

Multi-criterial evaluation in education of environmentally responsible interior design

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ABSTRACT: In this article, the author analyses issues concerning the modification of interior design teaching methodology as being important for the realisation of strategy of sustainability in the design of built environment. Proposals put forward enable students to implement sustainability imperatives into their future professional practice and to understand the importance of a comprehensive approach to contemporary interior design process. The space's high performance has to be accompanied with the reduction of the negative impact on the natural environment, and the optimisation of parameters of interior quality, influencing the well-being of inner space occupants, as well as their satisfaction. The implementation into the interior design teaching model of a set of determinants present in the leading multi-criterial evaluation systems, which would enable the verification of environmental issues concerning the designed interiors in programming, concept and working drawings design phase, is the most innovative and inspiring new approach to contemporary education in this discipline. This would make the students more aware of environmental problems and their significance in their prospective professional practice.

Keywords: Sustainable interior design education, sustainable indoor environment, environmentally responsible interior design, multi-criterial evaluation

INTRODUCTION

The increasing recognition of environmental sustainability issues by researchers, academics and practitioners in the field of interior design [1][2] demands the modification of interior design education programmes and the introduction of innovative teaching methods. These revisions are supposed to make interior design students better understand the issues associated with the complexity of environmentally responsible interior design process, as a concept combining the green and sustainable interior design perspectives [3].

The proposed improvements regarding the interior design education curriculum, are based on the author's own academic experience. They concern teaching models currently being realised in the majority of interior design departments, where the comprehension of environmental sustainability concerns still receives relatively limited attention. The perception of strategies applied to environmentally responsible interior design by students is an indispensable condition of their broad application in professional routines. It may be achieved by constant enquiries formulated by educators and students over sustainability issues, and the inclusion of adequate design teaching methods.

The purpose of this article is to examine possible modifications to existing interior design curricula. They are intended to emphasise the consequences and significance of the reform for the development of knowledgeable design, as well as for: 1) exploration of the inter-disciplinarity of design process; 2) implementation of evidence-based framework into the interior design discipline; and 3) introduction of new design-tools for students' projects assessments, founded on professional quantitative and qualitative validation schemes, including the whole-building certification systems developed and administrated by institutions oriented on the campaign of accomplishment of sustainability paradigm in architectural design.

These proposed programme adjustments should enable students of interior design departments to acquire a more active and analytical approach to the realisation of sustainability strategies through informed interior design.

REVISION OF INTERIOR DESIGN TEACHING MODELS

The suggested modifications, designed to adjust the conventional educational programmes to rising requirements for the higher quality of indoor environment and occupants' comfort, as well as for ecological and energy efficiency issues, combine theoretical and practical knowledge into the guidance on environmentally responsible interior design.

The corrections employed should be focused on the broad implementation of practice-oriented teaching methods into programme curricula, which provide students with experiential learning opportunities.

This postulation may be realised through the introduction of professional instruments and methods into interior design teaching process, as presented in Figure 1. They should include: 1) a series of trans-disciplinary student workshops, organised similarly to the eco-charrettes practiced by professional design teams; 2) developed research- and evidence-based design frameworks; and 3) comprehensive assessments of students' architectural projects, founded on existing consensus-based certification systems, being quantifiable tools allowing evaluation and measurement of the level of building's or inner space's environmental performance [4].

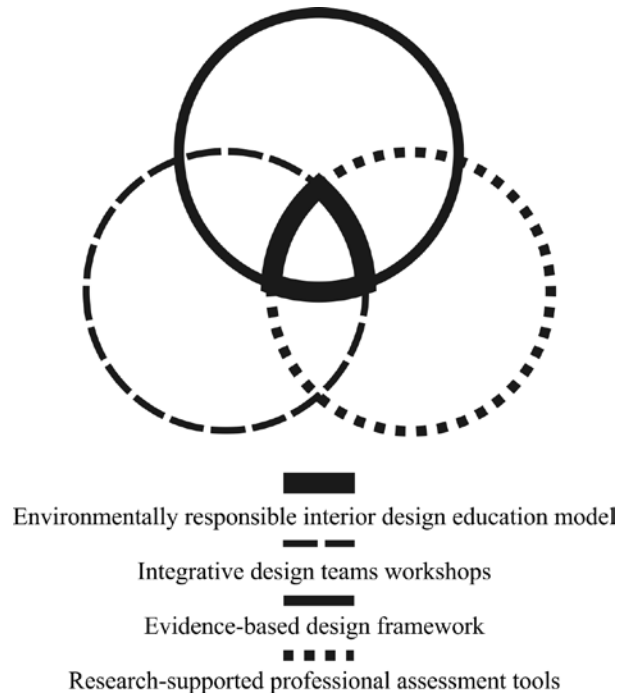


Figure 1: Revised education model of environmentally responsible interior design. Methodology and decision-making process in accomplishment of sustainability paradigm.

The systematic application of a revised methodology in accomplishment of the sustainability paradigm, based on the inclusion into teaching programmes of the three components mentioned above, may result in the effective decision-making process assuring: 1) greater contribution of interior designers into creation of sustainable built environment; 2) recognition of the necessity of knowledgeable analysis of completed architectural objects; 3) comprehensive implementation of sustainability imperatives, with regard to the interconnectedness and interdependence of natural and man-made interior environments; and 4) ability to form predictions of possible effects of mutual interactions.

It seems that the initially effective method of implementation of environmental responsibility into the existing interior design higher education programmes, would be a broad introduction of educational horizontal strategy. This methodology, based on the integration of sustainable design elements implicitly in all competencies and skills that students get [5], would be seen as an attempt toward the establishment of interdisciplinary design approach, with the emphasis being placed on the sustainability issues of every taught discipline, as well as the improvement of green building design techniques being executed by students.

The proposed modification of the teaching programme, combined with the introduction of an interdisciplinary approach into the area of education of interior design, currently being under examination by the author, may be advantageous in terms of integration of different courses provided within the interior design department curriculum.

The comprehensive environmental contextualisation of structural inner space elements [6] (i.e. formally and functionally remodelled external walls, partitions, suspended ceilings, raised floors systems, space dividers and enclosures) constitutes the essential sustainable interior design principle, because these interior elements may be considered to be the integral components of high-performance sustainable design [2].

The significance of this finding for the concept of interior design, conceived in accordance with sustainability, is being presented in the two-semester course named Sustainable Architectural Design, offered by the author to the undergraduate students of the Department of Interior Design at the Academy of Fine Arts in Kraków, Poland. Properly interpreted by the students, and applied in their projects, this attitude regarding the cohesive creation of interior components, may enable the accomplishment of conformity with sustainability imperatives. The same applies to the undergraduate and graduate students working within the modules of Building Construction taught by the author.

INTEGRATED DESIGN TEAMS IN STUDENTS PROJECTS

The demands regarding broader participation of interior designers in the architectural design process and their influence on the building's high performance and optimisation of indoor environment quality require an adjustment to the educational model. This improvement may be accomplished with the involvement of interior design students in the collaborative, environmentally conscious interior design process. In order to fulfil this goal, the educators, including those engaged with interior design teaching, will need to change their own and their students' attitudes, by encouraging them to *...participate in the integrative design process* [7], while working on their projects.

The students may get their experience of partnership in the design process through systematically organised workshops involving students with different specialties. These education formulae, being introductory to the full understanding of the significance of the integrated design process in the creation of sustainable built environment by students, and it may contribute to their *...experience and knowledge to inform project* [2]; and 2) successful execution of sustainable design strategies in the future design practice executed with the emphasis on environmental sustainability.

A broader perspective to the sustainability-focused design studios model may be obtained through the introduction on a large scale of a service-based learning concept, with interior design students working on their projects in inter-disciplinary teams comprising students and practitioners. These joint teams, working on practical projects, instead of hypothetical ones, may include educators, interior design students, and the students of related specialties (e.g. structure, heating, cooling, ventilation, installation).

These groups should be comprised of invited experts and practitioners from different disciplinary backgrounds, including architects, structural engineers, building physics engineers, facility managers, as well as professionals involved in the design process and responsible for the verification of the holistic approach to being green [8], and reviewing students' project documentation; namely, the independent and licensed assessors and accredited consultants on green building.

The series of organised inter-disciplinary student workshops enable the transfer of knowledge between students involved in the design process, since the knowledge necessary for executing eco-designs responsibly belongs to many team partners [9]. Students' eco-charrettes facilitate their recognition of sustainability as an indispensable aspect of design. These teaching tools permit students to participate in interdisciplinary teams as co-educators to each other. The integrative design teams, including professionals, give the students opportunities to address real-world expectations and demands, allowing them to complete their future architectural projects in compliance with environmental concerns.

EVIDENCE-BASED INTERIOR DESIGN FRAMEWORK

It has been indicated by architecture critics and scientific researchers, that there is an urgent

need to make stronger cases for evidence-based design within the sustainability movement [7].

The consequence of the application of evidence-based design methodology into interior design practice, may reduce the potential negative impacts of uninformed design decisions on building performance, endorse indoor environment quality parameters and protect natural ecosystems from the negative results of human interference. It seems to be justified to introduce this informed approach into the environmentally modified interior design education programme [6], as a fundamental attitude.

It is reasonable to incorporate this formula into the interior design teaching process, since

evidence-based design practices can help describe the criteria for sustainability [7].

This postulate should be adopted to interior design education programmes since the post-completion and post-occupation evaluation of students' interior design projects, as is the case in the majority of works completed by students, is not carried out. A significant role should be then assigned, by educators looking for optimal design solutions, to the supplementation of students with the abilities to produce new evidence, obtained as a result of their research and summarised in fact findings [10].

Detailed case-studies, as illustrative materials applied by other practitioners' design solutions and discussed by students at class exercises, present the substantial value of evidence-based interior design teaching methods. The profound analysis of quantitative and qualitative research [10], conducted by professionals in the course of design programming and schematic phases leading to evidence informing final proposals, may stimulate the students to create their own research schemes and sources.

The acquisition of valid and reliable data from distinguished resources by the students, their analysis and formulated findings in the result of evidence-oriented framed education standards, may become a method of enhancement of knowledge, assuring the comprehensive interior design results.

MEASUREMENT TOOLS IN STUDENTS' PROJECTS REVIEW

The holistic approach to the sustainable design process, which is fundamental for the completion of sustainable projects, may be accomplished with the introduction of yet another professional tool to the interior design curriculum. The assessment of students' projects, based on existing whole-building certification systems, applied by developers and practicing designers, may become the valuable validation tool for students' works.

Introduction of new design-tools into the interior design educational framework, including multi-criterial environmental evaluation systems, as a mean of systematic project's characteristics verification, is supposed to be fully recommended, considering that

to achieve sustainability, it is important to pay attention to the factors that create environmentally sustainable design criteria [11].

The submission of student interior design projects to the requirements of developed and complex multi-criterial evaluation, permits the review of their design proposals in the comprehensive process of pre-occupancy assessment. These estimation tools require from students a prior comprehensive data collection and research on all the possible aspects of a design project [10], so they can make environmentally responsible decisions. The evaluation, made with regard to the projects' components environmental contextualisation [12], consists of the analysis of their ecological-, economic- and social-related considerations. All the above-mentioned design aspects are addressed in the main categories of the majority of established whole-building certification systems, covering the imperatives of energy and water efficiency, natural resources protection and the reduction of the negative impact on natural environment, and the optimisation of indoor environment quality parameters are within the purview of sustainable interior designers. These criteria, as applicable to interior designs, formulate a specific check-list enabling the systematic adjustments of projects to sustainability requirements and the verification of applied solutions throughout the creation process.

MULTI-CRITERIAL ENVIRONMENTAL EVALUATION IN STUDENT PROJECTS' REVIEW

Many rating systems that address the complex criteria regarding human and environmental health have already been recognised as design standards in green design [8]. They may, therefore, play a substantial role in the creation of sustainable interior environment at every stage of the interior design educational process, from programming, planning, pre-design, through conceptual design to the design development.

Some statements describing the role of evaluation schemes in the professional design process, indicate that

assessment and certification schemes offer a way for designers to formalize a sustainable approach to design [13].

Assessment schemes may be treated as valuable and reliable interior design education instruments with regard to the conformity validation of projects with a sustainability paradigm. Their usage supports the students in the application of formal, functional and spatial solutions into their interior designs. They are, therefore, well equipped with specific design-tools assuring scientific, objective estimation of the impact of their proposals on surroundings and providing them with support for the analysis of built environment performance [13].

The importance of the role of evaluation systems in the design teaching model confirms their interpretation as a set of well-established design standards. Their foundation on the results of prior scientific research guarantees *green design credibility* [8] of assessed projects. It does indicate to the students the necessity of acquiring theory-based knowledge and its endorsements throughout the education process with the aid of evidence coming from completed architectural objects and the post-occupation evaluation assigned to them.

The evaluation of students' projects should be intended to assign a number of environmental sustainability measures to be undertaken to an object in order to improve its performance. This should be done in accordance with functional requirements and the certification level to be gained, as well as to indicate the main criteria for certification categories that are applicable to its specific design.

The participation of students of different disciplines in the design team should enable assembling and evaluating relevant to the project data, and creating an appropriate strategy, according to the defined tasks. Then, the corrections and adjustments of solutions recommended by designing teams may be enhanced by involved experts - professionals, especially, green building consultants, on the basis of measurements included into the certification system's set of sustainability criteria.

This procedure, accompanying the interior design accomplishment, may: 1) increase the interior design students' awareness of environmental impact of their proposals; 2) increase the number of design tools assuring the students' projects conformity to sustainability issues; and 3) indicate to interior designers the evidence of compliance of their proposals.

Multi-criterial evaluation may be seen, therefore, as an integrating platform in the environmentally responsible interior design revised education model, as presented in Figure 2. This platform and design tool may ensure the greater environmental contextualisation of inner space proposals, change of designers' attitudes towards their contribution to the decision-making process and the modification of design education methodology as an evidence-based and practice-oriented approach.

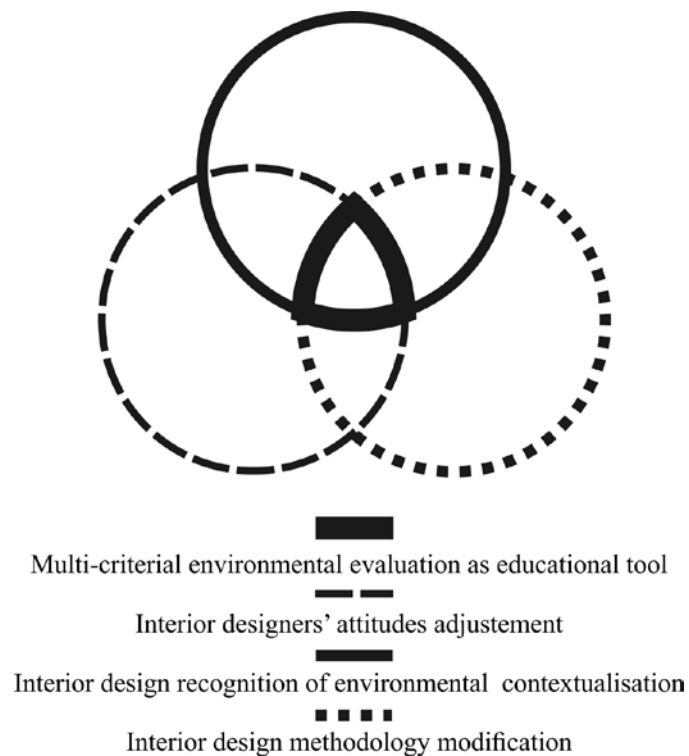


Figure 2: Multi-criterial evaluation schemes as an integrating and inclusive education platform included into proposed revised model of environmentally responsible interior design teaching programme.

CONCLUSIONS

The recognition of whole-building certification systems is becoming a professional obligation in the purview of interior design. It is the consequence of designers' awareness of the complexity of sustainability problem and the related necessity of application of new methods and design-tools, as well as the result of observing restrictive requirements established by governmental institutions. Such expectations are also expressed by conscious developers and owners who are striving for high-performance green designs. Green building rating systems included in higher education interior design studio methodology may be helpful in the identification of sustainability problems and the further execution of inner space project conformity with the requirements of environmental responsibility. The interior design students learn to comply with certain rules of sustainability by following the guidance formulated in the certification schemes, being an additional, expanded sustainability-conscious decision-making tool.

It is important to consider their implementation, as sustainability problems are still insufficiently recognised by interior designers and are commonly treated by them as separate issues (e.g. content of recycled building materials specified in project furnishings or finishing), without comprehensive connection with the evidence delivered by other professionals involved in the design process [14]. Their acceptance is necessary, because interior designers make a substantial contribution to the final solutions regarding the quality of indoor environment and its performance.

When it comes to indicating the most valuable aspect of the implementation of rating systems into the teaching methods, it seems that it may increase among students their critical approach towards the existing education programme, and to arouse their greater interest in environmental responsibility; thus, encouraging them to request an even *more sophisticated discussion within institutions of higher education* [15].

Multi-criterial environmental evaluation introduced into the programme curriculum as an education instrument may be seen from the perspective of inter-disciplinary architectural design process. It may be seen as an objective design tool indicating to the students the necessity of cooperation between different specialities and the importance of integrated design process with a view to the development of environmentally responsible interior design.

The implementation of these evaluation schemes into the programme curriculum may facilitate the selection of adjusted and environmentally responsible decisions and accomplishment of sustainability strategies in the professional interior design practice, as well as encourage students to achieve green building consultants' credentials by themselves.

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BIOGRAPHY



Magdalena Celadyn graduated with a Master's degree in architecture from the Technical University in Cracow, Poland, in 1986. She gained her first professional experience working as design assistant in several architectural offices in Montreal, Canada, on conceptual and technical designs, including newly conceived and renovated existing public buildings and commercial interiors. She took part in some international architectural competitions, presenting original concepts for the integration of elements of the man-made environment with extensive use of vegetation, which together with other theoretical works, may be seen as the origins of her interest in sustainability issues in architecture. From the late 1990s, until 2006, she continued her professional career as a partner in architectural offices in Kraków, Poland. As a qualified architect running her own practice from 2007, she was involved in 20 architectural projects concerning housing estates and commercial interiors. Since 2013,

she has been working in the Faculty of Interior Design at the Academy of Fine Arts in Kraków, where she has been responsible for running courses on building construction, structures for undergraduate students and modern techniques of completion of architectural interiors for postgraduate students. Since 2014, she has been additionally responsible for leading a facultative course on sustainability in architectural design. The results of her research on the methods of creation of sustainable built environment were incorporated in her PhD dissertation *Multi-criterial Evaluation in Sustainable Architectural Design of Office Interiors*, which was defended with honours at the Technical University of Gdansk, Poland, in 2016, and subsequently in a scholarly book *Environmentally Sustainable Office Interiors*, published by the Academy of Fine Arts Publishing in Kraków, Poland in 2017.