Understanding the value generated by a co-creation approach to the built environment.

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ABSTRACT

Cities are increasingly being looked to for strategies to address climate change through fostering low-carbon living. This requires not only technological innovation, but also a program of behaviour change. A recent report by the World Economic Forum suggests that architects and other practitioners in the built environment are uniquely placed to facilitate collaborative co-creation approaches. While most architects work with end-users to some degree, a co-creation approach requires architects learn new skills to shift their treatment of users from subjects that are designed for, to partners that are designed with. This paper explores this challenge through the lens of practice theory, and highlights some of the tensions between co-creation and consultation, particularly with relation to application and practice. The preliminary results of a Value Network Analysis are presented as a part of a case study where co-creation was used as a framework to inform the briefing process, generate ideas, and provide feedback on plans during design development phases. The case included a series of co-creation workshops that were a collaboration between the author, Match Studio, and the not-for-profit community services organisation undertaking the construction project, as well as other collaborative methods. This paper focusses on the transfer of value described by the organisation's staff (the future end-users of the project) and the architects and other professional consultants. It finds a disparity between the reported value on the two sides of the spectrum, suggesting there may be some unrecognised value exchanges taking place of both positive and negative value. The exploration of these unrecognised value points is then explored through the case study interviews. This approach highlights where architects as co-creation facilitators may be able to better communicate anticipated value during project planning stages to help the program of co-creation activities achieve its intended outcomes. Finally, opportunities for further research are identified, including the use of virtual three-dimensional models in co-creation processes that engage end-users.

KEYWORDS architecture, co-creation, participation, value network analysis

The built environment is increasingly being looked to for strategies to address climate change by creating urban environments that support low-carbon living.[21] This requires not only technological innovation, but also a program of behaviour change that can help citizens lower the carbon impact of their lifestyles.[42]

The World Economic Forum (WEF) recently stated that 'for the cities of tomorrow, collaboration as well as co-creation and co-design capabilities are the new "must have" competences,'[17] and that 'citizen engagement is crucial to fully understand the problem and find solutions that meet the needs of

all the sections of the community.'[17] The importance of designers in realising this vision has also been recognised by other organisations,[13] and by key authors in the field of social innovation.[32] In this environment, Architects are called upon to lead processes that engage with, and empower broad ranges of stakeholder groups.

The profession of architecture has a long history of user-engagement, and is familiar with working with users to varying degrees. However, the kinds of co-creation and co-design approaches discussed in the literature[25, 30, 39] are fundamentally different from traditional 'consultation', and require new skills and techniques to practice successfully. In a consultation process, end-users are typically asked to respond to a proposal through a series of formalised steps, while in a co-creation or co-design process, the user is seen as a partner in the ongoing development of a design.

This paper presents a brief exploration of the concept of co-creation and its potential application to projects in the built environment, then uses a case study to present the initial findings of a Value Network Analysis. This case study explores opportunities for architects and other practitioners in the urban environment to develop skills that could assist in the realisation of a successful co-creation approach.

Background

The WEF's statements are framed in the context of the social, economic and environmental challenges that our cities will face in coming decades.[17] When viewed through the lens of Practice Theory,[43] this push for architects, designers, planners, and researchers to engage in collaborative approaches to design makes a lot of sense.

Practice Theory has been developed by a number of authors but the version of Practice Theory used in this paper is described by Elizabeth Shove.[42, 43] Shove's version of practice theory suggests that any practice (behaviour) is made up of three key elements: meanings, materials, and skills. In order to change a practice, all three elements must be developed in order to transition to the new practice. There is ongoing debate about the impact of cultural and social factors on practices, however, Shove's arguably reductive theory highlights the importance of developing narratives that can create new meanings around architecture, and skills for end-users to understand

and operate within complex building systems. Architecture and other efforts toward sustainability in the built environment often focus on material change, rather than on the communication of 'why?', or the dissemination of the skills required to carry out the envisioned behaviour.

There is some academic literature emerging as to how the process of creating and adapting urban environments may be reconfigured to address the dimensions of meanings and skills that demonstrates how collaborative approaches to these questions can engender change across Practice Theory's three dimensions.[44] Importantly there are also resources that describe this concept in 'plain language', with Manzini's *Design, When Everybody Designs* describing concrete strategies for both facilitating co-creation processes (termed in his book as co-design), and steering general discourse.[30] These two important roles of the designer align with Practice Theory's skills and meanings dimensions.

Co-creation

There is a broad range of terminology being used to describe these kinds of engaged design processes, with co-design, co-creation, co-production, citizen-led, and participatory-design emerging in various forums. Co-design and co-creation, and to a lesser extent co-production are often used interchangeably when referring to an ongoing and iterative process that engages end-users in a design or in the creation of an innovation beyond the concept design stage.[10, 24, 25, 39] The term *co-production* has recently gained some significance in the academic discourse around urban environments with Stevenson & Petrescu editing a special edition of *Building Research and Information* on the topic,[45] however, this paper retains the use of the term co-creation.

The term co-creation is relatively new in academic discourse, emerging largely since 2000, but has its roots in the Participatory Design movement in Scandinavia in the 1970s in which users were engaged in the design of early computer equipment for their workplaces.[24, 46]

The differentiation between co-creation and consultation or co-design lies largely in the theoretical and philosophical approach to engaging with users. Although many workshops are described as 'co-creation', as a methodology it is necessarily an ongoing

rather than singular process that continues beyond the concept-design phase;[10] as Sanders & Stappers put it, 'co-design is a specific instance of co-creation'.[39] There is also a distinct shift in the users' role, from being the subject of design to being a partner in design.[37, 46] This partnership however, must be approached with a view to creating shared value and be about more than just giving people a say, or giving people what they want.[38]

Architectural Practice

Architects and designers of course have a long history of working with clients and user groups, however, the kind of collaborative approach to design required by co-creation and in many ways advocated for in Christopher Alexander's *A Timeless Way of Building*[1] is not often found in architectural practice. While architectural practice is in-tune with, and focussed on stakeholder and client needs, the critical shift in a co-creation approach is the process of designing *with* rather than *for* stakeholders and users.

There is a growing body of evidence that this kind of collaboration, although possible, brings with it significant procedural, political, and power-based challenges.[8, 34, 36, 44]

Co-creation and participatory approaches in general are seen as a threat to the existing hierarchies of decision making,[39] and in the Australian urban context are used often as a way of granting legitimacy and helping to 'sell' projects to the public.[27, 40]

Level of participation	Type of participation
8. Citizen Control	
7. Delegated Power	Degrees of citizen power
6. Partnership	
5. Placation	
4. Consultation	Degrees of tokenism
3. Informing	
2. Therapy	
1. Manipulation	Nonparticipation

Figure 1: A Ladder of Citizen Participation
(adapted from Arnstein, 1969)

Arnstein's Ladder of Public Participation (Figure 1) was developed in the late 1960s in response to challenges in understanding why although public participation in urban planning seemed like a good idea for all involved, it rarely achieved its purposes.[4] The spectrum describes outcomes rather than ambitions of consultation processes and ranges from forms of non-participation, to degrees of citizen power. On this spectrum, the aforementioned fear of giving over power to citizens assumes the 'citizen control' level of collaboration, while the reality of application in the Australian context often fits within the lower non-participation or tokenistic levels.

This stark disparity is telling, and highlights one of the significant challenges facing the application of co-creation approaches in the urban environment. Although there are many degrees of compromise between these two levels, the goal of working with rather than for, or treating users as partners rather than subjects, suggests that the 'degrees of citizen power' levels would constitute a true co-creation approach. This is supported by the WEF industry agenda statement that 'it is imperative that citizen engagement is not just symbolic, but rather are equal participants in the development process.'[17]

In order to shift toward the 'partnership' level in practice, it is important to take an approach of critical pragmatism (see Forester) to ensure that the level of collaboration intended is what is actually achieved;[16] and, to understand the value of participation for all involved.

Some recent case-study research has built on von Hippel's concept of lead users,[49, 50] focussing on the users' ability to express latent need and give insight into their day to day experiences.[9, 31, 36, 44] Other research has focussed on the role co-creation can play in consensus building.[15]

Baccarne et al.'s suggestion that 'the question is not any longer about why we should involve users, but how they should be involved'[6] points to the need to find ways of understanding users as partners rather than subjects.[46] Some go further, arguing that co-creation and other participatory design processes should extend the boundaries of design practice to question broader social, economic, and environmental issues alongside aesthetic, functional, and material dimensions.[19, 29]

In order to function in the kinds of roles envisioned in the WEF's vision and to achieve successful co-creation approaches, architects, designers, planners, and researchers need to act as initiators, facilitators,

mediators, and consultants.[36, 47] This focus on the changing role of designers is well supported in the literature and requires new approaches to the practice of being a designer.[30, 35, 39]

To meet these challenges, borrowing from the parlance of Practice Theory, architects need to be equipped with their own set of new 'meanings, materials, and skills'. For more than a decade, other disciplines have begun to shift toward the teaching of participatory design and co-design techniques as a part of their curriculum.[39] Evidence for the effectiveness of various facilitation tools and techniques continues also to grow, as does the number of toolkits being published.[7, 14, 18, 28, 41, 48]

Although the facilitation of successful co-creation 'sessions' is becoming an important part of an architect's toolkit,[11] these facilitated processes are often solely focussed on the 'materials' component of practice.[23] This is in no small part due to the challenge Architects face of undertaking simultaneous collaborations with a broad variety of stakeholders and users, as well as the increasingly large number of specialist consultants involved in construction projects.[39]

Empirical analyses demonstrate quantitative evidence for collaborative processes generating 'more ideas' and being of more use to designers than traditional consultation methods.[9, 15, 31] However, when working on projects with ambitions to have a broad range of social, environmental, and economic impacts, it is also important to understand and plan the ways in which the process can generate social, interactional, and networked value that may not be captured by these quantitative approaches.[5, 33] This makes it is important for architects and other professionals involved in facilitating these processes to understand these forms of value as it may shift or realign their objectives when planning and reflecting on co-creation activities.[12]

To this end, this research presents results from a case study project in Adelaide, South Australia, using interview data and a Value Network Analysis (VNA) framework to describe some of the types of value, both positive and negative, that are being generated and exchanged through the co-creation process.[2, 3]

Value Network Analysis (VNA) is a form of social network analysis first described by Verna Allee almost two-decades ago.[2] VNA focusses on capturing the exchanges that take place through the connections between human and non-human members of a network. The mapping process has its roots in Latour's Actor Network Theory[26] with events, processes, and other 'black-box' systems mediating contact between participants in the network. In contrast to Actor Network Theory, VNA focusses on understanding what is generated through a process rather than the specific form of the process itself.

Case Study: UCity

UCity is a sixteen-storey mixed-use development for a community services organisation in the centre of Adelaide, South Australia. The organisation partnered with the researcher and Match Studio at the University of South Australia to explore some of the opportunities that could arise from the use of an iterative and ongoing co-creation approach to their engagement of the building's end-users.

Case Study Protocol

End-users were invited to participate in this project through a series of briefing-interviews, co-creation workshops, and information sessions. The researcher was present at four co-creation workshops, three of which the researcher facilitated or co-facilitated, and one of which was facilitated by the architecture firm; the information sessions were facilitated by the project management team, the CEO of the organisation, and the architecture firm; the briefing-interviews were carried out by the project management consultant prior to the researcher's involvement in this project. Although the information sessions and briefing interviews do not satisfy the criteria of being co-creation activities in isolation, they are included in this study because they formed a part of the overarching engagement process and therefore cannot be separated from the workshops that explicitly employed co-creation.

The co-creation workshops were run with professional actors deliberately treated as equal participants with end-users, while the other activities were conducted according to standard industry practices.

Upon construction commencing, those who had participated in any of these processes were invited to participate in a follow-up interview with the researcher to discuss their experiences resulting in 20 x 45-60 minute individual and group interviews.

These semi-structured interviews asked participants some control questions about their knowledge of the concepts of co-design, co-creation, and participatory design to establish their level of previous experience in this area. Participants were then asked about their experiences, both positive and negative of the process, and professional actors (the architects, project management firm, and internal project management team) were asked to compare their involvement with other projects they had been a part of.

The interviews then shifted to a guided network mapping process, using the VNA framework described by Allee[3]. Participants were directed to map their position in the construction project, defining the 'actors' and 'events', then tracing their connections. Finally, participants were asked to consider what value, both positive and negative, they were contributing to the other actors through each 'event' and what value they were receiving from the other actors through these events. This mapping exercise resulted in a rich data set that describes a very complex network of value exchanges that has taken place through the co-creation activities so far.

Case Study Discussion

What follows are some initial findings about the relationship between future end-users, and the professional consultants (Architects, Engineers, Project Management, etc.). While it would be preferential to distinguish between architects and other professionals involved in these processes, in the interview process, it emerged that many participants could not distinguish between these professional consultants.

The interviews and network mapping process generated a broad range of descriptions of types of value. While some forms of value were described by only one participant, many were repeated across several participants. These forms of value have been broken down by participant type and whether it was a value the participant was contributing to, or receiving from, the co-creation process.

Figures 2 and 3 summarise the types of value described by participants categorised as end-users, while figures 4 and 5 summarise the types of value described by the professional consultants. The responses are separated in this way because

participants were asked first about the value they were giving to the process and to other participants in the process, then about the value they were gaining from the process, and from other participants in the process.

While the variation in forms of value described through the mapping and interview process can in part be explained by the differing sample sizes of the end-user group (n=14) and the professional consultant group (n=3), when grouping the types value described into broader categories, there is some disparity in the perceptions of the kinds of value-flows that are taking place between the two participant groups.

Though subject to further investigation, the 9 broader categories of value exchange that emerged are as follows:

- *Concrete* value relates to specific design concepts and ideas. This includes specific designs for service improvements, the physical structure of the building, and interior features
- *Insights* relate to unique information that an individual is able to give. This includes both personal and professional insights.
- *Insights (-)* is negative value generated by insights, particularly where additional information creates conundrums or confusion about how to proceed.
- *Communication* value includes all forms of value related to communication processes. This includes updates about where the project is up to, and the provision of information to pass on to others.
- *Communication (-)* is negative communication value. This is characterised by information being delivered in an inappropriate way that cannot be understood or utilised by the other party.
- *Personal* value describes value that is recognised internally. This includes concepts such as a sense of worth, and positive inter-personal affirmation.
- *Personal (-)* is negative personal value. This includes negative feelings about involvement, and knowingly creating annoyance or wasting others' time.
- *Organisational* benefits are characterised as those forms of value that are of benefit to the organisation and to the user's interactions with the organisation rather than individuals. Key concepts in this category are change management and buy-in.
- *Other (-)* includes forms of negative value that arose, such as the distrust and conspiratorial
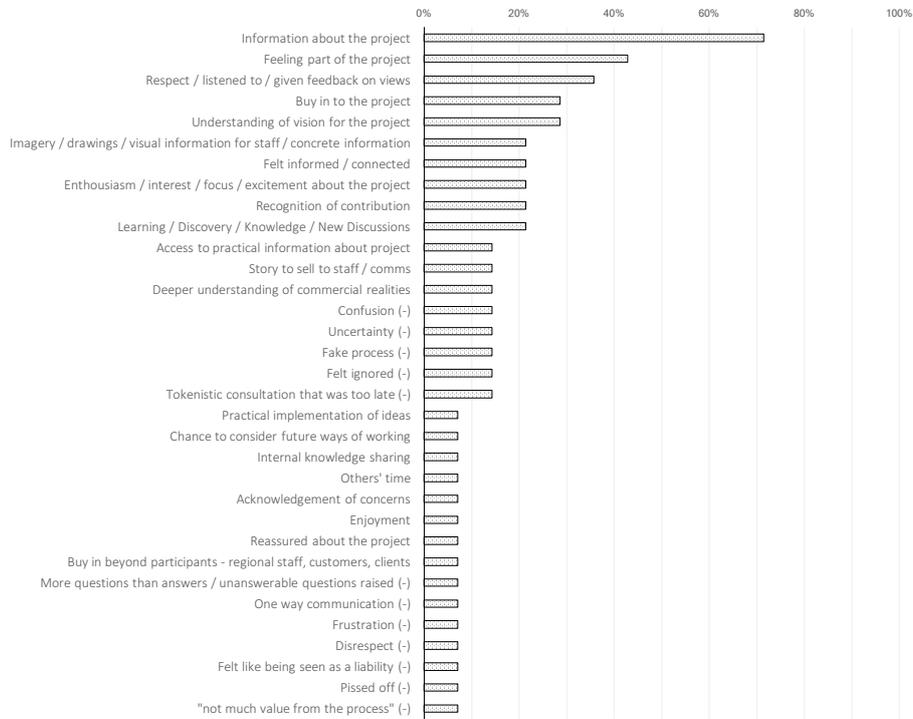
Figure 2: The types of value received from participating in co-creation activities as described by end-user groups (n=14)
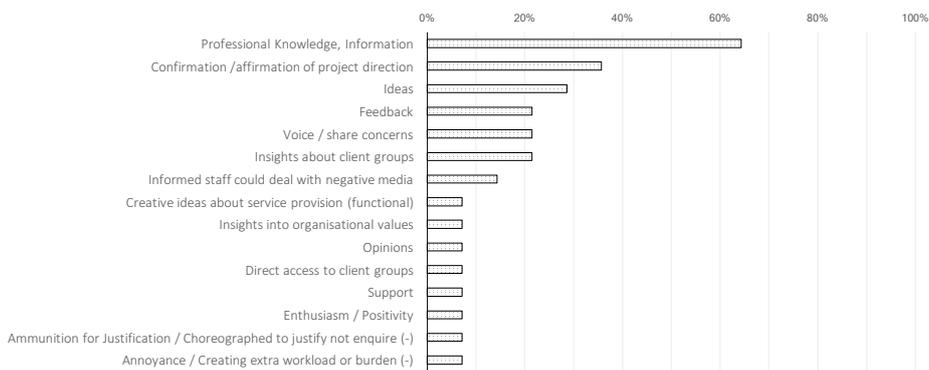

Figure 3: The types of value contributed to co-creation activities as described by end-user groups (n=14)
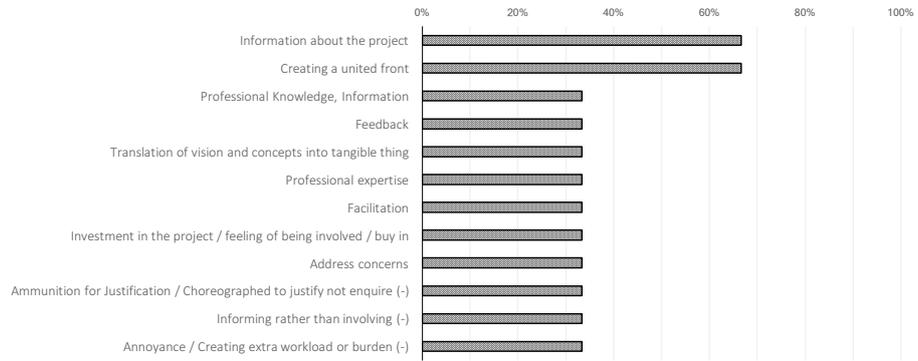
Figure 4: The types of value received from participating in co-creation activities as described by professional consultants (n=3)
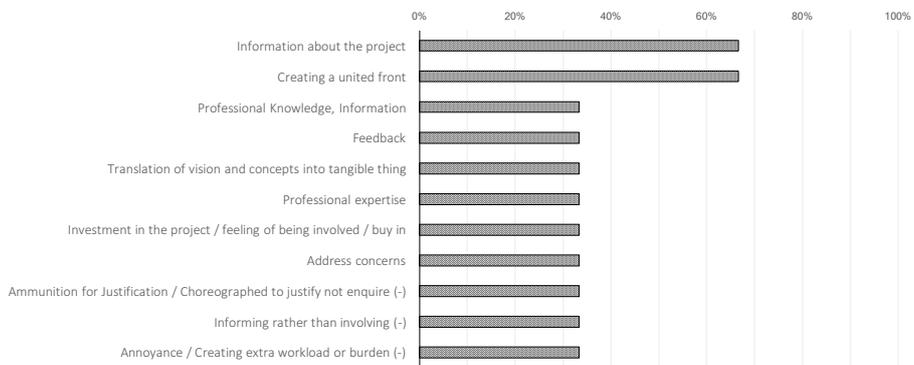

Figure 5: The types of value contributed to co-creation activities as described by professional consultants (n=3)
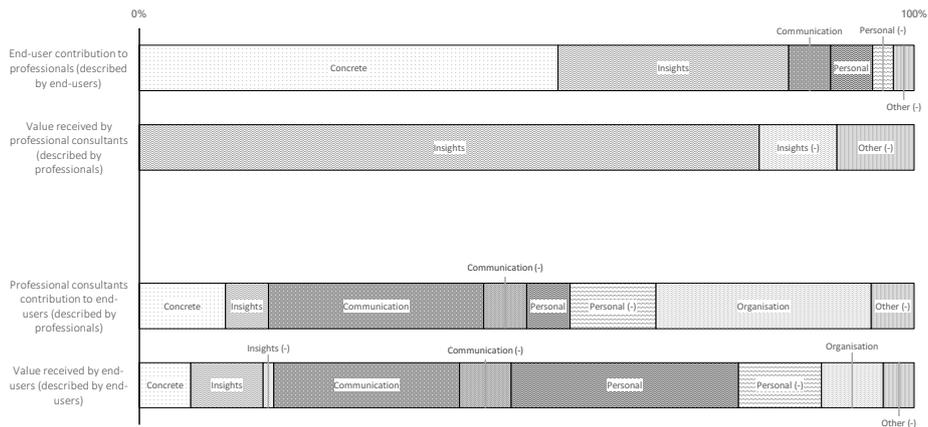

Figure 6: Percentage breakdown of types of value exchange identified as taking place from end-user to professional consultants and from professional consultants to end-users

thinking.

Figure 6 shows the relative weight of the categories of value exchange when value is being tracked firstly from end-users to professional consultants, and then from professional consultants to end-users.

Of particular note in this breakdown is the disparity between the types of value end-users reported contributing and those recognised as being received by professional consultants, and the large proportion of personal value that end-users report receiving from professional consultants that they did not report perceiving.

The lack of recognition of concrete contributions by users is reflected in the frustration expressed by a participant who wanted to have a meaningful impact on decisions but felt unable to make a contribution.

I've seen on plans, quite specific designs for that space, and I'm like, well, what if we don't agree, the people that are actually going to use the space. Who actually gets to have a say?. . . It wasn't very transparent what decisions had been made, and which decisions were still up for negotiation or could be impacted upon.

Other end-users, however were more pragmatic, and were focussed on making a contribution rather than expressing an assumption that they would be involved in decision making.

Our ideas might be misinformed, probably emotional, and maybe less than one percent of the whole process. But the very fact that you've actually felt like you've contributed, you've felt like you've been respected. . . I feel sorry for these guys because they've got to filter out all our bad ideas, and that's part of their job. But we feel respected, even if we don't contribute. . . we still feel like we're part of the story.

This statement also highlights an important yet under-reported role that may have been played by the professional consultants in this process, transforming contributions that are not useful (particularly those categorised in Figure 6 as concrete), into personal value for the end-users by using the co-creation process to actively listen and convey respect to the end-users. Interestingly, this personal form of value this was recognised by one of the architects when describing a co-creation process that involved an extreme group of end-users (two men with muscular dystrophy).

I think they probably got a sense of value that there's about ten people around the room, really intently listening to what they have to say. I think that's probably

important. That they're part of the group. I would say, it's kind of recognition as a person.

However, this same value was not recognised in co-creation activities with other groups of end-users on this project.

When speaking in general terms, this architect described how for end-users involvement can be more important than decision making power.

The whole role of co-creation is to create a process which eventually creates ownership over the space, as opposed to just giving them something. I think that through those sorts of consultation processes they feel like they were involved. Even if it's "oh they didn't listen to me" or something like that, at least they can say that they were involved.

Similarly, the project management firm's representative described a general philosophical approach toward inclusivity, stating that end-users who participate in co-creation activities

absolutely get that buy-in, so they feel involved in the process. So, it's not consultation, we were asking for their contribution, so they felt that any of their concerns were heard, and that they were addressed. Not necessarily given exactly what they wanted, but understanding the decision making process.

But, as with the architect, this approach didn't necessarily translate into the practical application on this project, with this actor describing their frustration at how

the majority of these people were clueless to the process. They did not understand the construction process or the design process. They were too concerned about "am I going to lose my office? I really need an office."… I wouldn't have been surprised if people took stress leave after the interviews. They weren't in any way confrontational, but they start to get concerned.

This disparity between abstract understanding of the role co-creation 'should' play, and the experience in practice points to Brause's point that it is critical to co-create the process with end-users so that they can achieve these kinds of value.[11]

Parts of the co-creation processes that didn't make clear the parameters in which the workshop was being conducted sparked a confrontational rather than collaborative tone.

[They] were asking our opinion on decisions that had already been made. The architect literally wasn't really speaking the same language as us or really hearing what

we had to say.

This notion of language was raised repeatedly as an issue across the interviews with both the professional consultants and the end-users. This was not limited to verbal language, with printed floorplans delivering a number of challenges.

It is important to engage with stakeholders in a language they can understand, and visualisation techniques are particularly important when soliciting feedback on something that is outside the users' typical experience.[38] Other research in this area has found soliciting feedback from three-dimensional models, to be more successful than relying on two-dimensional drawings.[11, 22]

The quote referencing the architect's language above was a reflection on a workshop in which two groups were given the same instructions, to work through some draft floor-plans for two levels of the building with the architects. In the group in which this reflection occurred, a printing error resulted the two floor plans being shown at differing scales. The group with consistently scaled plans had a generally positive response to the exercise and reported being highly-productive, while the group with inconsistent plans spent most of the allotted time discussing how the plans fitted together. While this cannot be attributed solely to the printing error, it demonstrates how concepts that can appear simple to an architect, such as reading a plan, can generate confusion and other negative forms of value for non-specialist participants. This was reiterated by a response from an end-user who was familiar with reading plans from previous work at a telecommunications company. He recalled how:

on the plan would be a G.P.O. and the staff would be scratching their heads thinking G.P.O. means General Post Office, not General Power Outlet. The amount of times they had to be told again, that's actually a power point. And there were all sorts of things [I was] continually translating.

More successful co-creation activities were facilitated through images (both abstract and literal), experiential descriptions and conversations, and tools that utilised elements of serious-play.

Opportunities for further research

The initial results presented here support continuing research into the value exchanges that take place through the application of a co-creation approach to the construction of the built environment.

The structure co-creation workshops attempted to challenge the ingrained power relationships that are assumed to exist in consultation processes by treating all participants as equal in the exercises. However, the analysis presented in this paper does not differentiate between the forms of consultation and instead focusses on the participants' overall impressions of the process. Based on the findings presented here, this has emerged as an important opportunity for further data analysis and research.

Most of the co-creation workshops, and all of the information sessions utilised technical architectural drawings (plans, sections, and elevations) as the primary medium through which discussion took place. While this is the standard form of communication for the construction industry, the results of this case study suggest that this form of communication brings significant translation challenges to the process. As with most large projects, a detailed three-dimensional model of the building was developed as a part of the architect's design process. This model was only used to generate two-dimensional plan, section and elevation drawings, and to generate static photo-realistic renders for marketing and communication purposes.

With continuing growth in the use of BIM globally, there is an opportunity to explore if the three-dimensional model can be used as a resource for facilitating co-creation processes. This suggests there may be an interesting cross-over with a body of literature that is exploring the value proposition of BIM, particularly for clients. To date, much of this literature has focussed on the benefits in the construction phase, and of the potential future benefit of BIM being used in facilities management applications.[20] Further research however, could explore the kinds of tools and virtual-reality environments that could support the use of early stage models in co-creation processes.

Conclusion

This paper began by exploring the future role architects may take in facilitating the co-creation of new meanings (understandings), materials (physical forms), and skills (ways of acting). It explored current attitudes to consultation and end-user involvement in design processes, using Arnstein's ladder to show

illustrate the tremendous challenge of achieving a true partnership through collaborative practice.

The preliminary case study results presented here reiterate the value of end-users as experts in their own experiences, and of co-creation acting as a vehicle for consensus building. They also suggest however, that despite a conceptual or abstract level of understanding, professional actors can underestimate or fail to recognise the value that end-user participants receive in a co-creation process.

The results also suggest that if architects are going to be equipped to lead the kinds of environmental, social and economic change programs that will increasingly be demanded of projects in the built environment, their understanding of co-creation must go beyond traditional consultation practices. This would enable architects to understand how to meaningfully engage with end-users as partners rather than a subjects, and to view the user as a source of inspiration for the exploration of ideas, rather than simply a source of information about their past experiences.

If architects can develop a more nuanced understanding of the ways in which this value is created, and are able to express this during the planning of a co-creation approach, they may help better align the outcomes of co-creation approaches with the partnership level of Arnstein's Ladder. The application of this knowledge is two-fold: Firstly, a better understanding of the types of value received by end-users may help alleviate the professional consultants' fears by challenging the assumption that consultation means giving over control of decision making. Secondly by shifting the focus when planning co-creation activities from consensus building and manipulation toward creativity and partnerships, Architects and other professional consultants may be more easily able to structure processes that can meaningfully realise the value of contributions by end-users.

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