

Environmental sustainability considerations in an interior design curriculum

Magdalena Celadyn

Jan Matejko Academy of Fine Arts
Kraków, Poland

ABSTRACT: In the article, the author analyses the options for adapting the interior design educational model, so that it complies with the principles of environmental sustainability in the creation of indoor environment. This is because the curricula currently realised in the majority of faculties of interior design have been established according to conventional design schemes. They reflect the division into subjects directly involved in the shaping of inner space and its components' formation, and realised in autonomic design studios and courses on sustainable architectural design, which provide students with theoretical knowledge, practical skills and competences. The author discusses modifications to this existing model. These changes should enable students to have stronger commitment to enhancing the quality of indoor environment, endorse its energy effectiveness and ecological efficiency, and thereby to meet demands for the sustainable interior design.

INTRODUCTION

The effective application of sustainability strategies in professional interior design practice results in the incorporation of environmental responsibility issues into the interior design curriculum. For the purposes of this article, it seems reasonable to accept the understanding of the term *environmental sustainability*, as an indispensable condition of

...balance, resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity [1].

The interconnectedness underlined in the above-mentioned description allows for these considerations, which may be within the scope of interest and responsibilities of interior designers. Among these concerns are postulates, which are supposed to enhance: 1) energy-cost effectiveness of inner spaces and buildings as a whole; 2) natural resource conservation and reduction of negative impact on natural environment through the rational acquisition and implementation of building materials and products; and 3) quality of the interior environment with a greater emphasis on the closed environment users' health and wellbeing. The third point, regarding occupants' comfort and wellness, has become relevant for designers of the last 20 years. It has resulted in a new approach to space planning with emphasis on their flexibility and adaptability, along with individual occupants' control over inner space microclimate parameters.

As a result, *each of these aspects is equally important to a holistic approach leading to sustainable design [2]*, and has to be taken into account by environmentally-conscious and knowledgeable interior designers. The sustainable concepts incorporated into the main interior design idea should be *integrated with all of the other important components of built environment [3]*. Emphasis should be put on the questions related to appropriate usage of building materials in inner spaces in the context of durability and ecological effectiveness, optimisation of materials selection to reduce energy requirements and use of reclaimed materials to boost eco-effectiveness.

The characteristics of these inner space components should be examined from the pre-design planning, programming through the schematic and development phase of design process *within the context of sustainability [3]*. The sustainable features of interior environment introduced into the project are becoming measures of integration of different specialities and disciplines involved in the interior design process. They are united in the search for optimal building performance and environment efficiency.

This imposes on the participating professionals, including interior designers, the need to improve their abilities to collaborate with other members of the integrated design team and to share their knowledge and experience, with

prevision of the possible effects on built environment performance. The new model of the design process enabling early simulation of proposed solutions and verification of possible consequences for sustainability requires constant modifications to the existing interior design education system.

The proposals for adjustments to the interior design curriculum, are based on the author's own academic experience and involvement. They concentrate on the remodelling of the educational programme within the existing teaching framework, towards a more effective conjunction of the course on building construction for undergraduate students with the theoretical course on sustainable architectural design for undergraduate, as well as graduate students; both delivered by the author.

INTERIOR DESIGN CURRICULUM MODELS

The statement defining the complexity of issues concerning the environmentally responsible design, their value and importance for the decision-making process, indicates that

...sustainable design must be integrated spatially and conceptually, as well as across the professional disciplines [2].

The integrated design process encourages all the specialists involved to evaluate the measures undertaken in order to accomplish project objectives, with predictions of possible multi-faceted consequences on the natural environment and inclusion of ecology issues as *deliberate considerations for the decision-making process* [4]. All adjustments in the proposed design solutions should be aimed at creating a high-performance sustainable built environment.

Analogically to this description regarding the implementation of sustainability concerns in practice, one may attempt to establish an education framework, in order to build up the interior design discipline as respecting the interconnectedness of natural, built and social environments, as well as forming the interior ecosystem model [5] on the directory of multi-faceted requirements to comply with, in order to achieve the sustainable design goals.

This concept would be relatively easy to accomplish in the case of a newly established and integrated teaching schedule, prepared for the autonomous part of study programmes; for example, the undergraduate or postgraduate interior design programme offering seminars on sustainability-oriented design methodology. When it comes to modifying existing interior design educational programmes based on the conventional methodology many problems occur inevitably, with regard to the comprehensive approach to sustainability issues. They involve different technical and substantive questions including:

- 1) proper harmonisation of existing subjects, programmes;
- 2) selection of topics to be discussed by teachers;
- 3) coordination of the education process accompanying different forms of students' activities;
- 4) close collaboration among the educators leading the design studios and those delivering technical courses, combining structure, building construction or building materials technologies.

The curriculum model assuring accomplishment of environmental sustainability issues in interior design, may be formed on the three schemes possible to be introduced:

- Integration of sustainability considerations across the interior design curriculum through the disclosure of problems related to environmental issues;
- Establishment of autonomous modules based on lectures, seminars and the organised multidiscipline students' workshops delivered by educators;
- Development of the educational programme around the building construction subject as enabling the coverage of basic problems related to the realisation of sustainable interior design goals through the broad and interdisciplinary students'-practitioners'-consultants' workshops and seminars.

The last proposal regarding the teaching scheme's modifications seems to be promising and straightforward, leading to implementation of the current compulsory educational model. Since the building construction subject is present in the interior design curriculum, as preceding design studios, it can effectively turn the attention of students to sustainability issues in their design work.

SUSTAINABILITY ISSUES IN THE MODIFIED INTERIOR DESIGN MODEL

The new interior design teaching model demands some adaptations regarding the placement of the building construction subject in the interior design curriculum and its integration with other subjects. The subject's main problems and the determination of environmental and temporal contexts in which the leading building construction issues should be delivered to students should be identified. This modified programme should be supportive in the designing phases,

and supported by design methodology topics focused on techniques regarding the collection of information essential for the pre-design phase (including focus groups, surveys, interviews, observations).

The current educational programme is built around the interior design studios, complemented with the main courses on architecture theory and history, aesthetics, graphic presentation techniques, building construction. These elements cover the problems traditionally assigned to building construction programme, including building code regulations, safety requirements and accessibility for disabled persons. The programme also includes a one semester theoretical course on environmentally sustainable architectural design, built on a multimedia presentation, discussions and analysis of selected case studies.

The author's proposals are based on the conjunction of the remodelled building construction course, as well as the theoretical course covering sustainable architectural design issues, as being delivered to students within the currently existing teaching programme (Figure 1).

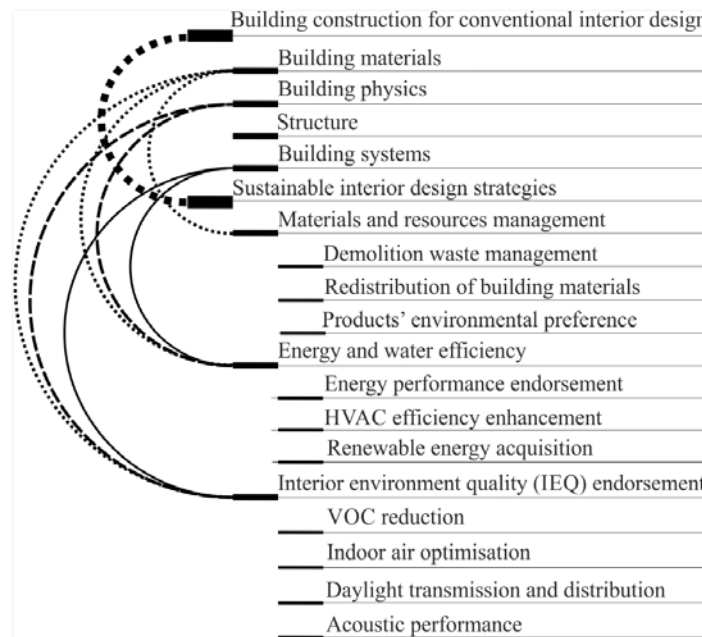


Figure 1: Juxtaposition of the building construction subject's content, as present in the conventional interior design programme, and strategies necessary to accomplish the sustainability concerns in interior design (Source: author's drawing).

This modified education model may help learners in several ways. First, learners will comprehend the meaning of sustainability and will gain the ability to implement them into the design process. Second, they will increase their commitment to collaborative work schemes. Third, the new model will facilitate the decision-making process for projects prepared in design studios in the postgraduate programme. Finally, learners will be able to verify how sustainability requirements affect the interior design process in terms of objects' energy effectiveness, ecological efficiency, and occupants' health and wellbeing.

Building construction, as the basic subject in the remodelled curriculum content, should be concentrated on four factors. These are 1) studying interior structural and complementing elements in relation to building systems and building components; 2) analysing their impact on the development of interior spaces; 3) analysing the formal, functional and material consumption-oriented results of structural cohesion of inner space elements and building components; and 4) identifying the consequences of the introduction of the interior components adding to the passive mode building systems' enhancement. Applying these strategies to the interior decision-making process suggest that every building component and inner space element should be designed as a conventional one, but with sustainability features.

The main purpose of this programme adjustment should be to develop the students' abilities *...to apply the understanding of the principles of sustainability to the objectives of a sustainable environment* [3] and to inform the interior design. This method may assure the full integration of sustainability principles with the creation of the indoor environment and, thus, enable the understanding of sustainability criterion *as an interdependent element of the environment* [3].

The restructuring of the teaching model within the current framework towards the creation of environmentally-oriented interior design programme, requires strategies that will enable students to determine sustainability issues. To ensure that the sustainable considerations are applied to all primary and complementary components of inner space in terms of their

structure, finishes, location, their multi-functionality and related flexibility, as well as adaptability should be considered as the main features of the environmental sustainability of interior components [6]. The remodelled building construction programme should underline the effects of consequent and conscious implementation of science achievements and building technology innovations, as well as traditional building techniques into sustainable design practice.

The learning strategies that should be implemented for the achievement of compliance of interior environment solutions with the demands of green design, and identified as essential *integration of education and practice* [7] include:

- Development of students’ research-focused capabilities, enabling creation of informed and knowledgeable interior design;
- Review of reliable sources of information including literature and databases;
- Integration of different specialities involved in design process on the basis of co-education model;
- Investigation of the use of categories of building inner spaces included in the leading building certification systems (e.g. Interior Design and Construction ID+C systemic category included into the Leadership in Energy and Environmental Design LEED Green Building Rating System) being standards in the sustainable architectural and interior design, on design solutions;
- Integration of sustainable interior design formal and functional solutions with advanced technologies;
- Integration of interior design elements and layout with building systems (i.e. mechanical, electrical, plumbing, ventilation and air conditioning);
- Mutual compliance of sustainable interior design and sustainable building materials, finishes, products;
- Environmental activation of interior environment components [6] towards the enhancement of building systems’ performance.

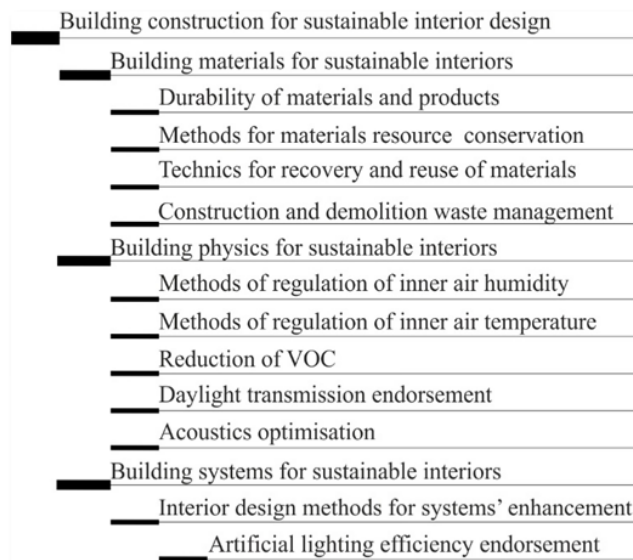


Figure 2: Building construction for interior design teaching programme as environmental sustainability-oriented modified education model for undergraduate students (Source: author’s drawing).

The modifications enabling the adjustment of the interior design education model to comply with sustainability imperatives in architectural design, are as proposed in this structural scheme (Figure 2). The scheme may rely on the consequent and broad presence of environmental contextualisation delivered to the students

METHODS AND TOOLS IN REMODELED INTERIOR DESIGN FRAMEWORK

Various forms of learning activities and design methods for interior design students should be introduced into the new interior design curriculum model in order to diminish the gap between the theoretical and practical approach to sustainability concerns in interior design. The new methods and design tools included into the teaching framework are supposed to help students to gain experience in acquiring valuable information from different reliable sources and to establish sustainable design goals to be accomplished throughout the design process. They may facilitate further completion of interior proposals prepared by the graduate students in the design studios.

Design Methods

Activities conducted within the restructured comprehensive sustainable building construction module should be carried out in line with the methods enabling the widening of the area of interior design research. They include a detailed

analysis of completed objects with a focus on appropriateness and multi-faceted consequences of the building materials chosen. These activities may combine the workshops conducted with external participants (including professionals, producers and consultants) to verify the correctness of solutions proposed by students. These forms may give the students an opportunity to combine creative and critical analytical thinking in the design process. They should offer the students proposals to be further developed in design studios, where design and sustainable design goals are supposed to merge in a unified design model.

Among the design methods recommended for introduction into a redefined teaching programme providing students with the catalogue of main concerns that should be addressed in green building design, the following should be indicated:

- Multi-disciplinary workshops engaging students of different specialties and faculties (e.g. architecture, mechanical engineering, electrical engineering, lighting engineering, environmental engineering);
- Comparative analysis of building materials and their parameters in order to identify the environmental preferences as the leading interior design decision-making factors;
- Simplified life cycle analysis of the building products and materials to be considered in the specification, as an integral part of the project;
- Case studies, as a detailed problem-based learning model built on a review of selected referenced completed sustainable interiors and buildings with the emphasis on the analysis, which is concentrated on formal characteristics and multi-functionality of products. They should be incorporated by designers in the relationship with the sustainable features regarding structural, technical or material issues influencing the objects appearance and performance;
- Workshops conducted by practitioners and accredited green building consultants [8] engaged in the interior design process, and aiming at encompassing the development and range of integrated sustainable solutions;
- Seminars on assessments of design documentation conducted on the basis of chosen criteria to pursue multi-criterial environmental evaluations;
- Discussions upon the properties of building materials and products with environmental preference as a decisive factor in making their specifications, along with their functional and formal characteristics;
- Seminars on the quantitative schemes enabling the analysis and interpretation of conducted surveys regarding the indoor environment quality in inner spaces.

Design Tools

The remodelled interior design educational framework should include professional tools explored by practitioners, and these will become additional valuable and stimulating learning instruments. Their inclusion in the interior design curriculum may assure a common understanding the complexity of sustainability concerns to be addressed in integrated design process. A special emphasis should be put on the specification of building materials, enabling the evaluation of their *environmental efficacy* [9]. Attention should also be drawn to the possible reuse and recycling of materials fostered by the demand for buildings designed *to be deconstructable* [9].

The learning tools incorporated into the joined research-focused seminars, which combine building construction and sustainable architectural design, would be delivered in the form of discussions and multi-media presentations, and consist of:

- Green building assessment systems applied in the design development phase for solutions proposed initially on the basis of theoretical recommendations, and conceived in the conceptual design phase. They would be realised in the design studios within the graduate programme and would play the role of a basis for discussion and pre-occupation stage evaluation;
- Certification systems assessing the building materials on the basis of their environmental consideration to be used in the selection of green materials and products for high performance buildings;
- Laboratory tests conducted by students during workshops and introduced into the projects' specification, comprising the interior structural or complementing components, their measured acoustic and visual performance with the view of these characteristics' influence on comfort and wellbeing of inner space users;
- Building information modelling (BIM) - digital model-based technology and effective design tool changing the design linear scheme into virtual and cyclical model;
- Resource drawings [3] prepared by students as integral elements of design development documentation conceived in order to explain interior design details proposals in association with the structure, building systems solutions and building energy concepts;
- Survey schemes established by students with regards to the indoor environment quality, to be used in order to inform the conceptual phases of projects developed in the postgraduate programmes.

In addition to the suggested design tools introduced by the educator on the basis of individually conducted research, students may identify additional means to be employed to lead to the improvement in the sustainable interior design methodology.

CONCLUSIONS

This model would significantly diminish the problems of not having a good understanding of basic principles of sustainability. It is designed to enhance the students' approach to sustainability in interiors at the beginning of their education. It should also facilitate the future application of the guidelines on the projects to be worked out in design studios.

An active learning environment created around sustainability-oriented interior design may enhance the students' ability to use the sustainability knowledge in their projects completed in design studios. This model, including the collaboration within the building construction subject, environmental sustainability course, and main subjects based on multi-faceted forms of students' activities, including interdisciplinary workshops with practitioners would be the result of modified education system within the faculty.

According to Pilatowicz, the successful accomplishment of sustainability imperatives in interior design requires certain structural systemic changes [2]. There is a need for closer cooperation between the educators in forming the interior design faculty teaching schemes. This would be to inform the development of consecutive phases of the interior design process and to determine the aspects of sustainability that could affect the formal and technical design solutions. As she indicates:

The difficulties are compounded by the need for interdisciplinary education that requires collaboration among faculty who have to be supported by more flexible academic structures [2].

The evolution of the education programme proposed here seems to correspond to the growing demands for informed and environment-oriented interior design as expressed by the rising numbers of environment-conscious clients. Becoming the potential response to these expectations, the remodelled teaching scheme outlined in this article, may:

1. provide students with abilities to determine sustainable design goals in their projects;
2. enable the identification of environmental and temporal projects' contexts;
3. provide students with the knowledge that will ensure comprehensive implementation of sustainability issues in professional practice with the ability to make predictions and assessment of projects' environmental consequences;
4. offer to students the information about the accomplishment of sustainability objectives in research-based interior design;
5. indicate the opportunities for the usage of appropriate research techniques and instruments in the multidisciplinary design process.

The proposed modified teaching programme around the integration of construction building and an environmentally sustainable design theoretical course may be a step forward within the currently executed programmes and structural schemes, searching for methods enabling fulfilment of the *fundamental paradigm shift in architectural education* [7] identified by many authors. It would create better condition for the entrance of students to the interior design profession based on environmentally-oriented research.

REFERENCES

1. Morelli, J., Environmental sustainability: a definition for environmental professionals. *J. of Environmental Sustainability*, 1, 1, article 2, 1-9 (2011).
2. Pilatowicz, G., Sustainability in interior design. *Sustainability: The J. of Record*, 8, 3, 101-104 (2015).
3. Winchip, S.M., *Sustainable Design for Interior Environments*. (2nd Edn), New York: Fairchild Books (2011).
4. Mendler, S., Odell, W. and Lazarus, M.A., *The HOK Guidebook to Sustainable Design*. (2nd Edn), Hoboken, New Jersey: John Wiley & Sons, Inc. (2006).
5. Nussbaumer, L.L., *Evidence Based Design for Interior Designers*. New York: Fairchild Books (2009).
6. Celadyn, M., Daylighting in sustainable interior design of offices. *Architecture Civil Engng. Environ., ACEE*, 9, 4, 5-12 (2016).
7. Foque, R., *Building Knowledge in Architecture*. Brussels: UPA University Press Antwerp (2010).
8. Celadyn, M., Multi-criterial evaluation in education of environmentally responsible interior design. *Global J. of Engng. Educ.*, 19, 3, 207-212 (2017).
9. Kibert, C.J., *Sustainable Construction: Green Building Design and Delivery*. Hoboken, New Jersey: Wiley & Sons, Inc. (2015).