Connecting for Impact: multidisciplinary approaches to innovation in Small to Medium sized Enterprises (SMEs)

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Abstract: *This paper reveals the methodology developed and adopted by groups of Multidisciplinary Design Innovation Masters students whilst working on projects with regional Small to Medium Sized Enterprises (SME's). It exposes an eight-stage approach and shows how the creation of a 'problem-space tapestry' acts as a mediator between different disciplinary approaches.*

The authors used a combination of observation, interview, post project-analysis and auto ethnographic reflection in order to uncover this process and to draw conclusions about the conditions that are necessary to support university based multidisciplinary design-led innovation projects of this type.

Keywords: *multidisciplinary, innovation, SME, problem-space.*

Background

This research reveals the methodology adopted and developed in a suite of team-based, design-led, multidisciplinary innovation projects conducted in collaboration with a series of regional SMEs. By unpicking the methods adopted in the projects' execution, the authors are able to identify a number of key points that informed their understanding of the conditions required to support this type of work.

The research is situated within a post-graduate Masters programme in Multidisciplinary Design Innovation (MDI) which is a collaborative venture run by Northumbria University between their School of Design, School of Computing, Engineering and Information Sciences and Business School. The MDI programme is a one-year, three trimester Masters programme in which graduates with first degrees in Design, Business and Technology and other specialisms like politics, psychology and fine art learn together and are taught by specialist academics from each of these disciplines.

This programme was developed in response to Sir George Cox's Review of Creativity in Business (Cox 2005) which suggested that establishing long-term economic business sustainability in small businesses requires an agile approach to innovation and employees who are open to change and capable of working across disciplinary boundaries. In response to Cox's report, Northumbria University made a proposal to the Regional Development Agency and was awarded a grant of circa £500k with which to establish post-graduate multidisciplinary innovation projects to facilitate knowledge sharing with local SMEs. Through this scheme, a suite of 18 projects was undertaken over a 2.5-year period involving 50 MDI students.

Case Studies

Project case studies are presented in the book Connecting for Impact: 18 Inspiring stories of multidisciplinary innovation, (Bailey and Smith, 2011) which outlines the approaches and value of multidisciplinary innovation in small to medium sized industrial settings.

Typical of the projects was one undertaken with touring caravan manufacturer, Elddis. The initial brief was to look at how the company might position its products to attract a younger market. The briefing was conducted in and around caravans and involved the students exposing, with the client, their initial perceptions of caravans and caravanning. This raw data was recorded on large rolls of paper and included anecdotes and childhood memories, rapidly sourced images and statistical data provided by the client. Following this outpouring of tacit knowledge and ideas, the students sought to cluster the data in order to make sense of what they were uncovering. Material was grouped under headings such as 'on the road', 'blue-rinse set', 'space-use', 'at one with nature' etc.

Following this initial externalising of knowledge and perception, the students were primed with questions and ideas to test in a real-world setting. The company loaned the group a motorhome and they visited a number of caravan sites where they immersed themselves in caravanning life; observing and engaging with caravan enthusiasts, first-timers, site owners and employees.

In order to understand more about the business, they visited retailers and tradeshows as 'secret shoppers', following up by declaring their purpose and interviewing business managers about their relationships with the manufacturer and customer. Simultaneously, they conducted on-line research via blogs, interest groups

and surveys. They made site visits in order to understand manufacturing processes and the company's capacity for change.

Concurrent with this data gathering they engaged in creative exercises in order to generate, prototype, evaluate and refine ideas based on their emerging knowledge base.

Ultimately, they drew their thinking together in order to present three clear opportunities to the client company;

1, they revealed critical insights and opportunities surrounding the relationship that existed between Elddis, the retailers and ultimately the end users.

2, they offered technical innovations in the way that caravans could be manufactured to support the requirements of a younger market.

3, they proposed radical new routes to market appropriate to that audience.

Research methods

Verganti (2009) argues that radical design-driven innovation can be made to happen when actors from different disciplinary fields work together as 'interpreters' through design discourse for the benefit of a company. In large organisations, this can happen when employees from different functional groups come together with users and representatives of partner organisations as a 'project team'. In contrast, the limitation of resources and broad-spectrum knowledge and skills available internally to SME's often dictates that such a project team needs to exist outside the organisation. In the projects that are the subject of this research, teams of MDI students, drawn from different disciplinary backgrounds, act as 'interpreters' for the benefit of the SME's involved.

This research was undertaken using four principle methods:

1, Observation and post analysis of each case study was used to establish the common stages of activity adopted in each case and to explore common traits and differences in the projects in order to identify the best conditions to enable project success. In this case, the researchers consider success to mean that significant learning took place for both the students and the organisation involved. This does not necessarily mean that significant innovation was achieved.

2, Semi-structured interviews with participating students and company employees were used to establish what learning had occurred and what impact this learning had.

3, Analysis of the participating students' reflective learning accounts ('Portfolio of Practice') was undertaken in order to understand whether the students were aware of the structure that they had adopted in undertaking the projects and whether there were common points at which learning took place which might indicate important conditions for project success.

4, Auto ethnographic reflection was also used in order to validate the emerging picture presented by the data revealed through the aforementioned methods.

Preparation for the projects

The students spent the first two trimesters developing their design-led innovation practice skills using the MDI 'Safe Environments' approach (Bailey and Smith 2010). 'Safe Environments' refers to the curriculum, assessment (predominantly pass/fail) and working environment design adopted in the MDI programme that encourages experimentation and risk-taking in pursuit of learning. In Trimester 1, students engaged in 'Familiarisation Projects' through which staff introduced and guided students in

research and creativity. In the second trimester, 'Experimentation Projects' were used to encourage students to be more exploratory in their approaches.

Finally, in the third trimester 'Integration Projects', the cohort was divided into mixed-discipline groups of three or four students to work with a different regional SME client evolving and deploying the most appropriate suite of mixed-discipline methods to suit the circumstances of the client organisation and project type. The constitution of the team members and their disciplinary background was matched to the needs of the project and the individual students' personal learning plan.

The working environment spatial design provided an essential element in supporting the project methodology in that it facilitated the externalising, display, mapping and organisation of all 'data' gathered and developed through the projects. The space was dedicated to the programme and made up of a flexible studio, teaching room and boardroom with walls that were designed to be written upon. The students were at liberty to arrange the space to suit the project.

Establishing the projects

Through auto ethnographic reflection and semi structured interviews, the researchers identified that before each project was introduced to the students, significant meetings to scope the background and set-up work had been undertaken by the academics, working closely with the companies. In each case time was spent establishing the focus and scope of the project to be undertaken. Whilst six of the eighteen companies were familiar with working with *design* students on *design* projects, they all had to be 'educated' regarding the potential of the new design-led multidisciplinary innovation approach in order to ensure that the scope of the project brief represented a suitably strategic challenge for the students.

The researchers saw that in each case, the key element in establishing projects that delivered significant innovation potential and long-term value (learning) to the client was the fact that the academic staff didn't approach the clients' situation from a design perspective, but rather from a business one. During these meetings, the academics probed the company's key stakeholders in order to establish, from their perspective, what they considered to be the organisation's strengths and weaknesses, aspirations and future direction of travel. They explored the company's organisational structure, financial model, capabilities, capacity, competitor and sector landscape and lastly current and future product or service offer. Important here, is the fact that the academics in question were all designers with significant commercial, as well as academic, experience. Whilst the MDI projects are essentially Design Thinking (Brown 2009) projects and often result in designed artefacts, systems and services, it was essential to communicate that they respond to business situations. This was revealed to be an essential element of the collaboration as near-to-market development activity was deemed by the academics to be too focused and narrow in scope.

By approaching each situation from an holistic business perspective, the available territory framed for the project was greatly expanded creating room for the client to be challenged by the questions and possibilities presented to them at the end of each project. This is exemplified in the aforementioned caravan project. Initially with a very specific design brief for the development of caravans to attract a younger customer, the client got a project that delivered three strategic opportunities.

These three opportunities only came about as a result of the initial business framing of the brief undertaken by the academics showing the client the scope that the broader brief offered.

An evolving, co-constructed method

In the projects, the students were required to plan and execute an appropriate project approach based upon their prior experiences and the needs of the task at hand. This meant that, as well as employing the structures and approaches that they had learned and rehearsed in the first and second trimesters, each disciplinary sub-group brought the conventions of their practice to bear on the situation. In order for these practices to be adopted by the wider group, the merits of the practice had to be demonstrated to the other team members; thereby the students exposed each other to new ways of thinking and doing.

In this situation, the academic adopted the role of facilitator rather than tutor, allowing the project to evolve; giving 'permission' to experiment and only intervening when adverse interaction between the activists looked likely to derail the learning.

Observation and post-analysis of each project, along with analysis of the students' Portfolio of Practice documents allowed the researchers to identify an eight stage approach which all the projects followed. In this approach, the researchers were able to trace Johnson and Johnson's 5 elements of cooperative learning (1994). These are positive interdependence, individual accountability, face-to-face interaction, social skills, and processing. Johnson and Johnson saw these as essential for effective group learning, achievement, and higher-order social, personal and cognitive skills (e.g., problem solving, reasoning, decision-making, planning, organizing, and reflecting).

The MDI approach that we have identified is a team-based approach that bears similarities to a Grounded Theory strategy (Glaser & Strauss 1967) in which both generative, abductive logic (Dunne and Martin 2006) as well as inductive, reductive logic are brought to bear on complex problems through the creative practice. In the MDI approach, we see that there is a simultaneous explorative 'what if?' enquiry alongside the 'what is going on?' questioning typical of Grounded Theory.

Verganti (2009) emphasises the importance of 'what if?' envisioning. He cites the need to make connections between emerging developments in socio-cultural and technological terms in order to create new meanings that represent new possible ways of living. Within the suite of projects investigated here, this same 'what if?' envisioning was evident.

This is very important because it is this type of enquiry that is necessary to reveal the 'unknown unknowns' that Bontoft (2012) of Team Consulting cites as being a critical stimulus for innovation.

Bontoft sets out a model of design research that acknowledges that there are some things that we know we know; assumptions, but that these aren't ever tested, that there are things that we've forgotten we know; tacit knowledge, things that we know we don't know; typically these are the gaps that research is trying to fill, and there are the things we don't know that we don't know. What this research has shown is that the MDI teams do challenge assumptions by requiring the knowledge owners to explain it to peers with different disciplinary backgrounds; 'dumb questions' are encouraged.

The authors have seen that the data derived from observing what was going on was over-laid with data about what was likely to happen (market trends, proposed legislation, demographic predictions etc.) and 'data' (in the form of opportunities identified) about what *could* happen and finally what *should be made* to happen. This latter layer was considered as research data whose purpose was to provoke further questioning (within the company) and inform strategy making. Whilst the first three layers were seen in the very earliest stages of the projects, the last only emerged as a consequence of dialogue and evaluation with the project stakeholders.

The eight stages

Client briefing

In each case, the client briefed the students, either in their own premises (Figure 1) or within the MDI facilities. There were three essential elements to the briefing.

Firstly, students came face to face with their client – the project assumed an authenticity and real-world context through this interaction which acted as a motivator; "...it felt real, it felt commercial and it was reflective of what we would encounter when we transitioned into industry" (MDI student, Industrial Designer). Establishing a relationship between client and student at this stage was essential to the iterative development of the project in subsequent stages.

Secondly, the briefing gave the organisational context to the project. This means that the client gave the students a macro view of the organisational structure, financial model, its operations, place within the sector and future direction. The research showed that the more open the client was able to be at this point and the greater access to colleagues and data they were able to afford, the greater the opportunity for the project to deliver real value and impact.

Finally, the briefing needed to establish the scope of the opportunity or challenge being presented to the group. The briefs varied from very broad, overtly strategic enquiries to more tightly focused product or sector developments. Unsurprisingly, in the more open briefs, where the client organisation was more receptive to challenging thinking, the researchers saw far greater opportunity for radical innovation. Here the opportunity for a truly *multidisciplinary* contribution was greater because the issue under consideration was viewed as a high-level business issue; the point of entry was different; "...the open brief allowed us to push boundaries and have freedom with the research [methods], which is something I learned a lot from" (MDI Student, Social Scientist).

Figure 1. On site project briefing

Problem interpretation and deconstruction

Immediately following the briefing, the student group engaged, en-masse, in creating what became known as a 'problem-space tapestry' by undertaking a non-judgemental 'brain-dump'; sharing their collective assumptions and tacit knowledge of the situation in a visual and textual way (Figure 2). The problem-space tapestry was a simple device that the students developed whereby they used large sheets of paper and populated them with imagery and words that captured their immediate thoughts and ideas about the situation. Initially these were an un-sorted, haphazard and spontaneous response to the briefing. This activity sought to identify and consider the problem from the perspective of all stakeholders and contextual factors that may have influenced the project.

This way of showing connections called 'designerly ways' (Saikaly, 2005; Yee, 2009) of conducting creative research lead to highlighting tacit knowledge and its connection between information provided in the brief and assumptions within the problem space. The students used this creative mixing of processes like data mapping, linking, and making sense of the connections to lead to innovative outcomes.
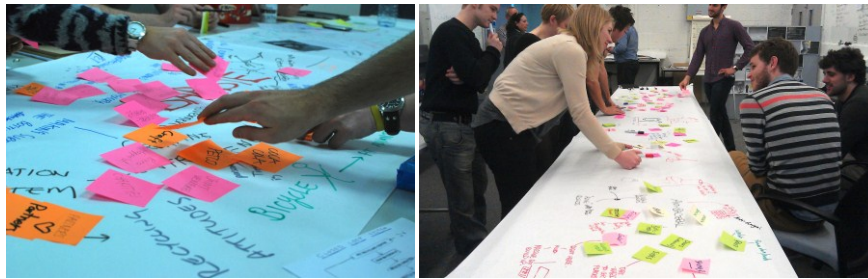

Figure 2. Creating problem-space tapestries

The researchers saw that the value of this exercise was threefold;

Firstly, it exposed a surprising amount of valuable, relevant pre-existing knowledge, assumptions and opinions. It caused students to think both within and outside their discipline as they sought to align disciplinary knowledge and life experience with the company context before them.

Secondly, because it caused them to externalise their thoughts, it allowed the group to visualise the knowledge that they had and the gaps that existed in a way that ensured that all of the group were involved and that the immediate outpouring of response to the brief was captured and displayed in a way that could be referred back to as the project unfolded. This 'open-plan' approach to the project chimed with Bontoft's view that projects should be given "maximum surface area" in order to act as stimuli for the knowledge that the team have forgotten they have.

Finally, because it was conducted immediately after the briefing had taken place, it rehearsed and embedded the knowledge delivered through the briefing and opened up the students to the range of possible directions that the project could take. It also gave them 'ownership' of the project.

Scoping initial idea development

The problem-space tapestry provided a platform for scoping the project. In a separate, initially more evaluative phase, students re-visited the tapestry and started to

rearrange the data, seeking patterns and themes that connected with each other (Figure 3). Once initial themes had been identified, a more creative activity ensued, the purpose of which was to establish the scope of the project by taking each emerging theme and posing "what-if?" questions around it. The researchers consider this to be a linked activity representing one stage in the process as the initial ideas developed are consequential to the themes that are exposed and established the scope of possibilities that the project may explore. It was important at this stage for trends to be identified and brought to the picture to ensure that the work was future facing rather than simply reactive. Sharing this emerging tapestry with the client established buy-in from the clients and demonstrated the power of the multidisciplinary approach; "The project focused on previously unrelated items and brought them altogether into a strategy. The ability of the multidisciplinary team was a huge benefit to the outcome" (Colin Foxton, CEO Sarabec)

Figure 3. Seeking patterns and connections in the data

Insight identification and opportunity creation

Whilst the tapestry was the landing-point for the data gathered, working in the field was an essential aspect of the MDI approach. Students sought to establish contextual experience by becoming immersed in the experience of all of the stakeholders in the project. "We lived Berghaus and this gave us the confidence and the understanding to complete this project successfully" (MDI Student, Transportation Designer).

We saw that where they had buy-in from the most senior stakeholders within the organisation, they were far better able to work closely in the company. The data that they garnered from this fieldwork was brought back to the tapestry. At this stage, the tapestry allowed students to observe the data set as a whole, making conscious and sub-conscious connections that informed the identification of useful insights. The meaning ascribed to 'insight' in this context is the 'ah-ha' moment; the point at which the available data connected with the students' contextual experience of the situation in a way that allowed them to see clearly an opportunity. They were able to use the tapestry to present these opportunities to the client and show them the interrelationship of the various observed factors that lead to them.

Around each opportunity, the researchers observed that the students developed a narrative, creating a tangible story that allowed them to share and understand its potential. (Smith, Bailey, Singleton and Sams, 2010 and Young, Pezzutti, Pill & Sharp, 2005).

Through previous research (Ref omitted for anonymity), we have seen that in order for multidisciplinary teams to function successfully, communication is a key element.

Students needed to be able to understand each other's meaning which could be influenced by both their cultural, linguistic and disciplinary backgrounds. They needed to develop confidence to travel into new disciplinary spaces. Doy (2009) explains that students and researchers who moved from one discipline to another "encounter languages and cultures which may seem alien, or perhaps welcoming. They feel uncertain and lacking in confidence sometimes, because they do not feel "at home" in the new discipline...". A 'common-language' is needed. The tapestry, because of its open and visual nature, helped in this. The creation of stories, however, revealed each individual's interpretation of the meaning in the opportunities thereby allowing the team to debate and adapt them with a common understanding. As the stories were developed, the richness of the multidisciplinary team-members' individual contributions could be leveraged, capitalising on the different communication tools used in each discipline. This was important as it ensured that the story spoke equally to all of the stakeholders who were involved in a review of opportunities.

The use of stories as a means of describing ideas, rather than some of the more traditional designer's tools such as sketching, helped team members without the designer's skills to voice their ideas on an equal footing.

This stage was often repeated through a series of cyclical refinements until the opportunities were clearly defined. It was often the case that there was more than one opportunity and in this case, cyclical development ensured that only the strongest emerged either as single directions or a coherent suite of ideas.

Rough prototypes and rigs were often used as development tools and to help articulate the emerging opportunity.

Strategy development and in-depth investigation

Analysing the final project reports and individual student portfolios of practice, it was clear that, at this point, the opportunities were merely a series of ideas and observations tied together by a narrative. In order for them to take on the potential to represent true innovations that could deliver impact for the client company a development strategy was required. Here, the balance of disciplinary influence shifted to a greater reliance on the skill sets of the business and technology students. Whilst the commercial viability and technical feasibility were always considered simultaneously with the desirability (Brown 2009) of the opportunity, it was at this point that they took the foreground, with the business graduates typically taking leadership. All the teams now focused on how the opportunity could be realised; what conditions needed to exist in order for their ideas to be turned into relevant reality for the organisations? These innovations may have been concerned with organisational structures, new business or trading models and routes to market, the creation of new job-roles or the development of new brands. Equally, they may have involved investment in new manufacturing capabilities, investment in fundamental scientific research or the development of strategic alliances. Here the multidisciplinary teams appeared to take a 360° view of the project in order to consider the implications of the opportunity from the perspective of each of the company and external stakeholders.

Refinement

At this point, when an opportunity was clearly articulated as a creative proposal told through a story, and a strategy existed for making it become a reality, the project was, once again, subject to review with the client. The researchers saw that it was

important that the communication tools used to present the opportunity remained loose, still leaving the opportunities open for refinement. Presenting a 'fait accompli' at this point closed the project down and missed the opportunity to make further refinements based upon the client feedback. The more successful presentations captured and used a combination of the tapestry to establish context and remind the client of the genesis of the opportunity, an illustrated story to demonstrate the end-user experience and a business benefit focused presentation to outline the strategy. These three elements were often drawn together as a single slide presentation. They also formed the spine of the final documentation of the project.

Feedback from this review guided the refinement of the creative proposal, the detail of the strategy and, importantly, the communication of the whole. In each of the case-study projects, a degree of confusion and misinterpretation from the client was witnessed at this stage. This was an important rehearsal for the final presentation, which often reached further into the organisation than the key contact with whom the students worked throughout. Responding to these misunderstandings allowed the students to consider and tune their communication strategy for the final project delivery, and ensure that it would speak equally to all stakeholders. In some instances, this involved students developing demonstration models and prototypes, again drawing on the wider skill set of the multidisciplinary team, with typically, but not exclusively, the design and technology specialists taking a lead in producing artefacts and rigs in order to make tangible the sort of products, systems and services that the strategy was intended to deliver.

Project documentation & final presentation

The structure, style and methods in which the project conclusions and insights were ultimately presented had a significant bearing on the potential impact and influence that the projects had within the client organisations. Some clear patterns were identified.

Whilst each project presentation tended to be context specific, what emerged in all cases was the production of an illustrated book, which framed and detailed the contextual background within which the innovations were situated. The books also included the opportunity narrative and the strategy mapping as well as the actions required to implement it. In addition, the researchers noted that product and promotional simulations, faux-advertising material, animations and video presentations were very well received as they "brought the proposals to life" (Figure 4).

Along with the polished, finalised proposal, it was observed that clients valued two other presentational elements; a catalogue of all of the material that led to the final proposal, including a capture of the tapestry or tapestries with all of the fragile early ideas and stories that didn't make the final cut. In addition, particularly where the client had little or no previous experience of working in design-led innovation, a journal that outlined the processes and working methodologies adopted in executing the project were greatly valued. Providing this record allowed the clients to seek to emulate the process; "As a producer of paper tubes and cores for over 100 years our people have thought of most applications or possible use for tubes and cores... or so we thought! As a result of this project, we are now challenging our people to think in a similar way to that of Northumbria University about new applications and markets to enter" (Gary Morgan, Sonoco Alcore)

Figure 4. Presenting the final documents to a client

Further consideration and debrief

In conducting the project, there was a to and fro of information between the student group and the client stakeholders. The pace and nature of this was typically driven by the students, who often ended up spending some time in the client company where their questioning became almost an accepted part of the working day. "It felt like we were working with them, not for them" (MDI Student, Graphic Designer)

Through this, the students could also manage expectations and start to understand the nature of the communication necessary to engage each of the stakeholders from each of their different disciplinary perspectives.

The researchers observed that the final client presentation often posed as many questions as it answered and client feedback invariably left students feeling that there was more to do. This was, in fact, the legacy of the project; that it left the companies with work to do having learned something new about themselves and their market.

A final refinement of the communication of the proposal allowed the students to reflect on the 'final' feedback and make any necessary changes for clarification or emphasis. No matter how close the students were able to get to the client organisation, it was often the case that the client would see something in the final proposal that the students considered peripheral but they, in fact, saw as pivotal. The fact that this situation occurred supports the value of providing the client with the full raw data set as this may, in time, be found to contain germs of ideas that make more sense as the context changes over time.

By presenting the findings in high quality, professional-standard book form, and providing the client with multiple copies, the material took on a reality and gravitas that allowed it to assume a catalytic effect within the company. Evidence of the strength of this approach is seen in the clients who have asked for multiple reprints for broader company dissemination.

There was a final act of debriefing that allowed the students and staff an opportunity to consider the question 'what have we learned about design-led multidisciplinary innovation here?' The students answered this question through their 'portfolio of practice' submissions; a factual account and reflective commentary document that informed their individual assessment.

Conclusions

The investigation of these projects has revealed an eight stage approach that differs from the typical 4 stage model determined by the UK Design Council (Design Council 2005) in that it allows for greater fluidity and takes equal account of emerging factors and business models as it does user-centred issues of form and function. By observing and analysing the projects, and questioning the key stakeholders in the projects, the authors have identified five conditions that are required to support projects of this nature. They are all linked as they are dependent on the relationship established with the client company. The five conditions are;

1, Framing the project brief as a business problem rather than as a design challenge. This requires that the projects are set up by staff with both design and business acumen.

2, Access to the senior management team within the organisation. This ensures buy-in and access to the highest level thinking of both an operational and strategic nature.

3, Creative exchange and openness between the organisation and the project team. This acknowledges that the client is a learner too and that the value of the outcome is dependent upon their willingness to engage with an open-mind and accept the challenges presented by difficult questions.

4, Co-creating with the stakeholders a flexible project framework that supports critical enquiry. The client and the students need to agree a way of working together that will allow for frequent, full and open dialogue.

5, Acceptance of visualisation of data as a primary development and communication tool within the project. This takes full advantage of the value of the problem-space tapestry.

This last point was critical to the projects as it addressed all four of the aspects of research for design that Bontoft identifies. It united the team and client around an emerging common-purpose.

By hosting a collective 'brain-dump' it allowed students to challenge assumptions. Through its open, visual nature it stimulated recall of tacit knowledge. By allowing data to be visually categorised and connected it identified gaps, and as a visual tool, it promoted communication of emerging opportunities (Figure 5).

	.....that we know	.....that we don't know		.....that we know	.....that we don't know
What we know...	Assumptions	Gaps	**What we know...**	challenges Assumptions	identifies Gaps
					Problem space tapestry
What we don't know...	Tacit knowledge	Discoveries	**What we don't know...**	Tacit knowledge stimulates	Discoveries communicates

Figure 5. Relationship between Bontoft's design research matrix and problem-space tapestry

In almost all cases, by virtue of the multidisciplinary approach, the projects revealed an horizon scan for the client where the true impact was neither in the designed service, system or product, nor in the strategy to deliver it. It was in the questions that the project posed and the legacy that it left in terms of new ways of thinking,

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communicating and working. In the case of the aforementioned caravan company, as an example, this was evident in that "the project acted as a catalyst for further work within the organisation. We have even utilised some of the methods used by the team within our own processes" (Gary Lees, Elddis)

The methods referred to in this case related to the communication of ideas and restructuring of meetings to take on a more multidisciplinary approach.

The project teams in the way that they interacted with each other and their clients demonstrated a social dynamic in working practices that few organisational structures support or reward. Their common purpose was innovation, which, by its very nature, is experimental, and experiments are prone to failure. However, few organisational structures or remuneration schemes encourage or reward failure, even if it is competent failure in pursuit of breakthrough success. What these projects did was give permission to think and behave in ways that recognised failure as a stepping-stone to success and demonstrated how this could be managed. By breaking down the typical functional structures and bringing mixed discipline teams to bear on a project, conceived at a macro business level, stakeholders could take ownership of that common-purpose. What the projects did was show how this works and how it can answer questions that weren't even asked (the unknown unknowns).   Through the continual to and fro of the project, the stakeholders started to engage in and learn about the value of co-creation.

Through the MDI programme, we have learned the importance of students developing a common language of innovation that crosses disciplinary and cultural backgrounds. Through these projects, we have seen that their true value to the client lies in experiencing the approach rather than simply receiving the outcome.

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