contact is "live" by means of audio and video conferences. The participants are seated at their terminals at the same time.

The most technologically advanced form of e-learning is MLE – Managed Learning Environment [2].

While not diminishing the "electronic" aspect of e-learning, it should be emphasized that even the most sophisticated and state-of-the-art ICTs cannot face all future challenges, however, yet, they can be helpful in formulating the right questions concerning future requirements.

2.2. Extended learning (tele-learning)

As one of the most essential features of e-learning is distant instruction, it should be emphasized that such mode of teaching has been applied in education for over 200 years [4]. As early as in 1883 Cornell University started up correspondence courses. Every technological breakthrough, such as the invention of the radio, television, and, finally, ICT, resulted in the enhancement of distance education and wider access of the public. In the 1920s the materials forwarded under the correspondence courses were extended to include slides and films. In the Interwar Period as many as 202 US schools were granted licenses to conduct teaching in the mode of radio transmissions. However, on the tertiary level, only one field of study by means of radio transmissions was started up, but no volunteers applied. The concept of radio transmission of educational materials was later resumed as a follow-up of the invention of the television; and in the late 20th century a rapid growth of educational television occurred. The increasing popularity of distance education attracted the attention of scientists. The characteristics of distance learning students were

analyzed, their requirements and needs, efficiency of the communication process between the student and the teacher, as well as the effectiveness of the whole process, the outcomes of which were compared with traditional educational methods. One of the first research works devoted to this issue was Gayle Child's (University of Nebraska) study dated 1949 [4]. Other important research achievements in this field were made by Charles Wedemeyer (Wisconsin University). In the 1960s and 1970s many educational programs were formed as alternative options to traditional modes of university courses, but it was the British Open University that introduced a new quality into distance education. Currently, it is the biggest and most innovative institution in the world, renowned for the greatest number of research schemes on distance teaching and learning. Initially, distance studies were labeled as "correspondence courses", in the late 1970s the term "independent study" was coined (it was at that time that video cassettes, programmed instructions, television, telephone communication and other multimedia technologies accessible at that time were introduced into distance studies), finally, in the 1970s and 1980s, thanks to cable and satellite communication, the concept of distance learning really took shape [4].

Distance learning is very popular among the inhabitants of scarcely populated areas (Canada, Australia, the United States) and remote areas to which access is difficult (mountains, marshes, lake districts, etc.).

2.3. Enhanced education

Distance learning makes it possible to acquire knowledge in the way consistent with our culture, life style, preferences and values. Also it increases the availability and universality of education, helping to overcome such constraints as low income, disability (i.e. the blind and sight-defected students are offered special tools converting texts to audio forms and the students' voices to textual forms), distance. More importantly, enhanced education can be classified as self-development education, as permanent components of educational systems and packets include the tools assessing the legibility, attractiveness, quality of teaching methods and materials and teachers appraisals.

Learning everywhere

Distance learning made it possible to eliminate the constraints of space and time. ICT provides satisfactory links with universities almost anywhere in the world. Thanks to asynchronous learning networks students may download successive parts of materials to study at any time, adjusting to their own time schedules due to, for example, working hours, taking care of children or different time zones.

3. ADVANTAGES OF DISTANCE LEARNING

The most important advantages of distance learning include:

- Lowered costs of obtaining education – thanks to distance learning students reduce the costs of accommodation, catering and commuting;
- Increased competition among universities – while choosing a university students pay more attention to its technological infrastructure, variety and flexibility of curricula;
- Optimization of the use of space available in buildings – as students are provided with on-line access, the demand for floor area of lecture and classrooms is diminished;
- Individual nature of the educational process – tailored to students specific needs and capabilities, as students determine the time and place of studying;
- Attractive, interesting, modern form of transferring knowledge – distance learning takes advantage of multimedia techniques, in the forms of images, sounds and interactive simulation programs;
- Unlimited access to knowledge;
- Monitoring of the results and of the training level.

4. THREATS AND CHALLENGES TO DISTANCE LEARNING

Distance learning involves many challenges, requirements and threats. Students must develop certain character qualities and skills to complete the self-learning process successfully, i.e. to obtain the BSc. or MSc. degree. The essential character qualities are: self-discipline, consistence, persistence, curiosity, diligence, time management skills, deep involvement in tasks performed and, last but not least, high motivation. Although distance learning may also lead to isolation and poor motivation, it may also release the student's potential of exploring new opportunities relevant to their life style.

E-learning imposes demanding requirements on authors of educational programs. The shift from traditional forms of instruction towards distance learn-

ing calls for profound re-engineering of university curricula. One of the most essential changes involves a new role of teachers – they are no longer sources of knowledge, but mentors, guides [1]. Some academic teachers perceive distance learning as a Trojan horse that will initiate the process of "McDonaldising" tertiary education, leading to reduced quality and poor homogeneity of teaching methods [2].

While discussing the inconveniencies involved in asynchronous methods of distance learning it should be emphasized that even perfect electronic communication shall not replace "face to face" contact between lecturers and students, in the course of which information is transferred not only in words, texts or vision, but also by means of intonation, mimics and body language.

5. QUALITY ANALYSES AS METHODS OF COMBINING THE CONCEPT OF DISTANCE LEARNING WITH THE PHYSICAL BUILT ENVIRONMENT

The dispute on the role of the "electronic" component in the overall e-learning process in well under way. Some scientists claim that technology is only a carrier, a form of transporting educational materials from lecturers to students, diminishing the role of technology to knowledge transmission only. However, other researchers state that technology exerts an impact on the shape of distance learning and improves it. From such angle, it should be treated as a tool developing awareness, supporting lecturers in creating new, individualized and powerful forms of education [2]. It is a platitude to say that without new technologies distance learning would not have reached the current state of development and that technology undergoes continuous changes. But, these two facts set forth an essential direction for architects to raise intellectual capital required for the design of the built environment suitable to e-learning. The emphasis is put on the environment that accommodates basic activities involved in the process of e-learning, especially with regard to educational institutions.

Some established methods of evaluating the organizational quality [5] are also applicable to the analyses of requirements and needs of the built environment associated with e-learning, for example: *Organizational Workplace Analysis* [6] used for designating the functional strategies of organizations and integrating the physical workplace environment, technologies, management, employee activities and intellectual potential. The described method is one of the outcomes of *The International Workplace Studies Program at Cornell*.

In the course of the organizational quality analyses the following data are collected:

– type of challenges that an organization will have to face in the future and the considered strategies;
– decision-making channels, scopes of employee responsibilities and competencies;
– methods of monitoring and rewarding employee achievements, employee motivation systems;
– types of information required by the employees for the performance of the assigned tasks: where and when such information is essential, how is it made available;
– contacts with other people required by the employees for the performance of the assigned tasks; where, when and how the contact is made;
– distribution of specific activities in space and time: to what extent are they predictable, how long they take, what are the human, technological and operational resources that must be engaged;
– significant differentiation of the occurrence of specific activities in space and time: daily, weekly, seasonally;
– users' emotional attitude to the changes that may result from the quality analyses, forecasted consequences, costs and benefits;
– facilities utilized by the organization: floor area, costs of maintenance, technical condition, quality of the internal environment;
– ICT.

The above data are essential for the compilation of a comprehensive picture of the organization's functions. Next, on the grounds of this information it will be possible to devise design guidelines for the built environment accommodating the activities associated with distance learning.

The following techniques are used in the research:

– Focused interviews with the users;
– Occupancy Surveys;
– Demographic data analysis of employees and customers;
– Focus groups discussions: in the course of which it is checked if the organization's scheduled activities have been correctly interpreted by scientists;
– Inventory of facilities and equipment;
– Walkthrough.

The research tasks are accomplished in the following sequence: introductory meeting, focused interviews, walkthrough, compilation of collected data, preparation of preliminary results, focus groups discussions.

One of the most essential elements of such types of studies is the involvement of the users of the analyzed facilities, as it is only them who can provide a comprehensive picture of the needs and requirements as to the workplace, physical space and technological solutions.

6. CONCLUSIONS

Tertiary education is at the threshold of fundamental changes in respect of teaching methods, management and research. The process of transformations has already been initiated. On the grounds of experience from other fields aided by modern solutions, such as commercial services, manufacturing of advanced products, it may be assumed that those who fail to join the current trends shall be left behind, and the distance between the best and average institutions will continue to increase. First and foremost, the educational process must be adjusted to the needs and requirements of the IT society, which is still in the course of continuous and rapid transformations.

Numerous tokens of the advancement of this process are visible all around us. For the majority of Polish universities, their www pages serve as their business card and advertising medium, providing, in very many cases, the first contact between prospective students and the university that they consider. Step by step, the following Internet services are becoming the acceptable standard:

– presentation of the university campus,
– recruitment,
– giving lectures,
– offering individualized courses of study,
– providing the network access to important events held at universities.

To recap, the author would like to add one more important remark. It is a fact that for many students distance learning has become reality, although virtual [2]. But if we put forward a firm declaration that traditional universities are "dying out" and the future belongs to e-universities, we should reflect on the statement that dates back to 1885, when the fashion for correspondence courses caught on: there will come a day when the quantity of correspondence work shall exceed the work performed in the classrooms of our universities and the correspondence students shall outnumber stationary students [4]. The key to determine the right proportions in the manners of functioning of tertiary schools in the future is the estimation of the quality of their built environment. On the one hand, the methodology of quality analyses makes it possible to comprehend the changes occurring in the structure and functions performed by universities. Accordingly, it will be possible to identify the e-learning processes that have already taken place, as well as to determine new requirements and needs of students and the teaching staff. On the other hand, the methodology provides a way of systematizing the knowledge about organizational, behavioral, social, technical and even economic interrelations and the practical translation of such knowledge to design guidelines. Such guidelines will enable architects to create new facilities, and to adjust or modernize the built environment to secure the most effective conditions for e-learning.

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