

Aarhus School of Architecture // Design School Kolding // Royal Danish Academy

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Published in:

Envisioning Architectural Scales in the Analogue and Virtual Representation of Architecture

DOI:

<https://doi.org/10.60558/eaea16-2023-203>

Publication date:

2023

Document Version:

Publisher's PDF, also known as Version of record

Document License:

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[Link to publication](#)

Citation for pulished version (APA):

Chanyakorn, O. (2023). Architectural scale from inside-out: Learning body awareness through figure drawing. In A. Kreutzberg (Ed.), *Envisioning Architectural Scales in the Analogue and Virtual Representation of Architecture: Proceedings of the 16th EAEA conference* (pp. 152-163). Royal Danish Academy - Architecture, Design, Conservation. <https://doi.org/10.60558/eaea16-2023-203>

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Architectural scale from inside-out: Learning body awareness through figure drawing

Introduction

Among other methods, architecture students learn architectural scale through observation and figure drawing. Throughout history, architecture has been intertwined with our understanding of the human body and its proportions. The primary purpose of architecture is to support humans, so architecture and the human body are intricately connected on many levels. The master Leonardo da Vinci (1452 - 1419) has long been admired as one of the best artists and inventors whose work demonstrates the connections between bodies and his creations. With no classical education (as he was largely self-taught), da Vinci relied mainly on the power of his observations. His extensive studies of human anatomy lead the Renaissance master to an understanding of proportions and the notion of scale in his creative work (Suh, 2005). Upon close examination, his architectural design works reveal a keen awareness of scale and proportion rooted in his microcosm studies of the human body. Furthermore, his study of the human body entered an ontological dimension, resulting in the divine quality of his work. Leonardo da Vinci's ideal man is prime evidence of his realization of the scale from microcosm to macrocosm; the Vitruvian Man is inscribed in geometries of square and circle to portray a divine connection between the human proportion and the Universe. Many artists and architects of the past, such as Michelangelo, Palladio, Le Corbusier, and Carlo Scarpa, to name a few, spent part of their lives mastering human anatomy and proportions to advance their architectural design. The intent of their studies was not for more than just anthropometry; the awareness of the human body and architecture is indispensable.

Le Corbusier developed Le Modulor based on a human proportion study that he later applied to many projects. The Marseille block is the direct result of this study. Each apartment block consists of small rooms; the ceiling height is based on the Modulor's raised arm height of 226 cm, and the rest of the design is based on his Modulor rules (Rasmussen, 1993). Furthermore, researching Alvaro Siza's design process through a series of initial sketches, Siza often accurately depicted figure drawings associated with his architectural explorations. The evidence illustrates Siza's constant awareness of human scale in conjunction with his architectural design. The fundamental understanding of human anatomy and proportion is essential to art, architecture, and design. For example, in Carlo Scarpa's architectural drawings, elements of architecture actively respond to human gestures; therefore, the human body is the primary component of his design decisions. Human figures not only function to indicate scale in architectural drawings, but they also motivate Scarpa's design decisions (Anderson, 2002). Technology, materials, and design conditions constantly change, affecting the idea of scale in architecture, but the awareness of

the body as an essence in architecture and design remains vital. To highlight the necessity of bodily awareness in the field of architecture and how our understanding of the body's dimensions contributes to the sense of scale in architectural design, Professor Pierre Von Meiss cites the quote by Auguste Rodin in his book, *Elements of Architecture*:

Harmony in living bodies is a result of the counterbalancing of shifting masses: the Cathedral is built from the example of living bodies. Its concordances, its equilibriums are exactly in the order of nature, they originate in general laws. The great masters who raised these marvelous monuments were men of science, and they were able to apply it, because they had drawn from its natural, primitive sources, and because it remained alive in them. (Rodin, cited in Meiss, 2013, p. 66)

From the quote, Rodin stresses the value of keen observations of the great masters who drew and distilled their inspiration from nature, and primitive sources. Visiting the Rodin Museum in Paris, one may sense the quality and quantity of Rodin's works that he captured from nature. The intensive study of human bodies was crucial to his creative process. Developing a comprehensive insight into our bodily dimensions and proportion is a way to learn about architectural scale from the inside out. In contemporary architectural education, scale figures can be conveniently integrated into drawings. Facilitated by digital and graphic software, students can easily add scale figures to their drawings without further understanding the relationship between architecture and humans beyond simply indicating scale in architectural drawings (Fig.01). However, this convenient method of cutting and pasting scale figures into drawing has lost an ontological dimension between architecture and humans, as Marco Frascari argues.



Fig. 01. Cut and pasted scale figures.

Source: author.

This essay argues the importance of developing a sense of architectural scale through figure drawing to inform and influence the design process. As an active practitioner in observational drawing and through first-hand experience teaching architectural design courses, the author speculates that if architectural students learn figure drawing, it will strengthen their sense of scale in the design process. A semester-long experimentation begins by integrating figure-drawing practice into the sophomore studio design pedagogy. Then the author analyzes the finding in relation to the existing theoretical perspectives. Furthermore, the investigation discusses the altruistic dimension of learning figure drawing for architectural purposes. In conclusion, the essay suggests a pedagogy on strengthening a sense of scale in the architectural design process based on the resulting evidence.

Architecture and the human body

The fascination and quest to understand our bodies have a long history that dates back centuries. One of the most significant discoveries in art and design that amplified the importance of anthropometry and ontology of humans was during the Renaissance era and onward. During the Renaissance, the knowledge of the body became fruitful in many fields, including architecture. With close examination, many artists and architects of the past advanced their creativity in art and design through intensive study of the human body.

In the architectural representation context, scale figures in a drawing help viewers associate the human body dimension with spaces, buildings, and the surrounding environment. Depicting human figures in architectural drawings is indispensable, as Marco Frascari argues. It helps architects understand the dimensions and scale of the proposed project while also integrating and constructing human facts and architectural dimensions. It is a method of accepting a body as a means to compose the architectural world (Frascari, 1987). On the contrary, Anderson argues that this declaration only partially applies to the contemporary practice of architectural representation since many architects utilize numerical and metric graphics to inform a sense of scale in their architectural drawings. According to Anderson, ‘human figures seem to promote an intuitive understanding of scale.’ (2002).

However, both scholars indicate other valuable aspects of learning human figures to strengthen a sense of scale beyond architectural representation. Both authors argue that, in contemporary practice, human figures incorporated in drawings have little to do with the buildings or spaces depicted. They are generic and less narrative just to indicate scale. Representing human figures is merely a form of communication pasted on the scene with no ontological dimension. In order to strengthen an anthropomorphic practice, an awareness of the human body as an integral part and its essential role in the architectural design process and representation is necessary (Frascari, 1987). Therefore, architecture should accommodate the human body through an intimate understanding and study.

Although human figures promote an understanding of scale in architecture, learning figure drawing in architecture has an additional benefit. If the primary purpose of depicting figures in drawings is to inform the scale and dimension of a project, it would be beneficial for students to further establish a keen awareness

of the human body as an integral part of design processes rather than purely for representation. Historically, architecture was spiritually and symbolically linked to the human body, proportion, and form (Anderson, 2002). Western architects applied male and female human proportions during the Renaissance and sixteenth centuries to compose various architectural elements such as columns or the arrangement of entire building facades. Shifting to the twentieth-century practice of architecture, some eminent architects apply knowledge of the body to inform and create spatial quality and their architecture. For example, Carlo Scarpa studied and utilized human gestures as direct agents to inform his architectural composition and develop responsive spatial quality. Studying human bodies strengthens our awareness of the architectural scale for representation and communication. It is an integral part of the design process in which awareness of the body and architectural space inform one another.

In 1977, Kent C. Bloomer and Charles W. Moore argued in their book *Body, Memory, and Architecture* that the profession focused on a set of prescribed technical goals and quantifiable elements rather than being responsive to fundamental human desires, feelings, and the whole architectural experience. Much research has been done since the book was published regarding the relationship between the human body and architecture, particularly recent research on neuroscience and architecture. The significance and affinity between the human body and architecture in the book are relevant to this article. Both authors believe an essential sense of three-dimensionality emerges within the bodily experience, which leads to our understanding of spatial feeling in our building experience. The human body is a three-dimensional possession we can use to understand and experience architectural form (1977). Our bodies become a doorway of our perception through which we experience the surrounding environment. We touch objects to feel their textures and temperature. The sense of touch, or the haptic sense, is a perceptual system that informs various bodily sensations, such as pressure, warmth, and cold. At the same time, we also haptically sense our bodies' motion through the feeling of muscles and joint movements or kinesthesia. Our body is in a constant mode of interaction with the surrounding environment. We subconsciously use our bodies to communicate and measure up and justify buildings' dimensions and scale as we experience them. Our bodies are in the center, as Pallasmaa indicated:

I confront the city with my body; my legs measure the length of the arcade and the width of the square; my gaze unconsciously projects my body onto the facade of the cathedral, where it roams over the moldings and contours, sensing the size of recesses and projections (Pallasmaa, 2012, p. 43).

Figure 2 is a result and an interweaving representation between awareness of scale in architectural space and a method of depicting space in a two-dimensional representation. By depicting human figures in the painting, the image presents the drawer's awareness and relationship between the human scale/body and architectural spaces and their elements. Yet, during this process of in-situ watercolor sketching, the painter consciously projects an awareness of the body into the observed spaces to establish an understanding of scale through their own body. The artist constantly and virtually measures and transfers three-dimensional reality onto the two-dimensional

surface of the paper. The process is a feedback loop of a strengthening sense of scale when the painter uses human figures to portray their awareness of scale. At the same time, the painting provides information on whether the spatial observation is accurate, judging through scale figures in the painting---the message in the painting further steps into the spatial feeling and the atmosphere, the connection between body and architecture. Through the contemplative act of in-situ painting, an embodied experience emerges with a wholeness of spatial scale and body intertwined. The spatial awareness of scale is strengthened by using the body as a doorway to articulate the experiential environment.



Fig. 02. Bodies and space.

Source: author.

Pedagogy

Throughout modern architectural pedagogy, it has been unfortunate for many architecture and design schools to gradually remove or never even include figure drawing in their curricula. With a close examination of various US undergraduate architecture program curricula¹, many schools excluded the study of human anatomy from their curricula. With the required acquisition of a large body of knowledge and technical skills with only four or five years of study, there is little room to accommodate studying the human dimensions and body that may not seem directly related to architecture. Moreover, wouldn't it be more direct to teach architecture students to draw a plan, section, elevation, perspective, and axonometric drawings? What would be the benefits of teaching the students figure drawing? No particular scale rules can apply to all architectural situations since the conditions and design circumstances constantly change. Alternatively, computer-aided design technology has gradually become an integral part of the equation regarding the study of architectural scale. In most universities, a figure drawing course will be offered through an art program. Most likely, architecture students will be able to enroll in the course as an elective course. However, due to the density of required architectural courses, most students have little time to take a figure drawing course to advance their understanding of human bodies and their dimensions.

Nevertheless, no one can deny the breathtaking effect of the Gothic cathedral spaces and proportions that portray the power of God emerged from a simple realization of the basic scale of the human body. Whether human figures are included in the representation and communication of architectural design, the awareness of human bodies and spaces should always be considered from the beginning of the design process. Understanding human bodies is the root of our comprehension of scale in architecture. Therefore, a brief introduction to human anatomy and scale in architectural curricula could benefit students' design ability and strengthen their sense of scale.

Why figure drawing in architecture education?

In early 1980, the dean of Cooper Union's School of Architecture, John Hejduk, commissioned an artist and educator, Professor Sue Ferguson Gussow, to teach freehand drawing to architecture students. Hejduk expressed this to his colleague, the painter Robert Slutzky, when he stated, "I want someone who can teach the figure." For nearly four decades, Professor Gussow continued teaching figure drawing to architecture students, despite many questioning the value of this practice. Gussow's argument emanates from the body, which she calls the "body of knowledge...[that] becomes knowledge of (the) body" (Gussow, 2008). Alex T. Anderson argues that beyond the basic functions of human figures to provide a clear scale indication in architectural drawings, they also provide a sense of scale that cannot be replaced

¹ The author examines the US architecture schools' curriculum based on the Design Intelligence ranking for undergraduate programs of the top 20 architecture schools, there were only a few that mentioned freehand drawing courses, such as Cornell University and the University of Notre Dame, but none specifically mentioned figure drawing in their curricula.

by mathematical graphic scale. Additionally, they also offer a functional and characteristic sense of a building when properly depicted (Anderson, 2002).

The concept of measurement and scale in architectural design begins with the proportions and dimensions of human anatomy. For example, the standard units of building materials, such as timber, brick, and many others, are based on human body dimensions. The measuring unit in America, the British Imperial system, refers to the human body. Therefore intuitively, knowing our body dimensions is the beginning of learning architectural scale. Figure drawing is an effective form of learning architectural scale. „Drawing entails another form of measurement,” Gussow went on, „from the vast panorama of what the eye perceives, one needs to isolate, translate, and transcribe an image and proportion it to fit the two-dimensional confines of a finite sheet of paper.” (2008, p. 15).

Translating a three-dimensional body form onto a two-dimensional surface through drawing is another method of learning about scale. For example, depicting a six-foot body on the 4”x 6” sketchbook requires complex skill and an understanding of scale. While each body element is scaled to the measure of the page, the process is the exercise of learning space concerning scale. Translating three-dimensional reality onto a two-dimensional surface through drawing is another form of measuring and learning about scale. The way one draws reflects the way one thinks. Freehand drawing is part of learning to think spatially when freedom and constraints are intertwined. (Fig.03) exhibits an experiment by the author on shifting and changing the scale of human figures on a two-dimensional surface of the paper. Moreover, the skill gained from the exercise of transforming a three-dimensional form onto a sheet of paper will be beneficial for students to strengthen a sense of scale in architectural design.



Fig. 03. Figure drawing and scale.

Source: author.

Eventually, students will use computational tools to create and produce their drawings as they progress to the upper levels of their study. However, the figure drawing and observational exercises will fortify their insights and scale awareness. As a result, students will establish a firm foundation before shifting their method of drawing to computer-aided tools.

Body diversity and drawing for compassion in design

The architectural design task is to respond to the need of others—architects design spaces and architecture to support others to the best of their ability. To fully understand the needs of others, architects must consider themselves from the clients' viewpoints. In other words, they altruistically imagine themselves as a client, then design the building for him/herself. With this benevolence of thought, compassion in the design process is seeded (Robinson & Pallasmaa, 2015). In contemporary design education, initiating such an altruistic viewpoint in the young generation is vital, and figure drawing could be a doorway to developing compassion for others. Engaging our observation of a place and people through freehand drawing brings us closer to the place and the person. Popowsky argues that a person who has spent a decade observing and sketching how people sit on chairs and benches will likely be able to design a good chair and bench for sitting. (Popowsky, 2019). If we have studied/drawn many people, we are more likely to develop compassion toward each individual. This feeling is the seed of body inclusivity and compassion in design when an emphatic thought originates from the beginning of a design process.

Historically, the study of human form and dimension has been based on 'male Grego-Roman forms,' which limited and narrowed the perception and idea of beauty in human form. However, attention to human figure diversity is gaining momentum in the current era, particularly in art. For example, a group of artists formed a project called Figure on Diversity, which concentrates on traditional skills of representing the human form. Unlike the traditional approach, the project provokes awareness and celebrates the beauty of human bodies with assortment. With a similar approach, architectural education can implement the idea of body diversity in design. Introducing students to various body types and forms through figure drawing will empower their understanding and compassion for other human beings. As Steinhart (2004) argues in his book, *Undressed Art*, learning to draw figures requires much observation. The opportunity to observe various types and differences in bodies from various ages and genders enables practitioners to look deeply. This intense observation is linked to developing a human connection. Consequently, the process is a gateway to developing compassion.

Implications

Based on the constraints of the existing curriculum where the author teaches, it excludes ergonomic study and figure drawing from foundational levels. Therefore integrating figure drawing and human anatomy into regular drawing or studio courses is in the experimental stage. By not adding extra courses to the already dense curriculum, the subject could be integrated into any introductory design course,

ideally in the program's first year (Meiss, 2013). With the circumstances in mind, the author selected a student from a second-year studio course who showed interest in figure drawing and asked the student to practice figure drawing in parallel with studio design development routinely.

The author began by introducing a figure drawing book, *Drawing from Life* by George Bridgman, as a reference to the student and asking him to spend ten to fifteen minutes practicing figure drawing at the beginning of each studio session. The introduction to figure drawing began with the author introducing an essential human proportion and scale to the student by demonstrating a method of figure drawing and using 7.5 human proportions as the focus of the practice. The author also introduced the human skeleton, which would help the student apprehend the human structure. After a few weeks of practice, the student had developed a better understanding and gained confidence in his figure-drawing skills. In addition to regular practice, the author gives input regarding the student's drawings by further demonstrating the method in more detail (Fig.04).



Fig. 04. Figure drawing and proportion studies.

Source: Sophomore student's drawing after George Bridgman.

With this experiment, the author hoped to see if the routine practice of figure drawing would strengthen the student's sense of scale in the design process and representation compared to students who regularly use digital tools as the primary method of designing and representation. (Fig.05) showcases the work of the student. Through repetitive figure drawing practice, the drawing demonstrates that the student could discern the notion of scale and proportion of space in conjunction with the human dimension and bodies during a design process, as evidenced in his section drawing.

In addition to understanding the scale of the building in relation to bodies for communication and representation, the expression of building occupation or human actions can help to explain the effect the building has on occupants and how people shape their environment (Anderson, 2002).

Based on the author's experimentation and observation, the notion of scale not only exists via depicting human figures in a drawing. It is rooted in an awareness of scale through a comparative measure of the student's body and the architectural spaces he designed via his figure drawing. The following quote is the testimony of the student responding to the question, What are the benefits of figure drawing practice in conjunction with an architectural design course?

Growing more familiar with the proportions of the human figure has proven extremely helpful in informing the proportions of designed space. Being able to sense the scale necessary for certain actions or activities allows me to understand and create much more effective spaces, with less effort spent. In understanding the rhythm and balance found in the body, one can much more easily understand those found in the built environment².

The span of this figure drawing practice in architectural curriculum experiment was an entire semester which is four months long. The practice could be continued if the student selects to do so. Based on the author's direct experience, routine practice of figure drawing for 15-20 minutes in each studio session throughout the semester will be more effective than a few assignments at the beginning or the end of the semester as these skills are strengthened through routine practice.

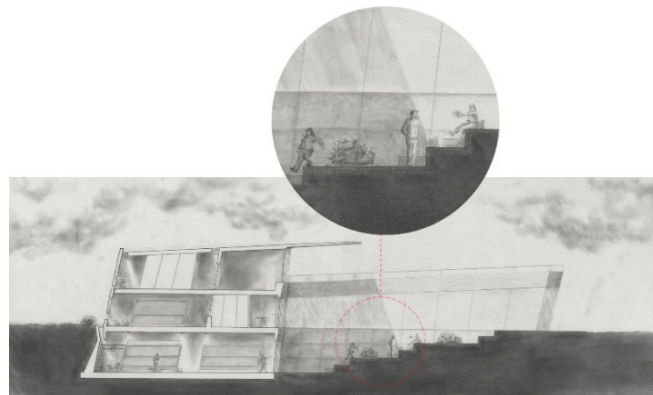


Fig. 05. Figure drawing and scale in architectural spaces.

Source: Sophomore student's drawing.

² This quotation represents the student's statement regarding the benefits of learning figure drawing to support his architectural studies and how the skills and knowledge gained from this experiment strengthened his sense of scale in the architectural design process. The student wrote the testimony a month after completing a semester of figure-drawing practice. He has continued practicing figure drawing and incorporating the skills and knowledge into this design process as he progresses in his education.

Conclusion

Developing a sense of scale is essential in architectural design. Awareness of human proportion and scale is a vital part of this equation. The impactful method to comprehend human proportion and scale is by learning to draw human figures, yet this awareness further empowers architects to step into an ontological dimension of architecture. The practice of figure drawing is a doorway to developing compassion for others, and that is the heart of architectural design, the concern for others' well-being through creating meaningful architecture. In architectural pedagogy, a sense of scale through figure drawing should be established at the early stage of student learning. The first-year curriculum is ideal for integrating and introducing students to the topic. As they progress through the school curriculum, they will begin to see the benefit of figure drawing practice and how it can enrich their sense of scale in architectural design. Although most students will gradually adopt computational tools to aid their design process and production, they may no longer create drawings by hand. However, there is an unbounded and subtle connection between this transition. The awareness of human proportions and dimensions established during their formative years of learning will remain in them. It is a foundation that students must establish before advancing to the next level of their education.

The images accompanying this article embody the author's argument that learning to draw figures could strengthen architects' and students' sense of scale. While the article is scholarly, it also resulted from the author's direct experience as an architect and educator who actively engages in drawing, architecture, and teaching. Through first-hand experience, how the practice of figure drawing empowers the author's confidence in the design and a sense of scale is the immediate motivation for developing this article, with the hope that this effort will aid architectural students in the digital age.

For further investigation, this experiment should be conducted at the freshman level of study before students acquire any architectural knowledge and compare whether figure drawing and human proportion studies will amplify students' sense of scale when engaging with architectural design. A longer term of study would be helpful with short practices over an entire school year. It is also worth considering drawing from cast or live models rather than from reference images. This approach enables students to practice transforming a three-dimensional form onto a two-dimensional paper surface and changing scale. While this experimental study with one student may not be enough to draw a solid conclusion, it does provide some positive findings on what figure drawing could offer students in architecture foundation courses.

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