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The para-disciplinary role of Design transforming innovation in organisations

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The research addresses the role of Design creating value at the intersections of disciplines in organisations. It presents a revision to the discourse on the nature of and relationship between Design and other disciplines.

This paper advocates a new *para*-disciplinary term for the post-disciplinary state of Design in its contemporary practices, acting as the 'inter-discipline' within organisations that are intent on the strategic development of their innovation capacity and potential. The work builds on a synthesis of findings from a longitudinal range of practice-based design research projects undertaken across industry and the third sector over the last four years. Case studies of these projects demonstrate that the involvement of Design has resulted in successive levels of influence leading to the radical transformation of the organisations' innovation strategies. The implication for the generic aspect of these findings are discussed in terms of inter-disciplinary discourses.

keywords: Design practice, Para-Disciplinarity, Transformation, Innovation

Introduction

Bremner and Rodgers (2013) contested that, "Design [as a discipline], again, finds itself in the midst of a crisis from a number of different perspectives, including professional, cultural, technological, and economic forces." Instead, the authors of this paper propose that the evidence of particular current practices of the discipline can be interpreted as somewhat of an apotheosis, whereby Design is actually *coming of age*. That the evidence increasingly demonstrates the capacity of Design to act as a transformational process in



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support of other disciplines within organisations seeking to develop their innovation capacity and potential.

Bremner and Rodgers' article built on previous observations by Friedman (1994) in his book *Radical Modernism*, which emphasized the responsibility of designers to avoid overspecialization and to see their work as an important creative aspect of a larger cultural context. Perhaps the passage of time has proven the advice but disproved the interpretation that the context implies a disciplinary crisis. Prior to Friedman, Richardson (1993) proclaimed that design "...is in a crisis of identity, purpose, responsibility, and meaning..." and that "...the viability of the profession as it is currently practiced needs to be seriously considered, its boundaries examined, and its values reconsidered." Bremner and Rodgers took this as a mandate to explore design's *crisis* as it contends with its disciplinary boundaries. Their approach was top-down, a generic sense-making theoretical interpretation based on critical discourse. The approach in this paper is countervailing, bottom-up, generating an alternative theoretical perspective from the evidence of specific contexts of design practice.

The Discourse About Disciplinarity

It is useful to remind ourselves of the original meaning of the word discipline, which concerns the suppression of base desires and is usually understood to be synonymous with self-control and restraint. Discipline is when one uses reason to determine the best course of action regardless of one's own desires (Fowers, 2008).

Irrespective of our concerns and views about the current transformation of the discipline of design, we also have to remind ourselves that disciplines are designed to; perpetuate and domesticate doubt as healthy scepticism (Brown, 2009), produce a sense of belonging and submission to a set of regularized practices (Chandler, 2009) and, create a [bounded] space where expertise is internally unstable (Post, 2009).

Rodgers argued that the boundaries of the historic Design disciplines, ruptured and began to dissolve due to the changing relationship between the product of design and its production following the gradual introduction of digital technologies (Rodgers, 2008). His argument contended that these changes include the realization that an indeterminacy of professional boundaries now exists, and fluid patterns of employment within and between traditional design disciplines is commonplace. The implication is that this has been harmful to the practice of Design, that the seriousness or restraint required of the discipline has been diminished following this creeping dissolution.

Bremner and Rodgers (ibid:2013) concluded that the historic disciplines of Design have therefore been superseded by a boundless space/time they called "alterplinary." That a combination of crises of professionalism in Design, global financialization, as well as the rapid adoption of digital technologies have all modified the models of Design thought and action. Consequently, historic Design disciplines need to transform, moving from regularized practices to a responsive reformulation of practices revolving around networked communication infrastructures, which are yet to be disciplined, but will nevertheless serve as conduits for power to re-organize space and re-regulate time to do things.

John Chris Jones (1998) previously suggested that an "alter-disciplinary" or "undisciplinary" approach to research in Design should be considered because the nature

of a PhD qualification for designers should successfully integrate art and science—as art/science—a new discipline.

Erich Jantsch (1970) was the first to present a framework to describe forms of collaboration that involve alternative disciplines. His framework of disciplinary terms describes the specific characteristics that make different levels of cooperation explicit. The underlying intention is important, because it promotes the act of cooperation as being the most important feature of interdisciplinary studies. The basis of Jantsch’s framework was used by Bremner and Rodgers (2013: 11) in their critical discourse on existing forms of disciplinarity. The format of the framework as adopted and adapted is shown in Figure 1, below:

<i>Similarities and Differences of the Disciplinary Dissolve</i>		
Inquiry	Character of the Designer	Character of the Discipline
Disciplinarity	Individuals demonstrate understanding of one set of conceptions and one methodological approach. They are able to generate unique questions and contribute new research in this field.	An understanding is demonstrated of one set of conceptions and one methodological approach from field of practice. Able to tolerate questions and contribute new designs in this field only.
Multidisciplinarity	Individuals demonstrate disciplinary competence and understand that their endeavors must be related to the endeavors of others in surrounding disciplines. They therefore come to know and use some concepts used in these disciplines.	An understanding is demonstrated of disciplinary difference and shows ability to learn from other disciplines.
Crossdisciplinarity	Individuals demonstrate disciplinary competence and know how concepts from other disciplines relate to their own, having mastered some of those concepts. They are able to constructively communicate with those from other disciplines.	An understanding is demonstrated of disciplinary difference and can follow problem-focus of other disciplines.
Interdisciplinarity	Individuals demonstrate at least two disciplinary competences. One is primary, yet they are able to use the concepts and methodologies of another discipline well enough to contribute to its questions and findings. New understandings of the primary discipline result.	An understanding is demonstrated of at least two disciplinary competencies. One is primary, yet it is able to employ the concepts and methodologies of another discipline. Strengthens understanding of the primary discipline.
Transdisciplinarity	Individuals demonstrate at least two disciplinary competences, neither of which is primary. They work in and contribute to both and generate unique conceptions and artifacts as a result of an emergent transdisciplinary perspective. They are able to communicate with individuals from a variety of disciplines in a synoptic manner.	An understanding is demonstrated of at least two disciplinary competencies, neither of which is primary. Results in a trans-methodological perspective. Abstracts disciplines to bridge new problems.

Figure 1: Bremner and Rodgers, adapted from Jantsch.

Bremner and Rodgers build beyond the hierarchy of existing terms developed by Jantsch and add a further set to describe the shift of Design as a discipline with regard to their interpretation of prevailing global crises, using a negative disciplinary discourse of theory informing practice. By doing this they infer that Jantsch’s five forms of discipline-arity are insufficient to describe the current context of Design. Their extended table is included in the section after the next, which describes the evidence from selected Design practice case studies. The authors use this extended table to highlight the relevance of the meta-level characteristics drawn from the cases, to provide a revision to the discourse about the post-disciplinary state of Design, whereby practice informs theory, moving beyond the position of Bremner and Rodgers and others.

Evidence from Design Practice

The expansion of Design's role across sectors in society has been a common feature of many research topics for the subject. Similarly, the nature of engagement of Northumbria University's contract research has addressed all types of organisations across the private sector, public sector, the third or Voluntary Community Sector (VCS) and the enterprise sector. The research described in this paper specifically refers to the private sector of industry and commerce and the third or Voluntary Community Sector (VCS). The main difference between these sectors is that VCS organisations exist to fulfil a specific social purpose while private-sector organisations' primary goal is to turn a profit for shareholders. Yet, in daily practice, working in the voluntary sector is not that different from the public or private sectors. People in all three sectors are working hard to do their jobs and produce a valued service (Reach, 2017). Within the private sector we find different scales and types of businesses that Design is making a contribution towards. For example, the Industrial Design discipline is no longer focussed on manufacturing industry as its concern; designers (Industrial, Product, Service designers and others) are now making a valuable contribution to a wide range of product service systems including financial companies through the design of their 'products' and services. Many of these organisations have not previously involved Design as a contributory discipline to their business delivery. The industrial case study example referred to in this paper is a medium sized enterprise that is a subsidiary of a global manufacturing corporation. Blaich (1993) made the distinction between categories of manufacturers where the business strategy and process are driven by different disciplines, i.e.; marketing (fast moving consumer goods (FMCG)), technology (capital and process equipment and components), hybrid manufacture with an engineering bias (e.g.; automotive), and Design as in the case of electronics products. These categories of manufacturers are useful to recognise in the interpretation of the meta-level characteristics of the cases in the last section of this paper. The VCS case study examples referred to are medium sized (EU criteria were used to define an SME) charities that were subsidiaries of national charity organisations.

The sampling design of the study involves multiple cases and multiple units of analysis, and in Yin's terminology is a multiple embedded case study, (Yin 1994, p. 39). For the purpose of succinctness, one industrial case study is referred to in detail here, based on a Knowledge Transfer Partnership (InnovateUK, 2017) lasting two years with a UK subsidiary of a global technology-based process equipment manufacturing company and one VCS doctoral programme is referred to that studied three national charities through regional subsidiaries.

The template for each case study comprises; a brief description of the organisation, the initial operational level project, strategic level actions, the policy level influence that this led to and the subsequent transformational impact on the innovation culture of the organisation. This template refers to the Model of three levels of design impact (Young et al., 2001).

Methodology applied to the case studies

This research aimed to determine the transformational impact of Design practice on the innovation culture of a cross-section of organisations not used to the contribution of Design, so the designer's practice was not guided by any previous engagement, as is

required by the Action Research approach, which was the predominant methodology (Lewin, 1946, p. 38; McNiff & Whitehead, 2011). The selection of contrasting cases from industry and VCS organisations described above were examined for this purpose, supported by a case study structure (Yin, 2003) to ensure generalizable theory.

Data on the impact and value of the Design practice approach to a range of stakeholders was captured during, immediately after, and after several months using: semi-structured interviews; project meeting recordings; reflection-on-action logs; and design artefacts (Author3, 2015). An independent researcher interviewed project stakeholders at the end of the collaborations to ensure accuracy in the reporting of outcomes. Gathering data at several points of the project from multiple stakeholders enabled a triangulation of data that ensured validity (Jick, 1979, p. 602).

Once all collaborations were conducted, all case study data was analysed using a four-stage inductive analysis process (Thomas, 2006). The first-stage involved 'cleaning' the data (Miles & Huberman, 1994, p. 51) by converting it into a common format and placing it in chronological order. The second-stage involved hand-coding of the data in relation to the study's evaluation objectives and encoding each related excerpt of text. In the third stage, all excerpts of text were then copied onto 'post-its' to allow for the creation of multiple coding collections (Guldbrandsen, 2006) by grouping similar quotes related to the same critical event across each case's timeline. The correlation of activities across project stakeholders, data collection methods and the project timeline also helped to ensure the critical events were objectively identified (Crisp, Green Lister, & Dutton, 2005). Finally, these multiple coding collections were compared and contrasted across stakeholders, timelines and cases to isolate common categories (Warwick, 2015). These were then grouped and reduced to identify themes (Silverman, 2006, p. 307) and patterns (Reichertz, 2007, p. 221). The derived patterns were then discussed in peer reviews with the organisations and Design communities to verify and validate them to reduce any research/practitioner bias. (Warwick, 2015).

Industrial Case Study

The research was conducted in a manufacturing SME, referred to here as Company A, which had not previously engaged with a designer. The shift from operational to strategic level Design actions is described using the key organisational features, which were found to effect transformational change.

Company A: is a subsidiary of a US headquartered technology-based manufacturing conglomerate operating across international markets employing over fifty thousand people. It can be characterised as an innovative, technology-centric manufacturing business. Company A worked in partnership with Northumbria University through a two year KTP project to introduce a customer-centric and value-proposition driven approach (Hassan, 2012) to its new product development.

Initial Operational Level Project: Redevelopment of Existing Product 1 (EP1)

Establishing confidence in a Design capability.

First, an existing product (EP1) was redesigned. Industrial Design expertise was used to redevelop the external qualities and user-interaction of one of Company A's product-ranges. Although it's focus was this one product-range, the industrial design work took a wider strategic view and established some early design principles and a visual language that could extend to more of the company's products. The timing of this design work

coincided with the rollout of new brand-guidelines across the whole Corporation, so this first product-range became a high-profile benchmark for other parts of the business to follow. For example, for several months, EP1 was featured in the organisation's foyers in both the UK and in the US head-office.

Industrial Design symbolising a corporation-scale change

The design language and principles that EP1 proposed, were extended to other parts of the business using mock-up product visuals. These were iterated based on feedback from various divisions, to arrive at a best-fit with the wide range of sales environments and competitors. Visual guidelines were then produced, which were rolled out Europe-wide, culminating in a major exhibit at the world's biggest manufacturing trade-show, the Hannover-Messe 2015.

Premises and Processes were transformed

- Internal 'Innovation Labs' have been established and drawing tools and method cards were created to begin a roll-out of idea-generation processes across the organisation.
- The company's proprietary Stage-and-Gate Product Innovation Process now integrates both Industrial Design and Strategic Marketing as the investigative resource used to define new value-propositions as well as confirming Industrial Design's role in the downstream product development stages.

Strategic Level Actions: Development of New Product 1 (NP1)

Defining the value-proposition from a customer perspective.

The design-research work defined an issue targeting the food and beverage sector, which:

- affected a majority of retailers in the sector.
- was recognised by very few in the sector as affecting customer experience.
- was recognised by very few in the sector as a business risk.
- was currently unmet in the industry by any existing product/service offering.
- could be addressed with existing technologies.

Therefore, new value has been proposed without needing to rely on any technological breakthrough. Instead the food retailer realises an improved customer experience, reduced business risk and improved supply-chain relationships.

Testing the value assumptions with customers

Product NP1 was developed in response to this research stage, and key market-access strategies along with specific target customers were identified. NP1 was prototyped and demonstrated to a series of potential customers and their feedback was used to iterate the proposed product through several versions. Only then was it introduced to customers with global reach. It was included, by invitation, in one such customer's annual selection of potential innovations for implementation. It was then selected to undergo 18-month long efficacy trials with a view to global adoption to meet the desired level of functional performance.

Evidence of the Impact of Design as Leadership

Senior Executives within the company were now paying attention to the actions of the UK site and were hearing about the role that Design was playing in key contracts that were being secured. They were also seeing a spike in sales of EP1 after re-launch, attributable to both technical performance improvements and the striking new external aesthetic. At this time, the same senior executives were engaged in determining where they would find and/or develop strategic leadership for the group of European manufacturing divisions. They eventually selected the UK site as the Divisional Headquarters across the six European manufacturing sites, a decision that was attributable in part to the successes outlined above.

Transformational Impact: Evidence of the widespread impact of the innovation

At this stage, the issue that NP1 addressed was in the public domain. As a result, one of the most influential industry-representative bodies concerned with the Food and Beverage sector, the International Society of Beverage Technologists (ISBT) added a new recommendation to its best-practice manual, which dealt specifically with the issue the customer-research phase had addressed. So, trusted international industry guidelines had changed as a direct result of the NP1 project. Furthermore, the NP1 now sits at the top of the company's forecast for the main revenue generating potential of its new product lines in their 5-year forecast. Of the top 10 in that forecast, Industrial Design will have an investigative, value-identification role in at least 3.

Sharing the story of this customer-centric innovation approach within the organisation.

The profile of the UK division has transformed through this period with several aspects of the business being developed including the approach to innovation. Company A's CEO in the USA has explained their view of the completed project as follows:

"At present the three sub-brands all produce competing products across these technology categories (having each grown up as independent companies before acquisition). UK Company A recognises that the substantial product-range rationalisation process necessary to deliver this new policy must be based on customer-centric approaches if it is to achieve the desired level of product innovation and market differentiation in each range. The UK division has the mandate to lead the rationalisation process in the largest of the three technology areas: filtration, and sees this process as a rare opportunity to reframe and redevelop its product ranges from a customer-value perspective. This was the central objective of the KTP and required an integrated approach to understanding Design-driven innovation in the international market context. The VP for Innovation sits on the board at Company A, giving this project high visibility at group level. The approaches and protocols developed through this KTP project have driven change at Company A and the successful strategies which were developed have been shared across all three EU filter manufacturing sites, consolidating the UK's position as a Centre of Excellence for R&D within the Group. This KTP will safeguard Company A in the North East and position the UK facility as thought leader in product and marketing innovation."

VCS Case Studies: Charity A, B & C

The research was conducted within three charities in succession, referred to here as Charity A, B and C, none of which had previously engaged with a designer. In each charity, a Design for service innovation approach was used to explore an issue of their choice. Although all charities had comparable income and all delivered public services, each had differing charitable aims and customer bases.

Charity A is a local organisation that is part of a UK federation, hereafter named Network A. They provide mental health and wellbeing services across three boroughs in North East England, many of which are on behalf of a local council. In this project setting, the designer (Author 3, Warwick) was asked to help the organisation consider what services they should provide in a new geographical area.

Charity B is also a local charity registered with a national federation. Operating in one borough in North East England, they provide a variety of community education services to all ages. In this project setting, the designer was engaged to help the organisation improve its earned income, particularly focusing on how it could improve its membership system, which offered discounts on fitness, arts and children's services to the local community.

Charity C is a national charity based in North East England. Their mission is to engage children in reading and they offer a variety of services, both directly to the public and through educational institutions, that address this aim. Here, the designer helped the charity to consider the experience that their services provided and how they could be improved to better meet the aims of the organisation.

In each of the three charities engaged in the study, the designer worked with a variety of stakeholders; staff and volunteers who administer services directly to clients; middle management; and executive leadership. Each collaboration lasted two months in order to allow an adequate amount of data to be collected, whilst not demanding too much capacity from the organisation.

Initial Operational Level Projects:

Charity A: asked the Designer to help the organisation consider what services they should provide in a new geographical area. Tools, i.e. personas, idea generation, service blueprints and touchpoint prototyping, were used to co-design a new recovery-focused service that engaged service users differently. Following the Designer's contribution, Charity A successfully applied for a grant of £425,000 from BIG Lottery Reaching Communities, to roll this service out across the region. Charity A's national federation commissioned a service design pilot with three other federation members following the successful use of the practice.

Charity B: engaged the Designer to help improve earned income, particularly how the charity could improve its membership system, which offered discounts on fitness, arts and children's services to the local community. Tools, i.e. visual customer journeys, staff surveys and co-design workshops, were used to co-design a new membership system that simplified the cost structure and reduced the price for those in receipt of benefits. The Designer also helped to undertake engaging user research that formed an application to BIG Lottery, and they were awarded £190,000 as a result. Charity B has since contracted continuing Service Design support after the project to support their customer communication.

Charity C: asked the Designer to consider how the customer experience provided by the charity's public services could be improved. Tools, i.e. observation, reframing the problem area and idea generation, were used to co-design and prototype nine concepts to improve the customer's experience. As a direct result, Charity C saw a 300% rise in their annual pass upgrade rate, which equates to an extra £52,500 a year for the organisation. Consequently, the organisation committed to using the Design process again, enlisting service designers to support an upcoming project around the user experience they provide for people with cognitive and sensory impairments.

Strategic Level Actions:

All three charities received the same information about the Design approach before the collaboration commenced and the designer spent time initially introducing and demonstrating the different tools and methods of the approach to the various stakeholders. Despite this consistency, analysis shows that the understanding of the Design approach was different in each setting, which influenced the trajectory of the projects. To consider this disparity in outcomes, this section of the paper presents the shift to strategic level actions in relation to four key organisational features found to be required for the Design approach moving from an organisational level to strategic then policy levels to effect transformational change.

Understanding the Design approach

In Charity B: the CEO stated in his pre-collaboration interview that he saw the Design approach relating to the marketing of services. However, when the Design work challenged fundamental policies and structures in the organisation, for example interrogating the way that prices were set, he responded by reinforcing the need to focus on the communication of services rather than question the practice of how they were delivered.

In contrast, stakeholders in **Charities A and C** who had also not previously engaged a Design programme, did anticipate that the approach might challenge some of their current practice. Conversely, as well as not anticipating that the Design approach could challenge **Charity B's** current organisational practice, the analysis shows that their Executive Management Team did not see this as a desirable role. This is indicative of their perception that the Designer's role was to provide capacity to help them to reach their pre-defined outcomes, rather than question any of their aims. It is clear that in **Charities A and C** there was both an expectation and desire that the Designer would operate across the different levels of the organisation and challenge their existing processes, which was lacking in **Charity B**. As such, the roles that the Designer was allowed to play in setting B were greatly restricted.

Receptivity to Change

A pre-requisite for each collaboration was that each charity should identify that they want to review or change existing or planned service offers, however analysis shows that the organisations had different levels of receptivity to change. In **Charity A**, the organisation-wide appetite to try new processes and be open to the outcomes that they presented, provided an ideal environment for the design activity to progress. Likewise, **Charity C's** stakeholders identified that they were at an opportune moment in their development for external input, and stakeholders also reflected that they were comfortable with the concept of transformation. In contrast, a recent period of organisational restructure in **Charity B** meant that front-line staff exhibited a reticence to change, which posed a significant barrier to the Designer's activity. Although stakeholders engaged in co-creation

activities, the organisational fragility decelerated the project momentum, thus reducing the impact it was possible to achieve in the given period. Similar disparities in receptiveness to change can be seen in **Charity B's** responses to proposals made throughout the collaboration that impacted on their current business model. Although the Designer demonstrated how improved customer-focused offers could help to increase income, their current financial difficulties limited the stakeholders' ability to see how the services could be offered differently. Although **Charity A and C** also highlighted the volatile fiscal climate as a driver for change, they viewed the Designer's engagement as an opportunity to explore ways of increasing or diversifying income in order to become more sustainable, and were therefore more responsive to alternative business models. Analysis of the inconsistency between **Charity B and A&C** shows that it is linked to the organisation's desire for change to occur. The lack of appetite for change at an executive level in Charity B ultimately restricted the work of the Designer to incremental rather than strategic outcomes.

Valuing Process and Outcomes

The difference in outcomes across the charities can also be linked to the value that the stakeholders in each placed on the Design process, in comparison to tangible outputs. Analysis of the pre-collaboration interviews shows that **Charity B's** executive stakeholders were focused on the results of the project from the outset. This emphasis on results in the data overwhelms any discussion of the value in the process itself. In **Charity A**, analysis shows that stakeholders placed huge value on the design process. Stakeholders' desire to understand how to enact transformation meant that as they recognised the Design process as a potential vehicle for change, the designer's input was increasingly valued. Their appreciation of the approach is also evidenced by the organisation's request for a service design toolkit in order to provide a legacy to the collaboration, which demonstrated their commitment to embracing the approach long-term. Similarly, in **Charity C** the stakeholders recognised that their current service development processes were not effective, and that they also valued the different perspective that the Design approach brought. As such, the charity also pledged to continue using the Design approach again. Although data from post-collaboration interviews suggests that all stakeholders valued the Design process, it is clear that the desire to adopt a new approach was fundamentally lacking in **Charity B**, which placed emphasis on the tangible outcomes of the engagement, resulting in the restriction of the Designer's influence to front-line services, and preventing a transformational outcome.

Compatibility between existing organisational culture and Design approach

In encouraging the use of the Design process in each setting, the designer advocated co-creation at every stage. However, in **Charity B**, current service development policy dictated that ideas should go through the EMT, who would then decide whether they should be implemented. This practice did not facilitate a culture of co-creation. Data collated across the collaboration timeline shows that Charity B's existing organisational policies dictated that finance was at the centre of the service development process, whereas a Design approach places users at the centre (Burns et al., 2006). Without a strong desire to alter the existing service development practice, the conflict between user-focus and finance-focus proved to be a barrier to the project progression and the extent to which Design could influence the organisation. In the case of **Charities A and C**, the principles of a Design approach aligned very much with the requirements of the

organisation; focusing on user needs to build desirable, efficient and effective offers was both an expectation of the organisations, as well as being an aim of the Design approach. The case study data demonstrates that during conversations in both settings, the designer and staff recognised this common perspective, which strengthened their relationship and their ability to co-create. In both A and C, the symmetry between the existing organisational attitude and the Design approach allowed the designer to adopt the roles of a facilitator and provoker (Tan, 2012) much more successfully. However, in **Charity B**, there was a distinct disparity between the Design approach and the incremental service development approach preferred by the EMT. With such a discrepancy, the design process was not sufficiently valued to permeate the strategic levels of the organisation and create transformational outcomes as it had in the other two settings.

Transformational Impact: Evidence of the widespread impact of the innovation

Analysis found that whilst positive service innovations were observed in all three project settings, the collaboration only had a transformational impact in Charities A and C. It found that the outcomes of using design in a sample of three VCS organisations were:

- Financial gains (design directly supported the organisations to secure £1.2 million in funding and was used as evidence to secure a further £1.5 million).
- More customer-focused services (each charity developed new service(s) that were still in use 12 months' post-collaboration and that they had changed the way that they engaged with their customers).
- And organisational learning (two of the charities made changes to their policies and processes).

Predictably, some of the research's findings build on existing knowledge within the Design community, such as Design's ability to create more customer-focused services (Gloppen, 2011; Hollins, 1993; Meroni & Sangiorgi, 2011). Warwick's case study has verified this existing knowledge in a systematic and rigorous way. However, it also extended the contexts in which this can be claimed, which has significant strategic and policy level values for both VCS organisations, practitioners and educators (Warwick, 2015).

The understanding of precisely how the Design community and VCS community can work together represents new opportunities for all stakeholders. The study demonstrated that the relationship established between the designer and community to be critical to designing value in the collaboration. More specifically, the importance of trust, in order to form such relationships. The Design-led service innovation (Design for Service) approach and the designer, using such an approach, should operate as a 'critical friend' during initial engagements with a VCS organisation, in order to result in improved services and new organisational learning. Positioning the Design process and the designer in the role of a 'critical friend' in a charity allows their influence to permeate beyond the systems level, to the policy level of an organisation, resulting in a transformational impact (Warwick et. al., 2015).

Derived Factors of Influence

The cases above identified a range of common organisational features, which were required for the Design approach to move from an organisational level to a strategic then policy level, to effect transformational change in the organisation. The interpretation is

that when Design acts as a transformational process in an organisation, it is having the greatest impact on the innovation capacity and potential of the organisation. If we ladder these features in the context of the two different sectors they comprise:

For an industrial technology-based manufacturing organisation:

- Defining the value-proposition from a customer perspective.
- Testing the value assumptions with customers
- Sharing the story of this customer-centric innovation approach within the organisation.
- Establishing confidence in Design as a capability.
- Evidence of the Impact of Design as Leadership
- Industrial Design symbolising a corporate-scale change
- Transformation of premises and processes

For a VCS charitable services organisation:

- Understanding the Design approach
- Receptivity to Change
- Valuing Process and Outcomes
- Compatibility between existing organisational culture and the Design approach

A meta-level analysis of these features derived from the case studies reveals a pattern in the approach of successful Design within organisations, who have not previously had a history of using design as part of their product/service innovation development processes in the past. Resonance across the cases indicates a primary need to:

1. Engage project challenges with stakeholders from a *human-centred* (user-centred or customer-focused) Design approach on the operational development of products and services.
2. Establish *trust* with stakeholders in project teams and build confidence in the Design approach to address project objectives by connecting with and supporting other disciplines in the organisation (knowing that the initial acceptance of trust is likely based more on the intrapersonal and interpersonal skills of the designer rather than confidence in the Design process, per-se.).
3. *Be consistent* in thought, word and action, which seems to cultivate trust and confidence with stakeholders, especially across levels within organisational hierarchies.
4. *Communicate* and demonstrate the value of the Design process through its outcomes to all stakeholders using a combination of media and communication channels. This is particularly important in order to offset the difficulty of trying to describe the tacit practices that the designer brings to bear in the delivery of the Design process, in advance of practice.
5. Use successful outcomes of the Design process to gain permission *between disciplines* to progressively climb up the different levels of project influence (operational, strategic and policy levels).

Whilst the cases demonstrated the importance of these features acting in combination to achieve successful outcomes, the meta-level analysis indicates that the most significant in

relation to the discourse about disciplinarity and the evolving role of Design in organisations:

Trust: builds confidence and respect and furthers influence. In each case study, the designer was working with an organisation that had not engaged Design approaches previously. Such projects can be viewed as ones that create both risk and interdependence between the designer and organisation; the two conditions that create the need for trust (Rousseau, Sitkin, Burt, & Camerer, 1998). The precise process and outcomes of Design cannot be guaranteed in advance, creating risk for the organisation and thus a reliance on the designer. This dependence is returned, as the designer needs the permission and time to engage with stakeholders, in order to create anything of value. The cases showed that calculative trust (where the trustor - the person imparting the trust - perceives the intentions of the trustee - the person receiving the trust - as positive) was required at the beginning of each relationship, in order to elicit the permission to co-design (Rousseau, Sitkin, Burt, & Camerer, 1998; Williamson, 1993). It was also found that relational trust (trust that develops during the relationship from interactions that occur between the trustor and trustee) (Rousseau et al., 1998, p. 399) was key to progress the use and application of design within each organisation. The cases demonstrate the importance of trust at the point of the initial application of the Design process, how it was obtained and what this means for human-centric (user-centred and customer-focused) Design-led innovation practice. There are no specific models on the development of trust in relation to Design innovation contexts, the nearest examples are those proffered by organisational discourse to support the development of trust. Mayer et al.'s (1995) model of trust is the most widely accepted in this literature, which comprises three aspects of perceived trustworthiness; ability, integrity and benevolence. Calculative and relational trust were used in the analysis of cases to examine how the aspects of trust were elicited in the initial phase of engagement and then during the course of each collaboration.

Communication: The importance of the role of the designer as interlocutor or communicator was promoted by Richard Seymour (2003?) in his article describing a chief function of the designer as interdisciplinary interlocutor. This strategic role was also recognised by Myerson (2007) at the Intersections conference 2007. The need for designers to improve their capacity as articulators of the Design process was previously identified by Buchanan (1985), including his reference to the importance of rhetoric, which he pointed out has been largely ignored in contemporary education curricula and practices, specifically including the education of designers. More recently, the designer's role as a communicator was highlighted by Yee et.al. (2009) and Tan (2012) in respective studies of the roles of the designer in Service Design and Design for public good contexts. More recently it has been written about by Yee, Jeffries and Michlewski, (2017), in their book; Transformations: seven roles to drive change by design.

The tacit nature of Design knowledge within the innovation process and practices of the organisation and its actors is a reason that the influence of design has not been acknowledged and given credence to in the past, where innovation breakthroughs have occurred. Effective communication of design-led innovation processes and outcomes are the only mechanism for deferring taciturn practice, until more of its action is capable of being revealed. Several doctoral projects are now addressing this conundrum at Northumbria University.

Between Disciplines: The importance of interaction between disciplines facilitated through a Design approach to effectively achieve innovation capacity within organisations

is in no small measure down to the learning experience of design students involved in multidisciplinary innovation education over the last ten years. The development of multidisciplinary postgraduate programmes in innovation practices was an initiative prevalent in Design Schools in the second half of the millennial decade. These programmes contrived to break down the hegemony of traditional academic departments and discrete discipline approaches to learning about innovation. They were not only about developing students' practical teamwork skills, they developed an affinity towards different mental models and disciplinary practices. They anticipated that multidisciplinary exposure has potential to create new knowledge that would not occur in discrete disciplinary contexts. The anticipation was that well-functioning teams not only get along in daily activities but can also create a shared body of knowledge that is more than the sum of individual contributors' own knowledge and skills (Karjalainen et al., 2009). This concerns both the creation and sharing of explicit, implicit and tacit knowledge, and especially so-called "embedded knowledge" within the teams (Madhavan, Grover, 1998). Embedded knowledge can be defined as a result of the combination of team members' tacit knowledge that is potentially created as soon as members get together. This type of knowledge is inherent in well-functioning teams; it is collective knowledge that cannot be held efficiently by individual members. Karjalainen and his colleagues in Helsinki understood that the better the learning team members' mutually recognize and acknowledge their roles, strengths and limitations as well as their practices and thinking models, the more purposeful embedded knowledge is created as project outcomes and the greater the satisfaction of external collaborators. Furthermore, the sensitivity to generate embedded team-specific knowledge, or what could also be called multidisciplinary knowledge, can be nurtured through project-based learning. Embedded knowledge that a team possesses is transferred to "embodied knowledge" in the new product that the team develops (Madhavan, Grover, 1998). How successfully the embedded knowledge transfers to embodied knowledge is a function of how well the product meets the intended goals, and is a central challenge of multidisciplinary teamwork.

Extended disciplinary framework

An extended figure of the disciplinary framework is included here to help interpret the findings from the case studies in the section above. The authors use this figure (2) to highlight the relevance of the meta-level features that are reinforced by data and the experience drawn from the cases, indicated as text blocks in grey-scale highlights.

Inquiry	Character of the Designer	Character of the Discipline
Pluridisciplinarity	This problem-solving mode combines disciplines that are already related, such as design and engineering. Some of the various domains in design itself involve pluridisciplinarity. ⁴²	An understanding is demonstrated of a combination of disciplines that are already related in the various domains within design itself.
Metadisciplinarity	This mode connects history/theory and practice so as to overcome specialization; it seeks to develop an overarching framework that differs from disciplinarity in that it does not address single problems.	An understanding is demonstrated that shows an effort to overcome disciplinarity by using methods to construct overarching frameworks to connect practices and their histories to new problems.
Alterdisciplinarity	Globalization and the proliferation of the digital results in connections that are no longer "amid" systems, cannot be measured "across systems, and do not encompass a "whole" system. Instead, the digital has generated an "other" dimension so that we might now need to consider "alter-disciplinarity." ⁴³	An understanding is demonstrated that shows an ability to make connections that generate new methods to identify "other" dimensions of design activity and thought.
Undisciplinarity	Practice shifts from being "discipline-based" to "issue- or project-based." ⁴⁴ "Undisciplined" research straddles the ground and relationships between different idioms of distinct disciplinary practices. Here a multitude of disciplines "engage in a pile-up of jumbled ideas and perspectives. Undisciplinarity is as much a way of doing work as it is a departure from ways of doing work." ⁴⁵ It is an approach to creating and circulating culture that can go its own way without worrying about what histories-of-disciplines say is "proper" work. In other words, it is "undisciplined."	An understanding is demonstrated that purposely blurs distinctions and has shifted from being "discipline-based" to "issue- or project-based;" an ability to mash together jumbled ideas and methods from a number of different, distinct disciplinary practices that can be brought together to create new unexpected ways of working and new projects. Displays an "anything goes" mindset that is not inhibited by well-confirmed theories or established working practices. ⁴⁶

Figure 2: Extended table of the disciplinary framework from Bremner and Rodgers (2013)

Conclusion

This research aimed to determine the transformational impact of Design practice on the innovation culture of a cross-section of organisations not used to the contribution of Design, to determine if this concurs with the existing disciplinary discourse on the role of design in society. The interpretation is that the cases provide evidence for a new interpretation of the role of design. The cases included a UK industry based KTP project with a subsidiary of a global corporate manufacturer, and three successive doctoral case studies with VCS, charities. All of these organisations had the aim of introducing design-led innovation capability to the organisation.

Case study analysis helped to derive a range of organisational features that were found to be required for the Design approach to move from an organisational level to a strategic then policy level, to effect transformational change in the organisations. A meta-analysis of these features indicated that the most significant in relation to the discourse about disciplinarity and the evolving role of Design in organisations were:

- Trust: which builds confidence and respect and furthers influence
- Effective communication of design-led innovation processes and outcomes
- The importance of interaction between disciplines facilitated through a Design approach.

Bremner and Rodgers (2013) argued that the boundaries of the historic disciplines of design have been superseded by a boundless space/time, which they called "alterplarity." That this explains the crises of professionalism in design, global financialization, and the rapid adoption of digital technologies. Their critique sees Design having to transform itself from a globalized state of culture.

The consideration of this research it to reject the discursive and categorical construction, even the fetishisation of disciplinary boundaries in the context of a global state, in terms of its relevance to the evolution of Design practice in organisational contexts. Consequently, this means that we cannot describe our approach as inter- multi- or undisciplinary, even though we draw on concepts, theoretical arguments and empirical studies written from existing disciplinary perspectives. Instead, we could describe our shared approach as post-disciplinary in its current intellectual implication. Our evidence seems to point to the growing value of Design as a 'functional' discipline within organisational structures. Hence, to Design's capacity as a 'para-discipline'; acting between, beside and beyond existing disciplinary categorisations. This concept is not entirely new, for example it was a conclusion of the Design for Service AHRC Workshop, where Kimbell and Seidel (2008) referred to Design as the inter-discipline. The authors suggest that the term para-discipline may be a more accurate, systematic interpretation from practice. To conclude, the observation of Richard Buchanan is apposite:

“Design does not have a subject matter of its own – it exists in practice only in relation to the requirements of given projects. The path of progress for the field is not defined by the next great unsolved design problem. Design is ‘integrative’ in that, by its lack of specific subject matter, it has the potential to connect many disciplines”
(Buchanan, 2002).

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