

Gliwice, 25.07.2026

Review

of the doctoral dissertation by Mosleh Ahmadi, MSc Eng., entitled “EXPLORING THE RELATIONSHIP BETWEEN DAYLIGHTING AND USER BEHAVIOR: AN EMPIRICAL STUDY OF CONTEMPORARY PUBLIC LIBRARIES IN THE TRI-CITY.”

dr hab. inż. arch. Tomasz Bradecki prof. PŚ.

Wydział Architektury Politechniki Śląskiej

Katedra Urbanistyki i Planowania Przestrzennego

Akademicka 7

Gliwice 44-100

Tomasz.bradecki@polsl.pl

I. Basis for the preparation of the review

The basis for the preparation of this review is Resolution No. 2/XII/2025/2026 of the Scientific Council of the Discipline of Architecture and Urban Planning of the Gdańsk University of Technology, dated 28 April 2026, and the letter dated 25 May 2026 requesting the preparation of a review of the doctoral dissertation by Mosleh Ahmadi, MSc Eng. Arch. Supervisor: dr hab. inż. arch. Justyna Martyniuk-Pęczek, Professor of the Gdańsk University of Technology, Faculty of Architecture, Gdańsk University of Technology, and dr Natalia Sokół (auxiliary supervisor). The review was also prepared in accordance with the provisions of the Act of 20 July 2018 – Law on Higher Education and Science (Journal of Laws of 2024, item 1571, as amended).

II. Assessment of the dissertation submitted for review

1. Scientific assessment of the dissertation

The typescript comprises 319 pages and consists of the following parts:

Introduction

Chapter 1. Review of Contemporary Library Buildings

Chapter 2. Research Design and Survey

Chapter 3. Modeling and Simulations

Chapter 4. Pattern Recognition and Data Layers Analysis

Conclusions

Annexes

Appendix 1 – Review of the Methodology

Appendix 2 – Approval Letter from the Ethics Committee

Appendix 3 – User Questionnaire Responses (Question 1)

Appendix 4.1 – DepthmapX Analysis for Mały Kack

Appendix 4.2 – DepthmapX Analysis for Witomino

Appendix 5.1 – Observation Sheet for Mały Kack in December

Appendix 5.1 – Observation Sheet for Mały Kack in June

Appendix 5.1 – Observation Sheet of Movement Intensity for Mały Kack in December

Appendix 5.2 – Observation Sheet for Witomino in December

Appendix 6.1 – Movement Scores for Mały Kack

Appendix 6.2 – Movement Score for Witomino

Appendix 7.1 – Daylighting Scores for Mały Kack

Appendix 7.2 – Daylighting Scores for Witomino

Appendix 8.0 – Space Syntax Scores

Appendix 9.1 – Ranking Table of the Mały Kack Scores

Appendix 9.2 – Ranking Table of the Witomino Scores

The dissertation contains several dozen illustrations and a dozen or so tables. The table of contents does not include a list of illustrations or a list of photographs.

The dissertation contains 187 bibliographic entries, of which 164 are literature items and the remainder are online sources. This list is extensive and is supplemented by several dozen additional entries comprising the bibliography of the appendices. All the publications listed are closely related to the topic, and the selection of literature should be considered appropriate.

2. Assessment of the thematic scope, aim, method and theses of the dissertation

The thematic scope should be considered sufficient, as it allows appropriate conclusions to be drawn. In the introduction, the author identifies the following aims of the dissertation, divided into a main aim and specific aims.

The main aim of the research is to analyze the relationships between daylight conditions and user behavior and movement in contemporary library interiors, considering spatial atmospheres, architectural layout, seasonal variation, and individual user characteristics. The study also aims to develop and apply a mixed-method framework combining parametric simulations and observational data to examine how spatial configuration, environmental quality, and human experience interact.

The author divides the objectives of the study into: conceptual, empirical, and comparative.

The author formulates four research questions:

RQ1: How are user movement and behavior conceptualized in daylighting research, and how can it be operationalized for spatial performance evaluation in library interiors?

- *RQ2: To what extent do daylight conditions influence user behavior and movement patterns in library interiors, and how is this relationship mediated by spatial layout?*

- *RQ3: How do different user behavior typologies and non-lighting environmental factors (e.g. privacy, acoustic conditions, thermal comfort) interact with daylight in shaping space use and user preferences?*

- *RQ4: How does seasonal variation affect the relationship between daylight conditions and user behavior in library interiors?*

The main aim and specific aims have been correctly formulated. The dissertation addresses the typology of contemporary libraries as important public spaces of considerable social significance. It discusses issues such as the evolution of library design, the manner in which library spaces are used, user movement with regard to functional layout, and the role of lighting in this type of building.

The author puts forward a main hypothesis and subsidiary hypotheses:

Main Hypothesis

Daylighting is one of the most important factors defining the architectural form of the library as a building, however, spatial and functional configuration of contemporary libraries play a key role in how the space is used in relation to daylight. Moreover,

seasonal variation significantly modifies the relationship between daylight conditions and user behavior.

Specific Hypotheses

- *Daylight conditions differentially influence user movement patterns and spatial occupancy in open-plan compared to closed-plan library layouts.*
- *In spaces intended for focused work, non-lighting environmental factors (e.g. visual privacy, acoustic conditions, and thermal comfort) exert a stronger influence on seat selection than daylight conditions alone.*

The research method comprises a literature review and case studies conducted as part of the author's own research. This research included in-situ studies as well as studies using 3D models and dedicated software applying additional methods, including Space Syntax Analysis (SSA), Visibility Graph Analysis (VGA), and the AnnuOWL tool. The concluding section presents the conclusions and a synthesis of the answers to the questions posed in the introduction.

3. Assessment of the composition of the dissertation

The composition of the dissertation, based on chapters and subchapters, should be considered appropriate. The numbering and labelling of the appendices are inconsistent. Furthermore, the illustrations and tables in the appendices should use the same labelling and numbering system as in the main body of the dissertation. It appears that the appendices could be organized as follows: a methodological section, a section devoted to the research results for the Mały Kack library, and a section devoted to the research results for the Witomino facility.

4. Assessment of the manner of presentation of the material and its treatment

The author presents the narrative very well. The text lacks footnotes, which could have been used to elaborate on certain issues in greater depth. The materials and key information are presented in the dissertation in a clear and comprehensible manner.

5. Assessment of linguistic and stylistic correctness

The author uses correct vocabulary and employs terminology related to the subject matter in a professional manner.

6. Assessment of the terminology, notations and symbols used

The notations, symbols and terminology adopted in the dissertation should be considered appropriate and commonly used in research within the scientific discipline of architecture and urban planning.

7. Assessment of the length of the dissertation (repetitions of information, general remarks, minor details)

The dissertation is very extensive, its content presented on 319 pages of A4 format, printed double-sided. The information presented in the dissertation is very detailed.

The dissertation's very detailed presentation of the author's own case-study research deserves recognition. The author's personal research engagement deserves a high rating, as it was not limited to visiting and observing selected locations but also included conducting surveys and studies: measuring light intensity, qualitative analysis of the arrangement of reading spaces, and how they are used.

8. Assessment of the choice of title

The title of the dissertation should be assessed as correctly chosen.

9. Assessment of the choice of illustrations and tables

The illustrations, tables and charts were selected appropriately. The detailed research results in the appendices on the final pages are illegible, both in print and in the paper version.

10. Assessment of whether the dissertation meets the requirements set for doctoral dissertations

The dissertation is characterized by high cognitive value. The research and literature review presented are conducted in an appropriate and comprehensible manner. The author's own research, presented in Parts II, III and IV, is presented clearly and legibly. The summary and conclusions are contained in Chapter V. This chapter should be considered sufficient.

The author's greatest achievement appears to be the creation of a multifaceted, multidimensional research method that, on the one hand, makes use of commonly known tools — in-situ studies and user surveys and questionnaires — and, on the other hand, employs modern software, object models for light analysis, and

simulations of user movement (Space Syntax Analysis (SSA), Visibility Graph Analysis (VGA), the AnnuOWL tool). The sound scientific justification of the prepared surveys deserves appreciation, as each question is linked to relevant literature references. The use of all these methods demonstrates that research on public buildings, at both the pre-design and post-design stages, can indicate potential directions for good solutions for this type of building.

The case-study approach appears debatable, as it was limited to only two cases (as the author himself acknowledges). Two library cases were subjected to detailed study, differing in spatial structure: the Mały Kack library represents an open-plan building type, while the Witomino library represents a classic closed-plan library type. On the one hand, the demonstration of differences, advantages and disadvantages, accessibility, analysis of use by users, and the study of daylight penetration and the merits of artificial lighting is very well executed, and these two different building types excellently demonstrate these differences. However, the question remains whether examining two cases for each building type (i.e. four cases in total) would not have been more reliable and would have better highlighted significant differences in interior arrangement and other characteristics affecting the research results, and consequently shaping user behavior.

Some of the graphic materials selected are not legible: Fig. 2.28, shown in black and white, does not clearly convey what the author intended to indicate.

An analysis of the text concerning the author's own library research raises the following questions:

1. The selected cases are examples of small libraries serving local communities, where the number of users is low (how many per year/day?). According to the data presented by the author, an estimated 2,000 users per month can be assumed, although the author mentions that the studied cases are characterized by a considerably smaller number of visitors due to the character of the immediate surroundings, which is dominated by residential development. It can therefore be estimated that no more than 100 people visit each library per day. Is such a sample representative for potential pre-design research on larger libraries with a greater number of users, or will a modification of the method be necessary?

2. In the text, the word "comfort" appears more than 100 times (a search indicates 168 occurrences). The concept of comfort is described in various ways: visual comfort, user comfort productivity, physiological comfort, thermal comfort, etc. Comfort is most often described in connection with lighting conditions, which is understandable given the topic of the dissertation. Analyses of user movement took into account the characteristics of seating places from multiple perspectives. However, could it also be considered whether the number of users and their behavior may be related to the local character of the libraries rather than resulting directly from environmental conditions (including sunlight exposure, etc.), due to other factors — e.g. the character of the

immediate neighborhood, the quality and attractiveness of local infrastructure and service (including positive aspects related to staff), or the proximity of a café, shop, or other amenities.

3. The AnnuOWL tool allows for the analysis of spatial daylight autonomy (sDA) and useful daylight illuminance (UDI). These are important indicators taken into account in building certification (LEED, BREEAM). The author does not mention this. This raises the question of whether the proposed research method and the results obtained could provide recommendations regarding optimal values of the selected indicators (mentioned above and/or others) for future libraries. Could this also apply to other types of buildings, and if so, which ones? (On page 183, the author states in the conclusions that this methodological approach could be applied to other building typologies to enhance its reliability and generalizability.)

The use of light intensity, illumination and other parameters obtained through specialized software appears to be very detailed and precise. The visualization of the collected data in the form of illustrations facilitates the drawing of conclusions. However, the material presented does not include a study of daylight penetration in the form of visualizations showing which parts of a given floor of the building are sunlit (a 3D cross-section of the building with glazing, viewed from above). It is worth considering whether the graphic material should be expanded to include this type of analysis. From the point of view of the author, a specialist in the field of lighting research, this type of visualization would certainly be a simplification of the issue (not least because this is already shown by the graphics demonstrating the UDI simulations). Figures 4.20, 4.21, 4.22 and 4.23, showing movement intensity overlaid on the UDI simulation, do convey this, but in a manner that is not intuitive for readers unfamiliar with the field and specialty. For this reason, the reviewer believes that this would be clear and legible to readers who do not study the dissertation in its entirety, particularly since the library models are already available, as shown in Figs. 2.9 and 2.12.

The dissertation addresses an important and contemporary issue: a current decline in interest in reading and a decreasing number of library branches in Poland can be observed, alongside a trend of merging several branches and transforming individual branches into more attractive and modern buildings combining the functions of libraries, local culture centers, and media libraries.

The dissertation meets the requirements set for doctoral dissertations. It presents complex and in-depth research in the field of theory as well as knowledge accompanying research and design practice. The dissertation's very detailed presentation of the author's own case-study research deserves recognition. The author's personal research engagement deserves a high rating, as it was not limited to visiting and observing selected locations but also included conducting surveys and studies, which enabled the formulation of conclusions. It is also worth appreciating the

author's own explanations of the tools used and the effects of their application, presented in the form of tables and diagrams.

III. Final conclusions

In light of the provisions of Article 187 of the Act of 20 July 2018 – Law on Higher Education and Science (Journal of Laws of 2024, item 1571, as amended), the Author's achievement presented in the dissertation entitled “EXPLORING THE RELATIONSHIP BETWEEN DAYLIGHTING AND USER BEHAVIOR: AN EMPIRICAL STUDY OF CONTEMPORARY PUBLIC LIBRARIES IN THE TRI-CITY” should be considered to meet the required criteria and to constitute a significant contribution to the development of the discipline of architecture and urban planning.

I recommend that the dissertation be published as a book available on the market, excluding the survey forms and the partial results presented in the appendices.

At the same time, I recommend that the dissertation be distinguished, in view of the author's own multifaceted research tool and the consistency of its implementation. On the basis of the dissertation, one gains the impression that the author is a specialist in the field, as he creatively and independently employs various tools and combines the results of his research.

The critical remarks included in this review should be considered marginal, given the very high substantive level of the dissertation, the reliability of the research carried out by the author, and the overall quality of the work. I hereby admit the doctoral dissertation to public defense before the Scientific Council of the Discipline of Architecture and Urban Planning of the Gdańsk University of Technology.



dr hab. inż. arch. Tomasz Bradecki