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DESIGNING AS A COURT OF LAW

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ABSTRACT

It is contended that legal proceedings, as they have evolved from Antiquity onwards, embrace important and effective principles for collaborative competition in pursuit of a common goal, in the considered context, justice. Seven principles contributing to this goal can be recognised: "hear both parties", reasoned judgment, right to appeal, use of both logical and rhetorical arguments and reasoning, standardized proceedings and documents, public nature of proceedings, as well as dedicated and structured space.

It is contended that the court of law can be used as a metaphor of what is happening in design. There are wishes, concepts and solutions competing against each other. For reaching the best outcome, each wish, concept or solution needs to be promoted and defended in the best possible way, and a reasoned judgment among them has to be done. Then, the question arises whether the seven principles found in legal proceedings have relevance for this collaborative, yet competitive pursuit of a common goal in design, namely the best solution in view of customer requirements.

For initial exploration of the relevance and validity of the seven principles in design, a case study was undertaken. It turns out that all the seven principles are being implemented. The outcomes of the project are clearly better than in projects managed in the traditional way; although it is not possible to trace back the benefits only to the collaborative principles and related practices, their emergence, and continued use, provide solid circumstantial evidence on their efficacy.

KEYWORDS

Collaborative design, competition, design management, communication, legal proceedings, lean construction.

INTRODUCTION

The rich connections between rhetoric and design have been analysed in prior research from several angles (Buchanan 1985, Buchanan 2001, Ballard & Koskela 2013, Koskela

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& Ballard 2013). It is well-known that the classical rhetoric originated from the need of citizens in ancient Greece to make speeches in a court of law. Understandably, the discipline of rhetoric was then built up around the unit of a speech. Unfortunately, this notion of rhetoric has largely side-tracked the related innovations in how legal proceedings, as a whole, should be organized. It is contended that legal proceedings, as they have evolved from Antiquity onwards, embrace important and effective principles for collaborative – but simultaneously competitive - pursuit of a common goal, in the considered context, justice. Seven principles contributing to this goal can be recognised: "hear both parties", reasoned judgment, right to appeal, use of both logical and rhetorical arguments and reasoning, standardized proceedings and documents, public nature of proceedings, as well as dedicated and structured space.

Arguably, the law court can be used as a metaphor of what is happening in design. In all stages of design, there are wishes, concepts and solutions competing against each other. For reaching the best outcome, each wish, concept or solution needs to promoted and defended in the best possible way, and a reasoned judgment among them has to be done. We posit that the principles of legal proceedings can effectively be used in this endeavour. To support this claim, we show that in the advanced practice of lean construction project management, methods and tools resonating with the principles related to legal proceedings are already being used, with very good overall results.

Following this introduction, the paper is organized in the following sections: Learning from legal proceedings; Competition of ideas in prior design theorizing; Case Study; Discussion; Conclusions.

LEARNING FROM LEGAL PROCEEDINGS

We posit that legal proceedings, as they have evolved, embrace important and effective principles for collaborative yet competitive pursuit of a common goal, in the considered context, justice. In the following, we briefly discuss such principles and their significance.

In the legal science, this area is called procedural law. From early on, interest to procedural law has been unsystematic and scanty in comparison to other areas of law. It has been said that the Romans treated old procedural rules as if they were old newspapers (Metzger 2013). It is for this reason that it has been necessary to determine fundamental principles of legal proceedings in the underlying work for this paper. In most cases, we refer to ancient Greek and Roman legal proceedings, but also newer developments are taken into account. The three first principles are associated to the characteristics of the rule of law (Bergholtz 1987). Most of the remaining principles are features connected to legal proceedings from ancient times and still today.

HEAR BOTH SIDES

The principle of "hearing both sides" of the case, *audiatur et altera pars*, is of course fundamental to the idea of fairness. Another term for this principle is "the level playing field". It implies accommodating the proceedings so that both sides have an equal opportunity for presenting their case and responding to evidence against them. For

example, this means that a session has to be postponed if one side cannot be present or needs more time to acquire materials for preparing their case.

REASONED JUDGMENT AND FACT FINDING

The reasons for the judgment, *ratio decidendi*, is another idea stemming from ancient Rome. Although not systematically provided, a considerable part of judgments contained such reasons already in Roman times (Honore 1973). The requirement for giving reasons has later evolved into a key principle of a due process (Bergholtz 1987). These reasons cover both rules of law and facts of the case.

RIGHT TO APPEAL

The right to appeal regarding a judgment has its origin in Roman legal proceedings. It is still today seen as one of the elements of the rule of law (Bergholtz 1987). From Roman times, the opportunity to appeal about a judgment to a higher court has had an important implication: the judgment had to be delivered in writing (Honore 1973). Further, there is a relation to the previous principle: the subsequent appeal process is considerably facilitated if the reasons for the judgment (*ratio decidendi*) are also provided.

The right to appeal, besides giving the possibility of correcting obvious mistakes and poorly prepared judgements, has a proactive impact: for the judge, it provides an incentive to carry out the process and to formulate the judgement in such a way that there is no need for an appeal, potentially leading to the embarrassing situation that the judgement of the lower court is overruled.

NOT ONLY LOGICAL BUT ALSO RHETORICAL REASONING

From the 19th century onwards, the mainstream assumption has been that legal rules and decisions are deduced directly from legislation, previous cases, and secondary authorities (Sinclair 1971). Thus, legal reasoning has been seen to primarily fall into the realm of logic. However, since the 1950's, the rhetorical approach to reasoning has been forwarded, pioneered by Perelman (Perelman & Olbrechts-Tyteca 1969), Toulmin (1958) and Viehweg (1993) (largely based on ideas originated in ancient rhetoric). This approach emphasizes the content of arguments and the context-dependent aspects of acceptability. Especially, the acceptability of argumentation is dependent on its effectiveness for the audience to which it is addressed (Feteris 1997). Finding the starting points (*topoi*) of reasoning, and creating persuasive arguments about the particular and probable thus accentuate.

PUBLIC NATURE OF PROCEEDINGS

The court sessions were public in ancient Greece and Rome (Samons II 2013, Metzger 2013). This ensured that no party could make claims that would have been generally known to be incorrect. Also, this created a situation where the judges, the witnesses and the jury are publicly accountable. An eloquent, and more current, justification for publicity of courts of law is provided by Bentham (1843, pp. 316-317):

Publicity is the very soul of justice. It is the keenest spur to exertion, and the surest of all guards against improbity. It keeps the judge himself, while trying, under trial. …Nor is

publicity less auspicious to the veracity of the witness, than to the probity of the judge. Environed as he sees himself by a thousand eyes, contradiction, should he hazard a false tale, will seem ready to rise up in opposition to it from a thousand mouths. …. Without publicity, all other checks are fruitless; in comparison to publicity, all other checks are of small account.

STANDARDIZED PROCEDURES

From early on, it has been found useful to standardize both court procedures and the contents of documents and presentations. Already Corax (5th century BC) suggested a way to arrange the presentation of a legal case as follows (1) Introduction, (2) Statement of the Case, (3) Argument Summary, (4) Proof of the Case, (5) Conclusion. Still today, the U.S. Supreme Court requires essentially the same structure to be used (Frost 2005).

An example of an early standard procedure is provided by the preliminary hearing (*anakrisis*) of Socrates (Linder 2002):

The preliminary hearing before the magistrate at the Royal Stoa began with the reading of the written charge by Socrates' accuser, Meletus. Socrates then formally answered the charge. Both the written charge and denial were then attested to by each, under oath, as being true. The next phase of the preliminary hearing was one of interrogation: the magistrate questioned both Meletus and Socrates, and then both the accuser and defendant were allowed to question each other. In the final phase of the hearing the magistrate, having found merit in the accusation against Socrates, drew up formal charges and set a date for a public trial.

The standardized order of presentation helped to communicate the case in a logical and persuasive way. In turn, the standard procedure let both sides to be fully heard and brought order and certainty to the process: no disagreement how the matter was to approached needed to be solved. Perelman and Olbrechts-Tyteca (1969) pinpoint a further benefit: order ensures that particular premises are given sufficient presence for them to serve as starting points for reflection. Thus, fruitful paths will not be prematurely abandoned.

DEDICATED AND STRUCTURED SPACE

From early on, a dedicated place for court hearings was found helpful. The mentioned Socrates' trial was held in a courthouse obviously built for this specific purpose. The Scandinavian thing rings (Wildte 1928) provide a well-known example.

The dedicated venue for court proceedings emphasized, for its part, the authority of the court and focused attention to the matters being handled. Even in the archaic Scandinavian conditions, justice was not delivered by any assembly of men, but by those gathered to the thing ring for the specific purpose of proceedings.

It has been held that due process has a readily identifiable spatial structure with deep historical and cultural resonance: it is the trial courtroom (Spaulding 2012, p. 330):

On a symbolic level, elevation, ornamentation, and partitions (specialized boxes, benches, bars, and tables) serve to fix and hierarchically segment lay and expert role players. At the visual and aural level, however, the division of space accentuates

accessibility. The standard organization of partitions ensures proximity, audibility, and clear sight lines to stage adversarial confrontation-sequences of viva voce testimony and argument directed by the judge and elicited by attorneys.

COMPETITION OF IDEAS IN PRIOR DESIGN THEORIZING

The bulk of domain-independent design theorizing addresses the design process. The starting point has been the analysis-synthesis-evaluation model, which has been refined into many different variants, including Pahl & Beitz (2013) model and Gero's and Kannengiesser's (2004) model. The common feature in all these descriptive process models is that there is the assumption of selections and decisions between different ideas, sub-solutions being made in satisfactory manner; however, the models are silent on how the decisions are or should be made. This applies also to the C-K theory (Hatchuel & Weil 2009), which abstracts away what is occurring between the concepts providing the starting point, and the knowledge used for realizing those concepts.

Besides process models, design theorizing covers several narrower topics (partly based on Kroes 2002), such as (creativity in) design thinking, design education, design effort, conceptual design as a process, design progress, communication of design knowledge, managing design information, the role of computers in design, design as a cognitive activity, decision making in design, design intent/rationale, collaborative design, team cognition. From these, most relevant for the angle of competition of ideas are perhaps decision making in design, collaborative design and design intent/rationale.

The topic of decision making in design triggered first the idea of optimal design, inspired by economic thinking. However, the approach of optimal design was at the outset constrained by the unrealistic requirement of formulating decision situations in clear-cut mathematical formalisms. As Belton and Stewart (2002) argue, design is a different kind of decision-making problem, which comprises research to identify or create new decision alternatives to meet the goals and aspirations revealed through the design process. Many other decision-making methods have been proposed, also for allowing a bigger role for subjective assessments, for example Analytical Hierarchy Process (AHP). The use of such methods has not grown in the design arena, presumably either because of their lacking transparency or because their assumption that the decision can be entirely objective (Singh and Tiong, 2005; Arroyo et al., 2015).

Regarding collaborative design (or co-design), the majority of research has focused on describing the determinants of collaboration. While initial understanding has been provided, this research has suffered from fragmentation, due to historical discontinuities and many different disciplinary backgrounds. For example, the ancient idea of common ground as a precondition for collaboration, only recently reinvented, can be found under confusingly many terms (Koskela et al. 2016).

Research focusing on design intent/rationale (Fischer et al. 1991, Lee & Lai 1991) has pursued conceptual frameworks and computer tools, which would document the design history and especially support changes to design. However, their uptake has been modest.

Up to now, in design theorizing the angle of competition of ideas has either mostly been abstracted away or some specific topic in relation to that competition has been examined; however, theoretical and practical gains have been modest. By and large, the question on how this competition should be arranged has been left disregarded.

CASE STUDY

The case study was done in retrospective for a design of a large complex campus (circa 600,000 sf) located in Silicon Valley, California. Researchers collected evidence of the application of legal proceeding principles in a portion of the project where advanced lean design principles and methods were implemented. Documenting where the seven legal proceeding principles were used was done after the fact, using three sources of evidence: 1) direct observation, the second author acted as one of the lean coaches for the project; 2) project documents-A3s, meetings agendas, drawings, project schedule and budget; and 3) interviews with the project manager and mechanical engineer. In addition the benefits of using lean in design were calculated and reported by the project manager, and validated by the owner.

HOW WERE THE SEVEN LEGAL PROCEEDING PRINCIPLES REALIZED?

Hear both sides

All relevant stakeholders were invited to each of the 52 meetings held to select from design alternatives. Even where there was not a physical meeting, everyone had the chance to participate in the decision remotely through a videoconference. If any of the relevant stakeholders could not attend, the meeting was rescheduled. For example, when one of the mechanical engineers could not attend a meeting to decide about the HVAC system zoning, the meeting was rescheduled. If more information was needed, follow up meetings were scheduled before a decision was made.

Another, generalized realization of this principle occurred through the application of set based design (SBD). In this practice, several alternatives are explored collaboratively and decision-making is deferred to the last responsible moment, instead of selecting one alternative early for allowing certain inputs to subsequent tasks. The rationale of SBD is to "hear the alternatives" until there is as much information available as possible.

Reasoned judgment and fact-finding

The method of Choosing by Advantages (CBA) was used to evaluate design alternatives by considering their attributes (characteristics relevant to determining if and how well they meet agreed criteria). These facts were also documented in A3 reports. This is different from legal practice, since in law evidence is about the past and in design evidence is about understanding future physical performance of the building. For example: For a decision, where to locate the outdoor fitness area for future building users, the baseline design was compared to four other alternatives. In order to look for facts, several factors and criteria were agreed, to be able to compare alternatives fairly. Each alternative is evaluated using facts (attributes in CBA language) according to criteria shown in Table 1.

Table 1: The criteria evaluated for each alternative

Must Criteria:	**Want Criteria:**
a. Pathway between CE and fitness location must comply with ADA code requirements	f. The less travel time between locker room and outdoor fitness location the better
b. Location must be shaded a minimum of 25% utilizing architectural elements	g. The more privacy from pedestrian walkways and vehicular traffic the better
c. Must have a minimum of 2,400sf of flat space to comply with program requirements	h. The less acoustical and visual impact to desks the better
d. Must be secure and provide ample storage	i. The less impact to City entitlement approval process the better
e. Must have access to drinking water, convenience outlets and light fixtures for night workouts	j. The less impact to current site design (ecology, elimination of tranquil space, etc.) the better
	k. The less pedestrian pinch point on route to main entry the better.

Right to appeal

As in courts of law, the right to appeal a decision was always available. Further, anyone could offer new information, a new alternative, a new factor to consider, and new facts that help differentiate the alternatives, perhaps correcting a mistake in previous assessment of attributes. There were several meetings before the final decision was presented to the client; therefore there were several opportunities for appeal.

Use of logical and rhetorical arguments

Rhetorical arguments were used several times at each decision. CBA is well aligned with the use of rhetorical arguments, which have been divided into three types: *logos, ethos and pathos* (Arroyo et al. 2014).

Logos: In CBA, the use of logos is encouraged by requiring the design team to describe the advantages of the alternatives based on their attributes. The design team needs to think of all available arguments, which favor a particular alternative, for example: gather data or facts to support an advantage, considering a shared point of comparison (anchoring); agree on criteria to be considered in the decision; understand the current conditions on the baseline design; and understand the regulatory requirements.

In the previous section on reasoned judgment and fact-finding, examples were provided how logos is used in lean design.

Ethos: In several occasions lean design methods support considering the arguments from people who have authority or relevant knowledge. During the decision-making process, several specialists were giving their assessments for evaluating possible outcomes of alternatives, and assessing accuracy of data. For example, in a particular decision geotechnical engineer was concerned about other members understanding the level of uncertainty in the practice. During the lean design process, all relevant specialists are given the option to speak and provide pertinent advice.

Pathos: CBA involves arguments that appeal to the people who will be affected by the decision (e.g., users, environment, etc.). Designers appeal to emotion in many ways; e.g., by considering how an alternative will impact the user experience. Consider this statement of objective from an A3: "Find an outdoor fitness location that evaluates aesthetics, privacy and disruption (nearby pedestrian pathways, vehicular traffic, loading

dock deliveries, etc.)". The whole point of changing the baseline or current design is to produce a better user experience in the future.

All meetings are public

All records are public to the design team. Everyone in the project has access to the A3 files, and can see the status and history of each decision.

Decision meetings were mostly held through videoconferences. Participants would retrieve general access documents such as drawings, specific architectural models (BIM Models), structural models, or mechanical models, depending on their pertinence to the discussion. Also design guidelines and contractual documents were retrieved from shared files, for the purpose of discussion or for finding relevant information to inform the design. Every one in the team was able to share a screen to show relevant information. The models and access to specific information was hyperlinked to A3 documentation for facilitating the access to information.

Standardized procedures

This is a one of the main points of the lean design implementation, where everyone has a standard to process an issue in the design, documented in an A3 report, exploring alternatives (using SBD when needed), and CBA when decision was complex and required multiple criteria. In the case of issues that required a collaborative decision-making process, the standard was the following:

- Problem definition: Problem to be discussed, background and current state (baseline design). What is the objective of the meeting? What are the factors and criteria (must and want to have) for judging alternatives?
- Proposals / Solution Analysis: What alternatives can be considered? What facts can we use to describe the characteristics and consequences of the alternatives? What are the advantages of each alternative? What are the costs of the alternatives? How important are the advantages compared to each other? Propose a recommendation (if all information is available).
- Actions: Obtain more information if required, and meet again if needed. The recommendation is presented to the client when all the relevant information is obtained, and the team has achieved consensus to make an informed recommendation, or the time to make a decision has finished (last responsible moment). Approvals (including virtual signatures).

Dedicated and structured space

The project had critical team members working remotely in several different locations (i.e. San Francisco, New York, and London), therefore physical co-location was not always possible (in contrast to many other current projects organized in similar lines). However, one week per month the team had a big room dedicated space, the remaining weeks virtual co-location was implemented. The team had regular meeting scheduled through videoconference, and discussed design decisions collaboratively across disciplines (e.g., mechanical, structural, architectural, and construction perspectives were often discussed

in the same meeting) using real time collaborative documents and spreadsheets hosted on the cloud. In addition, BIM models, plans and specifications were accessible for the team.

EVALUATION

Before the team implemented lean practices, embodying the principles of legal proceedings, designing was a frustrating and confusing process, where relevant information was not shared when needed, and where the team did not had a clear procedure to discuss design problems or new possibilities. After implementing lean, the design team was able to increase the design value for the client, while saving time and money. Quantified saving of lean design practices were 9.7 million USD (11% less than the original design budget). Increased efficiency in design process was measured through meeting records (time reduced by 37% per decision in a 4 month period). In addition, according to members of the design team, less negative design iteration existed since decisions "stuck" with the client, and the design team developed mutual trust and respect. These results were validated and approved by the owner, then presented in the 2017 Lean Construction Institute Congress.

The performance outcomes of implementing lean practices embodying the principles of legal proceedings are thus clearly better in comparison to the situation before. Although it is not possible to trace back the benefits only to the principles of legal proceedings and related practices, their emergence, and continued use, provide solid circumstantial evidence on their efficacy.

CONCLUSIONS

This paper continues the authors' study of the relationship between rhetoric and design (Ballard & Koskela, 2013; Koskela & Ballard, 2013; Koskela, 2015; Arroyo, et al., 2014; Arroyo, et al., 2015), in this case by examining and elaborating courts of law as a metaphor for design. An advanced lean construction project has been presented as an example how design is organized and managed when the competition of ideas is held to be central. In contrast to this perspective, current design theories barely consider the competition of ideas if at all.

The findings of this paper suggest several lines of research going forward. One such is to revisit design theories to incorporate competition of ideas. Another is to understand more completely how competition is actually structured and managed in different design practices, and also what can be learned across these different practices.

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