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RHETORIC AND DESIGN

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ABSTRACT

The relationship between rhetoric and design has been the subject of numerous scholarly publications in the last fifty years, but has not been addressed by scholars of engineering design. This paper argues that the relationship is important for theory and practice of design in all its varieties, principally by providing evidence from the literature that rhetoric and design share key characteristics. Both
- are broadly applicable across subject matters
- concern the particular and the probable
- require invention and judgment, and
- involve arrangement in space and time

From ancient times through the Renaissance, rhetoric was a key element in education, and its methods were widely adapted to other arts, including design. Rhetoric's loss of status in modern times is explained, and its resurgence in the latter part of the 20th century is described through the works of three scholars that focus on the relationship between rhetoric and design. The conceptualization of these scholars is best represented in the view that rhetoric is design limited to words and design is rhetoric with an unlimited palette.

Keywords: design, invention, rhetoric, theory

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1   INTRODUCTION

The relationship between rhetoric and design is the topic of numerous academic publications in the last forty-five years (Buchanan, 1985, 1990, 1995, 2001a, 2001b, 2007; Crilly, et al., 2008; Foss, 2005; Friess, 2010; Frith, 2004; Hart-Davidson, 2007; Kaufer and Butler, 1996; McKeon, 1971, 1987; Patterson, 1997; Quek, 2010; Sheridan, 2010; Vickers, 1987; Wrigley, et al., 2009), but does not appear to have been addressed in engineering design[1]. This paper proposes to remedy that omission, arguing for the importance of rhetoric in relation to design theory and practice.

If it can be shown that rhetoric is a type of design, it makes sense to explore what can be learned about design from rhetoric. In the following, we first provide a brief description and history of rhetoric and the relationship between rhetoric and design. We then argue that rhetoric is a type of design, and propose three research topics, study of which could improve our understanding of design theory and practice.

2   A BRIEF HISTORY OF RHETORIC

Rhetoric originated in ancient Greece as the art of public speaking; arguing legal cases, speaking for or against public policy, and praising the dead in funeral orations. Aristotle was the first to provide a systematic account. For Aristotle, rhetoric was "…the faculty (power, capability) of observing in any given case the available means of persuasion" (Aristotle, *Rhetoric* 1355b, 26-27; translation from McKeon, 1941).

Rhetoric was understood to involve invention, arrangement, style, memory, and delivery, all of which could be taught. Aristotle's theory of rhetorical invention was based on topics, or places from which to launch arguments, such as similarity and difference, better and worse, etc. Arrangement concerned the structure of a speech, style and delivery concerned methods of effective presentation, and memory, obviously restricted to unwritten speeches, concerned aids to memorization.

In addition, three contributors to persuasion were identified: logos-rational argumentation, pathos-appeal to emotions, and ethos-gaining the confidence of the audience through the speaker's reputation and behavior.

With Aristotle's account, rhetoric earned a place in the essential human arts. The ability to speak persuasively about political and social matters was an essential capability of the citizens of Greek city-states, and subsequently of the Roman Republic.

2.1   Rhetoric's decline

Rhetoric has been understood differently in different historical periods. Taking a giant step forward in time, all the way to Descartes, we see a degradation of rhetoric compared to classical Greece and Rome. This decline in repute was a consequence of the Cartesian theory of knowledge.

According to Perelman and Olbrechts-Tyteca (1969): "Now Descartes' concept…was to take well nigh for false everything which was only plausible. [He]…made the self-evident the mark of reason, and considered rational only those demonstrations which, starting from clear and distinct ideas, extended, by means of apodictic proofs, the self-evidence of the axioms to the derived theorems." And further along (p.3), "It is the idea of *self-evidence* as characteristic of reason, which we must assail, if we are to make place for a theory of argumentation that will acknowledge the use of reason in directing our own actions and influencing those of others."

If legitimate argumentation is limited to apodictic proofs, grounded in self-evident axioms, rhetorical argumentation is necessarily illegitimate. Descartes replaces persuasion, understood by Aristotle as the soul of the audience inventing itself about matters particular and probable, with *demonstratio* (demonstration). Persuasion is not needed because proof results from the force of self-evidence. As a consequence of the dominance of Cartesian thought, understanding the meaning of spoken or written words was suppressed by an immediate striving to judge their truth. Since invention occurs both in the mind of the speaker/writer and also in the mind of the listener/reader, in the Aristotelian view, a result of the Cartesian shift was an expulsion of both invention and judgment from rhetoric. Both were ceded to logic.

The degradation of rhetoric with Descartes persists into modern times. Most people equate rhetoric at

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[1] A search for "rhetoric" in the journal Research in Engineering Design and in the Journal of Engineering Design yielded two articles in each, none of which addressed the relationship between rhetoric and design.

best with 'mere ornamentation' in speech. Even more common is the use of the term "rhetorical" to indicate illicit behavior, attempts through speech to make the worse appear the better or otherwise to illegitimately advance the speaker or writer's interests to the disservice of society.

In the latter half of the 20th century, rhetoric began a recovery. The focus in this paper is on those modern scholars that focus on the relationship between rhetoric and design. Their contributions will be described in the following section, after another brief detour through historical changes in how the relationship between rhetoric and design has been conceived.

3   THE RELATIONSHIP BETWEEN RHETORIC AND DESIGN IN HISTORY

Whatever the changes in how rhetoric was understood, why associate rhetoric and design? Has that connection previously been made?

3.1   Aristotle

For Aristotle, rhetoric's subject matter was understood to be drawn from specific fields, of which the most common were ethics and politics, which Aristotle understood to belong to *phronesis,* knowing how to behave in society. However, he evidently believed that rhetoric also applied to another of his three types of knowledge[2]; namely, *techne* (productive science), which involved both thinking and making (Aristotle, Metaphysics 1032b15-17, in McKeon, 1941). Hence what we call 'design' was included in Aristotle's concept of *techne.* Indeed, according to the Stanford Encyclopedia of Philosophy article on Aristotle, "Another form of productive science is rhetoric…." (Shields, 2008). Rhetoric produces persuasion, like medicine produces health, poets produce poetry, and carpenters produce ships.

Although Aristotle speaks of *techne* as practiced by individuals, the introduction of collaboration brings with it the need for persuasive argumentation in the service of planning and coordination, recognizing that design is to a large extent co-created by a number of different specialists. Also, apart from social production, an individual producer has to go through an internal dialogue to persuade himself that a possible method will be effective. Mindful that production has always depended upon knowledge regarding the materials of construction and their physics, which is drawn from *episteme*, nonetheless the application of those principles is made in specific conditions with some degree of uncertainty regarding forecasts. According to Aristotle, knowledge (episteme) of things that change is limited. Principles apply for the most part and understanding the causal relationships expressed in those principles constitutes knowledge. However, it is not possible to know when accidental, infrequent conditions will exist that prevent the causal relationship holding. Consequently, such knowledge-based 'arts' do not always succeed. For example, the physician's treatment, though based on knowledge of principles, may fail to cure the patient.

It appears plausible that Aristotle's *techne*, and hence design, requires rhetoric; i.e., reasoning concerning the particular and probable. While not fully assured of achieving objectives, even with knowledge of generally applicable principles (this seems to be the sense of 'probable'), it is possible to attend to the particularities in each case. What does this customer need? What are his constraints of location, time, money, etc.? What other stakeholders must be taken into account?

3.2   Vitruvius

Another link between rhetoric and design is found in Vitruvius (See the 1960 edition of his famous work; original publication date ca. 30 BC). According to Frith (2004):

> "The significance of the reliance by Vitruvius on rhetoric cannot be overstated.
> Architecture takes on the character of oratory in Western traditions, such that buildings
> are expected to 'say' something. In the *Ten Books*, the way we are encouraged to judge
> architecture is the same mode of reasoning that oratory was to be judged by. Some of
> the key words in the lexicon of architecture find their way there from the teachers of
> rhetoric. Etymologically the word for plan or plot is shared with that of the 'plot' or
> narrative thread of a speech. The word 'elevation' to describe the public face of a

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[2] According to Shields (2008), "The principles of division are straightforward: theoretical science [episteme] seeks knowledge for its own sake; practical science [*phronesis*] concerns conduct and goodness in action, both individual and societal; and productive science [*techne*] aims at the creation of beautiful or useful objects." *Terms in brackets [ ] added.*

building is borrowed from rhetoric's demand for an 'elevated' mode of speaking. The way Vitruvius teaches us to design a work of architecture is similar to that for putting a speech together, through invention, arrangement, memory, delivery, and style."

Frith goes on to connect Vitruvius' rhetorical concept of architecture with Aristotle's idea that the purpose of all things that arise from nature and from production (*techne*) "...is the inherent design that it carries within itself." Richard Patterson (1997), in an earlier paper on Vitruvius, anticipates Frith's interpretation: "*De architectura* was intended as a codification not of the 'art' of building as it was practiced, but of the modes of discourse that might be employed to capture its discontinuous technical rigors and present them in a form susceptible to standard, critical, rational judgment." Richard Buchanan (1990) finds in Vitruvius support for the intimate relationship between understanding and practice in all design arts: "...the ability to explain is an integral part of practice: it enables the designer to judge the progress of work at each stage and *persuade* [emphasis added] colleagues and clients that a particular design is effective in a given situation." (fn 17 and p.78).

3.3   The Visual Arts and Music in the Renaissance

According to Brian Vickers (1987), "...rhetoric offered the only complete and integrated communication system" in the Renaissance. In addition, there was a revival in the 14th-15th centuries of an educational system based on the language arts: grammar, rhetoric and logic. Consequently, discussion of the visual arts and music was chiefly informed by concepts and structures from rhetoric.

Alberti's *De Pictura*, the most influential guide to criticism of the visual arts (painting and sculpture) in the Renaissance, is structured on the model of Quintilian's *Institutes of Oratory* (2001; originally published ca AD 95). Basic is the need to exteriorize feeling following Cicero's comments on gesture, by which "...the body talks, so it is all the more necessary to make it agree with the thought; and nature has given us eyes…to indicate the feelings of the mind…." (Cicero, *De Oratore*). "We painters…who wish to represent emotions through the movements of limbs,…" (Alberti, quoted by Vickers, 1987). As noted by Vickers (1987), even today, "….we talk of being 'moved' by this work of art, 'left cold' by that."

The fact that both oratory and music are performing arts, executed through time, provides some basis for analyzing them using the same concepts; e.g., theme, motive, phrase, metrics, rhythm, period, exposition, episode, accent, articulation, figure, style, composition (Vickers, 1987, quoting Gurlitt, 1966). Music was understood as telling a story, with the consequence that instrumental music was subordinated to words, evident in opera. The subordination of music to movement occurs in ballet, another of the performing arts. This subordination of music proper can be taken as an indication of the limits of the analogy between music and the language arts, since music has no fixed system of denotation; i.e., specific sounds standing for something else, but the endurance of opera and ballet as high arts equally shows the power of the analogy.

Raymond Quek (2010) understands the appeal to rhetoric and other liberal arts as attempts to elevate the status of the mechanical arts, including painting, sculpture and architecture. This led to a gradual separation of designing from making, culminating ultimately in the modern conception of design as a set of instructions that do not require oral communication. However, Quek argues that the Renaissance humanists understood design excellence as parallel to the eloquence achieved by an orator. "Like nature, the architect imposes form on matter. His measure of excellence is in active invention in contextual situation, the equivalent of creative eloquence, an ability to 'breathe life in the artwork'." (Quek, 2010, p.15).

4   THE MODERNS ON RHETORIC AND DESIGN

Evidently, the relationship between rhetoric and design has a basis in history. Indeed, Vitruvius to a large extent anticipates modern thinking regarding architecture and the Renaissance's alignment of the visual and performing arts with the language arts further expands the nest of relationships. Turning now to direct examination of selected publications and authors from modern times, we start with Richard McKeon's (1971) "The uses of rhetoric in a technological age: Architectonic productive arts". Even though McKeon himself does not explicitly link rhetoric and design, his vision established the framework within which scholars have made that link. Kaufer and Butler's (1996) *Rhetoric and the Arts of Design* makes the link explicit, arguing that rhetoric belongs among the arts of design. In Buchanan's (2001)"Design and the new rhetoric: Productive arts in the philosophy of culture", he argues that rhetoric is design limited to words, and, echoing both Vitruvius and Alberti, that design is

rhetoric with an unlimited palette.

4.1   Richard McKeon (1971)

An important Aristotelian scholar in his own right, McKeon builds on Aristotle's conception of rhetoric as being unlike the various sciences, each with their own specific subject matter and methods. Rhetoric is rather understood as among the universal, architectonic arts, applicable to a broad range of subject matters, and, in fact, defining and differentiating subject matters one from another---directing and organizing thought concerning any subject-matter. This architectonic role is said by McKeon to be most evident in two historical periods, the Roman Republic and the Renaissance, when "...rhetoric was enlarged to become a productive or poetic art, an art of making in all phases of human activity." He calls for rhetoric to play the same role in the modern, technological age, and accordingly, to shape its culture and "...to reorganize the subject-matter and arts of education and life."

In the Roman Republic, Cicero is said to have used rhetoric to structure a program of education and culture designed to meet the challenge of that historical period; namely, to reunite eloquence and wisdom in action. That program of education and culture ultimately produced Roman Law, said by McKeon to be "the great architectonic achievement of the Romans". However, the rhetoric of political deliberation fell into disuse when the Roman Empire replaced the Republic. With the Emperor or his minions making all the decisions, there was no space for public deliberation. Subsequently, deliberative rhetoric shrunk back into "...an art of verbal construction and exhibition...." and the divide between eloquence and wisdom reappeared.

In the Renaissance, again rhetoric became a "...productive architectonic art of all arts and of all products rather than a productive technical art of language and persuasion." But that bond between eloquence and wisdom was again broken, emerging as distinctions between art and nature, values and facts, and finally the humanities and the sciences, expressed in the rejection of invention in the sciences: "Despite the fact that 17th century scientists employed both methods of discovery and of proof, by the 19th century, "...scientific method was conceived as a method of proof,..." and there was widespread agreement that there was no method of discovery."

In McKeon's view, our modern, technological age again requires that rhetoric become an architectonic art, enlarged beyond preoccupation with speech and the written word to become an art of producing all things and arts. Ours is an age disposed to and needful of this expansive rhetoric. To paraphrase McKeon:

> 'Rhetoric has replaced metaphysics in the past, when the organization and application of the arts and sciences were based, not on supposed natures of things or forms of thought, but on recognition of the consequences of what men say and do.' (McKeon, 1971, p.18)

4.2   David Kaufer and Brian Butler (1996)

Kaufer and Butler argue that rhetoric belongs to the family of arts we associate with design, of which they list engineering, architecture, graphics and musical composition. They appeal to a variety of descriptions of acknowledged arts of design and argue that rhetoric fits those descriptions. Their primary source is Goel & Pirolli's 1992 paper "The structure of design problem spaces". Having argued that design cannot be described through necessary and sufficient conditions, Goel and Pirolli offer eleven general characteristics in that paper, characteristics said to be 'more or less central to, but not strictly required for, a generic design art':

1. The nature of a design problem does not strictly determine what the designer can or should do.
2. Design problems have two very different sets of constraints. 1st, similar to non-design problems, are the logical constraints that constitute the problem description. Change the constraints and you change the problem. 2nd, unique to design problems, are the constraints that underlie the choice set of the designer--historical, social, and cultural information. These can be modified in refining the problem prior to solving it.
3. The size and complexity of the problem.
4. The contingent modularity of design environments. Because of #3, design problems must be divided into modules. That division can be done many different ways.
5. Interdependence of modules.
6. Only better or worse 'answers', not right or wrong ones. Test: fitness for purpose.
7. Open process of design versus closed process of non-design problem solving. The goals, desires,

needs, and expectations of clients and consumers must be taken into account in order for the design to succeed.

8. Comprehensive assessment of the design comes only with use of the artifact.
9. Despite #8, the costliness of a design failure makes pre-use testing necessary.
10. Designs can be judged apart from their designers and their rationales for producing them.
11. The distinction between specification and delivery; between the design and its embodiment in a concrete artifact or performance.[3]

Kaufer and Butler's book is devoted to arguing that rhetoric shares all eleven characteristics, except #10, which they consider wrong. They focus on those they consider problematic as regards their applicability to rhetoric, and argue by developing a theory of rhetoric that aligns it with design, then validating their theory by reference to the Lincoln-Douglas debates.

4.3   Richard Buchanan (2001)

While Kaufer and Butler treat the relationship between rhetoric and design from a background in rhetoric, Buchanan does the opposite. Long a prolific and influential writer on design theory, he provides a bridge between design and McKeon's concept of an architectonic rhetoric, proposing that design has begun to function as an architectonic productive art, and "...offers a pathway for bringing theory--ideas about the nature of the world and how we should live our lives--into closer relationship with practical action and the creation of diverse kinds of products and experiences."

Buchanan proposes that "...all products are vivid arguments for how we should live our lives". He applies the three rhetorical themes of *logos*, *pathos* and *ethos* to understand how products persuade and influence us.

In rhetoric, *logos* is the rational argumentation in speech or writing. In design, *logos* is the "...technological reasoning or the intelligent structure of the subject of their design." Success in *logos* means the product is capable of doing its work.

In rhetoric, *pathos* is the appeal to the emotions and social circumstances of the audience. The designer also tries to provide features that appeal to specific users, but *pathos* is operative also in the concept of affordance; i.e., the suitability or fit of a product for a user. Success in *pathos* means the product is usable by humans.

Lastly, in rhetoric, *ethos* is the character of the speaker/writer made evident in speaking/writing, thereby achieving a special relationship with the audience through appearing trustworthy. In design, *ethos* may be understood as the 'voice' of a product, referenced in 'brand name'. Success in *ethos* means the product is desirable.

> "If a product is persuasive in the debate about how we should lead our lives, it is so because a designer has achieved a powerful and compelling balance of what is perceived to be useful, usable and desirable."

Finally, Buchanan offers a set of "fundamental arts of design thinking", which he says closely parallel those proposed by McKeon. In fact, they closely parallel the traditional arts of rhetoric. According to Buchanan, designers are concerned with:

–   "...the conception or invention of new products and their discussions have yielded a rich variety of common and proper places that they employ in generating possible innovations.[4]
–   …judgment; with the evaluation and selection from design alternatives.
–   …how a product concept is developed and tested (prototyping), which corresponds to rhetoric's arrangement and delivery.
–   …evaluating the objective worth of products, which is linked to rhetoric's traditional question regarding who and how to judge; e.g., a case in law.

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[3] Several of these characteristics are familiar from the concept of wicked and ill-defined problems (Churchman, 1967; Rittel & Webber, 1973; Horn & Weber, 2007). The relationship of wicked problems to design has been discussed in Rittel, 1988 and Stolterman, 2008.

[4] "Common and proper places" refers to Aristotle's theory of rhetorical and dialectical argumentation by means of topics, both those generally applicable (common to a broad range of subject-matters) and those peculiar to specific subject-matters (proper). Modern scholars' interpretations of *topoi* range from Pater's (1968) logical laws to Stump's (1988) strategies. From an Aristotelian perspective, the historical understanding of *topoi* degenerated from methods of discourse to products of discourse; the last exemplified in the learning of set pieces, or *places* in texts.

– …expression or style."

Having argued that design is capable of playing the role of an architectonic art called for by McKeon, Buchanan concludes by laying out his understanding of design so conceived. Central to that understanding is his "four orders of design"; namely, symbols and images, physical artifacts, actions and activities, and environments or systems. Operating as a rhetoric with an unlimited palette, unrestricted to words, design can "...dissolve the boundaries of old fields and disciplines and establish new ones that address current and emerging problems of cultural life."

5   CHARACTERISTICS SHARED BY RHETORIC AND DESIGN

Critical characteristics are shared by rhetoric and design; namely both:
- are broadly applicable across subject matters,
- concern the particular and the probable,
- require invention and judgment, and
- involve arrangement in space and time

5.1   Characteristics of Design

It is evident that these characteristics apply to design. Consider 'the design of operations', 'the design of buildings', 'systems design', 'design of policies', and more. Any activity that produces something new can be said to involve design. Consequently, design is not limited to a specific subject matter, but rather is broadly applicable across subject matters.

That design concerns the particular and probable is equally apparent. Design is always contextually limited and constrained—this client, this location, these stakeholders, these regulations, this time in history. This contextual limitation (particularity) of design situates it in the realm of the probable. The literature on wicked problems (Rittel and Webber, 1973; Rittel, 1988) reflects the fact that design occurs in the face of uncertainty regarding the actual impact of design solutions on desired outcomes.

As for invention and judgment, design involves the generation, evaluation and selection from alternatives. Generating alternatives is a process of invention. Evaluation and selection apply judgment. Finally, for physical products, design involves arrangement in space and time. Consider sketches, models, and generally the specifications and instructions needed to physically realize a design.

5.2   Characteristics of Rhetoric

The scholarly literature clearly supports the claim that rhetoric shares key characteristics with design; namely:
- broadly applicable across subject matters,
- concerns the particular and the probable,
- requires invention and judgment, and
- involves arrangement in space and time

Aristotle defined rhetoric as the art of finding means of persuasion regarding an indefinite range of subject matters, but limited to the particular and probable, as opposed to the universal and necessary (Kennedy, 1991; Shields, 2008). McKeon builds on Aristotle's conception of rhetoric as being unlike the various sciences, each with their own specific subject matter and methods. Rhetoric is rather understood as among the universal, architectonic arts , applicable to a broad range of subject matters, and, in fact, defining and differentiating subject matters one from another---directing and organizing thought concerning any subject-matter (McKeon, 1971).

McKeon also echoes the classical tradition in his treatment of invention and judgment in rhetoric: "Invention is the art of discovering new arguments and uncovering new things by argument, while judgment is the art of testing arguments, proving conclusions, and verifying statements." (p. 59, McKeon, 1987).

Perhaps the most surprising claim is that both rhetoric and design share the characteristic that they involve arrangement in space and time. Arrangement is made prior to presentation, either in memory or in writing, showing the juxtaposition of parts of the speech.

6   WHAT MIGHT BE LEARNED FROM EXPLORING THE RELATIONSHIP BETWEEN RHETORIC AND DESIGN?

Some possible learnings from exploring the relationship between rhetoric and design:

1. A new way to think about design as an architectonic art situated in the realm of the particular and probable. This perspective might facilitate development of a comprehensive theory of design, embracing its various forms, including engineering design, industrial design and architectural design.

2. Theorizing about invention in design could be informed by the study of rhetorical invention. If it is true that design is rhetoric with an unlimited palette, what design methods correspond to rhetoric's topics, starting points for generation of 'arguments'? Kroll's parameter analysis as a basis for concept development looks to be akin to rhetorical invention, and worthy of exploration from that point of view. Although the majority of steps in Kroll's parameter analysis as a basis for concept development can be argued to resonate with the method of analysis (Kroll and Koskela 2012), there are parts and aspects that look to be akin to rhetorical concepts and steps, and worthy of exploration from that point of view. For example, Parameters may align with rhetoric's 'topics', Creative Synthesis may be understood as rhetorical arrangement, and Evaluation as the realm of plausible reasoning and natural language.
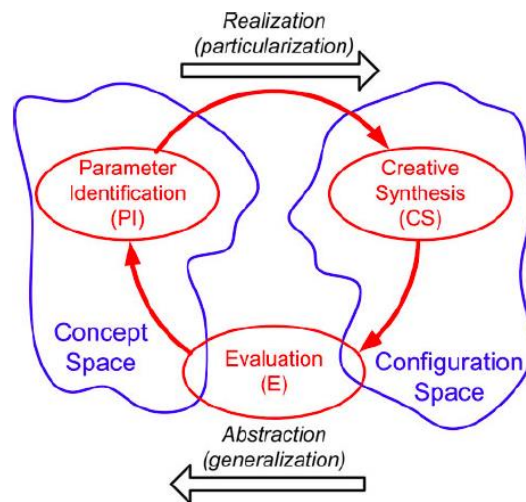

Figure 1: Prescriptive model of conceptual design (Kroll, 2013)

3. Once designs are developed, methods of evaluating and selecting from alternatives might be informed by deeper understanding of rhetorical methods of judgment. Descriptive research of practice could in part be structured to identify methods of persuasive argumentation. Such methods play a critical, if thus far mostly unexamined, role in methods of multivariate decisionmaking now in use in architectural design (Arroyo, et al., 2012). One such method, Choosing by Advantages (Suhr, 1999), appears to be particularly aligned with rhetorical methods of argumentation given that it attempts to achieve consensus among stakeholders with competing criteria preferences.

7   CONCLUSIONS

This paper has endeavoured to show that the relationship between rhetoric and design is an important topic for design theory and practice. Arguments have been advanced in support of the claim that rhetoric and design share critical characteristics, and that rhetoric is a type of design. Consequently, it makes sense to explore what can be learned about design from rhetoric. Further directions for that exploration have been suggested concerning the development of a more inclusive theory of design, understanding methods of invention in design, and understanding methods of evaluating and selecting from design alternatives.

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