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Grammar and Quality: Assessing the Design Quality of Grammar-System Generated Architecture

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In architectural research the SPT 2017 challenge of understanding things by their grammar has been taken up. Grammar systems have, for instance, been developed for analysing the design principles of types of architectural artefacts as Palladio villas and Queen Anne houses. The understanding these analytic grammars give of the artificial world may already be the topic of philosophical research. This paper focuses on a further challenge that grammars may bring to philosophy and that is their use for designing new architecture. This further use of grammars may seem business as usual, since it is merely the transition from descriptive tools to prescriptive ones. Within architecture it however raises fundamental questions. Are designs generated with grammar systems true architecture? Have grammar-system designs the same quality as designs created by human architects? In this contribution we take up the challenge of answering this last question. We present a research method for assessing the quality of grammar-system generated designs, and give the outcomes of an experiment done with it. This contribution may be taken as work on the broader methodological challenge of validating design tools.

Our case is a grammar system developed for analysing refurbishment design of Rabo-de-Bacalhau apartments, a specific type of housing in Lisbon, Portugal. This grammar system generates new refurbishment designs, leading to the question about their quality we have taken up. An approach to answering it is to first define design quality and then test if the grammar generated designs have this quality. A drawback of this approach is that it makes the answer dependent on the adopted definition of design quality, and that a positive outcome leads to further tests with sharpened definitions of design quality. For avoiding this we operationalised design quality in a manner that is customary in architecture: we organised an architectural competition in which a panel of architectural evaluators ranked sets of refurbishment designs for Rabo-de-Bacalhau apartments that included designs generated by the grammar system and designs created by human architects. We thus could demonstrate that grammar systems can generate designs that are of sufficient quality.

Eloy, S., Vermaas, P.E. & Andrade, M., The Quality of Designs by Shape Grammar Systems and Architects: A Comparative Test on Refurbishing Lisbon's Rabo-de-Bacalhau Apartments. *Journal of Architecture and Planning Research*.