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## Multiple Intelligences Theory and Architectural Education

Peter Holgate

Art and design subjects, including architecture, have traditionally attracted students with aptitudes and skills that are not necessarily acknowledged nor appreciated by the dominant text-based learning and teaching methods employed in the majority of secondary or university-level curricula. An entrenched preference to assess verbal and written skills consequently misses the additional evaluation of attributes and abilities that may contribute to a scholar's academic profile and potential. In response to this hegemonic state, Howard Gardner's theory of "multiple intelligences" seeks to acknowledge and categorize a more comprehensive consideration of functional, affective, creative, and applicative skills.<sup>1</sup> Gardner's original theory separates a normative, singular conceptualization of intelligence into eight discrete "modalities" that may more accurately reflect the range of abilities required for full human functionality:

1) musical-rhythmic, 2) visual-spatial, 3) verbal-linguistic, 4) logical-mathematical, 5) bodily-kinesthetic, 6) interpersonal, 7) intrapersonal, 8) naturalistic.

In terms of educational development, traditional teaching and learning approaches tend to favour teaching and assessment methods that focus upon "verbal-linguistic" and "logical-mathematical" modalities. Evaluation of human capacities in the other six fields appears to be relatively under-represented. Therefore, the research project "How do architects think and design space" conducted at the ZHAW and ETH Zurich, holds the promise of multiple benefits for enhancing educational approaches, particularly in the development of objective methods of evaluating visual-spatial intelligence and abilities. This initiative has particular value for the development and assessment of spatial, perceptual, and problem-solving skills within architectural design. Principally, this research tool can be used to evaluate the existing abilities of participants and students, in order to interpret two-dimensional information as three-dimensional models (and vice versa); to mentally rotate three-dimensional forms and to visualize such volumes from alternative perspectives; and, in architectural terms, to correlate plans, sections, and elevations from singular two-dimensional forms. Identification of such "visual-spatial" intelligence may provide an initial indication of participants' potentials for design thinking, visualization skills, and three-dimensional creativity, with the potential to predict possible success in both current and future professions that demand such key skills as deductive reasoning and complex problem solving.<sup>2</sup> The empirical methodology employed in the online evaluation may also provide an empirical alternative to the subjective "connoisseurship" models of assessment that still prevail in arts and design education<sup>3</sup>, having a potential application to identify untapped spatial intelligence capacities at the outset of a student's education.

Additionally, the longitudinal nature of this inquiry provides an opportunity to test whether such "visual-spatial" intelligence is developed or enhanced through the normative methods of architectural design education. Such a transformative impact would appear to be an intrinsic aim of such pedagogies<sup>4</sup>; the National Architectural Accrediting Board, responsible for validation of courses of architecture in the USA, demands that curricula develop "graduates with an understanding of design as a multidimensional process involving problem

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<sup>1</sup> Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences* (New York: Basic Books, 2004).

<sup>2</sup> Hasan Bakhshi, Jonathan M. Downing, Michael A. Osborne and Philippe Schneider, *The Future of Skills: Employment in 2030* (London: Pearson and Nesta, 2004), p. 67.

<sup>3</sup> Helena Webster, "The Assessment of Design Project Work (Summative Assessment) [Briefing Guide No. 09]," (1 March 2007), <https://www.heacademy.ac.uk/knowledge-hub/assessment-design-project-work-summative-assessment-briefing-guide-no-09> (accessed: 30 July, 2019).

<sup>4</sup> Jack Mezirow and Edward W. Taylor, *Transformative Learning in Practice: Insights from Community, Workplace and Higher Education* (San Francisco: Jossey-Bass, 2009).

resolution and the discovery of new opportunities”.<sup>5</sup> Realm A of this document, entitled “Critical Thinking and Representation,” concerns student performance criteria, and pays particular heed to the student’s acuity with two- and three-dimensional design skills.<sup>6</sup> However, in seeking to achieve these learning outcomes, architectural education tends to remain uncritically wedded to many traditions of nineteenth-century Beaux-Arts studio teaching methods.<sup>7</sup> A systematic and objective evaluation of whether these traditional methods actually improve the spatial intelligence of students over the course of their studies is long overdue; utilizing this tool could complement the few comparable inquiries that foray into this territory.<sup>8</sup>

As an overarching theme, the development of this tool provides a wide-ranging assessment strategy that directly evaluates spatial intelligence through disciplinary-appropriate visual methodologies<sup>9</sup>, thereby acknowledging the authentic application of multiple intelligences within architectural design.<sup>10</sup> This visual focus has particular value with respect to students with dyslexia and other similar neurological conditions, who may not excel in the evaluation of “verbal-linguistic” skills, but who may well be capable of excellence in art, architectural design, and visual communications.<sup>11</sup> Fitzwater illuminates the “emancipatory” possibilities inherent in unlocking the untapped potential of students who are deemed to “fail” by normative and narrow educational approaches. Imaginative, student-centered methods of teaching, learning, and assessment serve to democratize opportunities for learning and development, through a sophisticated appreciation of diversity of academic literacies and individuated talents.<sup>12</sup>

## Discussion

The ZHAW and ETH Zurich inquiry, assessment, and training tool provides a valuable addition to ongoing discussions of spatial cognition and spatial intelligence. Participant engagement is enhanced by the problem-based “gamification” of the evaluation, and the range of assessment tasks within the test span a variety of abilities and academic challenges. In future iterations, this methodology could seek to discern increasingly sophisticated academic levels of spatial intelligence, as categorized in Jo and Bednarz’s conceptualization of a taxonomy of spatial thinking (Fig. 1).<sup>13</sup> An ethical issue arises with the potential to use this tool to evaluate the potential of prospective and new students of architecture, regarding whether or not they have the spatial intelligence and abilities to succeed in architectural education (and therefore whether they are admitted into

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<sup>5</sup> National Architectural Accrediting Board (NAAB) (2014) “2014 Conditions for Accreditation” (18 July, 2014)

[https://www.naab.org/wp-content/uploads/01\\_Final-Approved-2014-NAAB-Conditions-for-Accreditation-2.pdf](https://www.naab.org/wp-content/uploads/01_Final-Approved-2014-NAAB-Conditions-for-Accreditation-2.pdf) (accessed 24 July, 2019), p. 11.

<sup>6</sup> Ibid., p. 16.

<sup>7</sup> Thomas A. Dutton (ed.), *Voices in Architectural Education: Cultural Politics and Pedagogy* (New York: Bergin & Garvey, 1991); David McClean, “Embedding Learner Independence in Architecture Education: Reconsidering Design Studio Pedagogy,” PhD thesis (Robert Gordon University, 2009); Charles Doidge, Rosie Parnell, Rachel Sara and Mark Parsons (2006) *The Crit. An Architecture Student’s Handbook: Seriously Useful Guides* (Oxford: Architectural Press, 2006); Garry Stevens, *The Favored Circle: The Social Foundations of Architectural Distinction* (Cambridge, MA: MIT Press, 1998).

<sup>8</sup> Magda Mostafa and Hoda Mostafa, “How do Architects Think? Learning Styles and Architectural Education,” *International Journal of Architectural Research* 4, No. 2, (July 2010), pp. 310–317.

<sup>9</sup> Gillian Rose, *Visual Methodologies: An Introduction to Researching with Visual Materials* (London: SAGE, 2016).

<sup>10</sup> Newton D’Souza, “Design Intelligences: a Case for Multiple Intelligences in Architectural Design,” *ArchNet-IJAR: International Journal of Architectural Research* 1, No. 2 (July 2007), pp. 15–34.

<sup>11</sup> Lynda Fitzwater, “Theory and Practice in Art & Design education and Dyslexia: The emancipatory potentials of a neurodiversity framework,” *Humana.Mente Journal of Philosophical Studies* 11, No. 33 (2018), pp. 121–143; Peter Holgate, “Developing an inclusive curriculum of architecture for students with dyslexia,” *Art, Design & Communication in Higher Education* 14, No.1 (July 2015), pp. 87–99.

<sup>12</sup> John Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (London: Simon & Brown, 2011); Paulo Freire, *Pedagogy of the Oppressed* (New York: Continuum, 2000).

<sup>13</sup> Injeong Jo and Sarah Witham Bednarz, “Evaluating Geography Textbook Questions from a Spatial Perspective: Using Concepts of Space, Tools of Representation, and Cognitive Processes to Evaluate Spatiality,” *Journal of Geography* 108, No. 1 (2009): pp. 4–13.

such courses of study). However, the longitudinal nature of the study also seeks to uncover whether spatial intelligence can successfully be developed over **several** years of study, possibly balancing out this potentially negative consequence.

In contrast, this position paper argues that the inquiry’s visual methodologies to evaluate spatial cognizance provides a model of emancipatory assessment, in that it aligns with a “multiple intelligences” approach that could benefit non-traditional students, particularly those with neurodiverse profiles that are hindered by normative educational models. In similar fashion, it could be argued that a multiple intelligences approach to architectural and arts education could well encompass many more of Garner’s “modalities” to successfully reflect the complexity of the discipline and the diversity of its practices.<sup>14</sup>

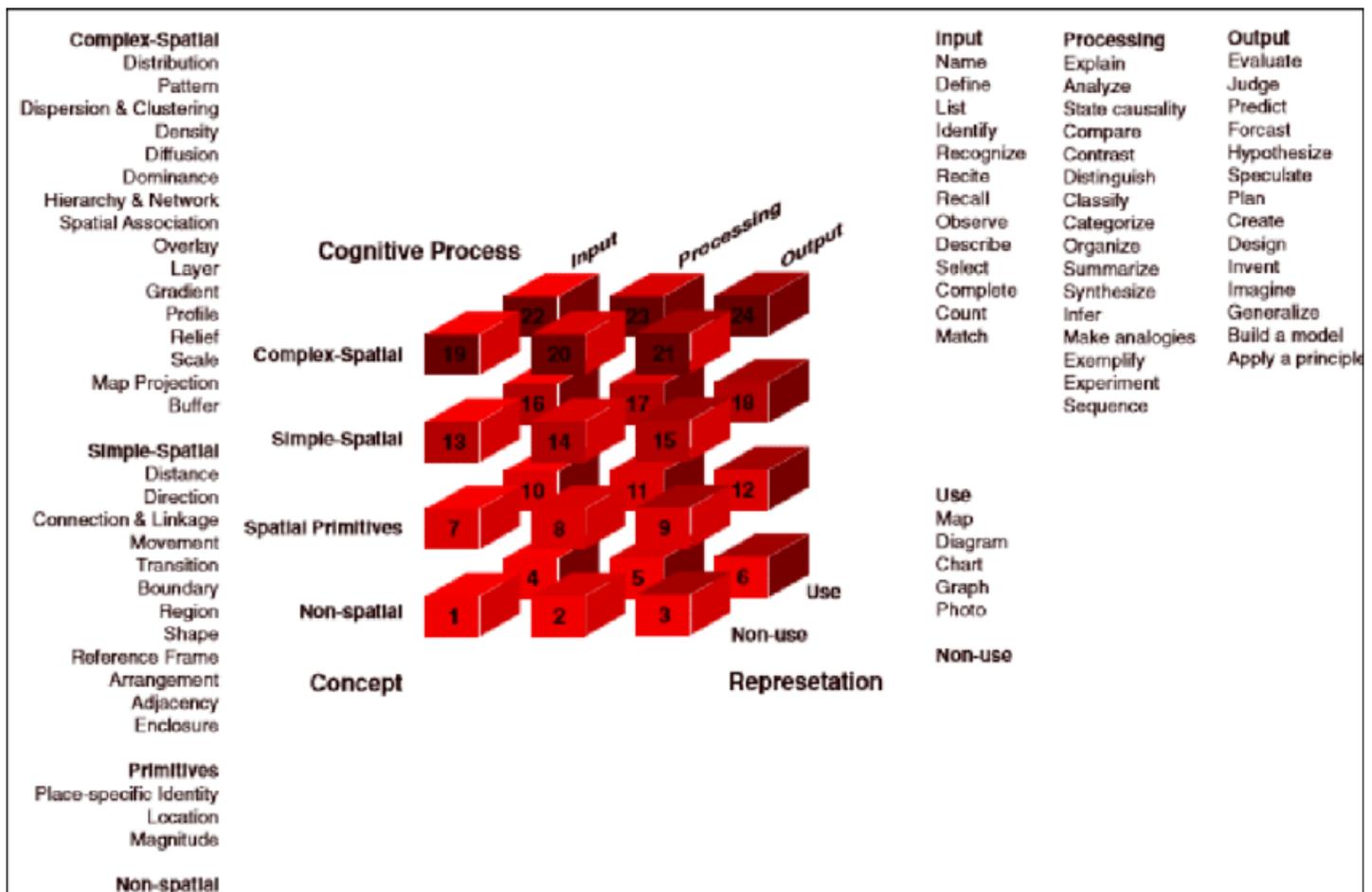


Fig. 1: Taxonomy of Spatial Thinking by Jo and Bednarz

<sup>14</sup> Angela Clarke and Peter Cripps, “Fostering Creativity: A Multiple Intelligences Approach to Designing Learning in Undergraduate Fine Art,” *International Journal of Art & Design Education* 31, No. 2 (June 2012), pp. 113–126; D’Souza, 2007.