Multidisciplined Individuals: Exploring The Genre

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This paper reports on a study which focussed on learning occurring inside the workplace related to individuals developing expertise acquired outside of that normally associated with the tasks for which the individual is employed and has a background in. The research found that the application of that additional expertise changed and enhanced the individual and the organisation. By combining perspectives across the disciplinary boundaries and developing multidisciplinary expertise, these individuals demonstrate better methods of achieving business objectives, leading to faster, more imaginative solutions, more frequently, and with significantly less effort. The study concluded that developing multidisciplined individuals was worthwhile but required organisations to be willing to provide the appropriate platform for such learning by more adventurous individuals who held the appropriate underlying abilities required by the additional discipline (s).

Field of Research: Organisational, Learning Development

1. Introduction

Much of the literature surrounding informal learning is predicated upon the assumption that learning occurring inside the workplace is related to developing the knowledge and skills associated with the tasks for which the individual is employed. This paper differs in that its general focus can be expressed as being simply about individuals acquiring

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knowledge and skills in disciplines which lie outside of their core discipline: they become "multidisciplined individuals". Furthermore, it argues that the application of the additional expertise changes the individual, often leading to significant improvements in their work performance.

Multidisciplined individuals often demonstrate better methods of doing business, leading to both faster and more imaginative solutions, more frequently, and with significantly less effort. They offer scope for improvement to established processes by offering better solutions, speed and completeness. In establishing recognition of the existence of multidisciplined individuals this paper seeks to bring attention to their value and to encourage industry to provide the appropriate environment for their development. In the wider context, multidisciplined individuals hold the potential to address some of the issues Kline (1995) raised in respect of the requirement to find ways to increase innovative problem solving and discourse across the disciplines.

The term "multidisciplined individuals" is frequently used to describe individuals inside the case organisation who have broadened out their knowledge base across one or more disciplines, as opposed to, or in addition to, becoming increasingly specialised inside their core discipline. Use of such localised terminology "reflects shared ideas and concepts among the narrower group to which the respondents belong and are characteristic of the specific cultural domain" (Gibbs, 2007:58). This practice was considered a significant feature producing individuals able to integrate their knowledge and intellectual skills across disciplines (Koike, 2002). Using this integrated knowledge, project teams and individuals produced "metaperspectives" leading often to innovative and creative problem solving. This was particularly relevant when working at the higher levels of strategic advice projects common to the case organisation.

The research was conducted from a researcher-observer perspective using an inductive, ethnographic approach. Set inside a medium sized international oil and gas consultancy offering technical advice on a wide spectrum of issues across a range of clients inside the oil and gas industry. The technical advice is formulated in response to client requests and handled through multidisciplinary project teams. Furthermore, the case organisation lacked any hierarchal structure and was subject to the economic cycles experienced by the industry itself.

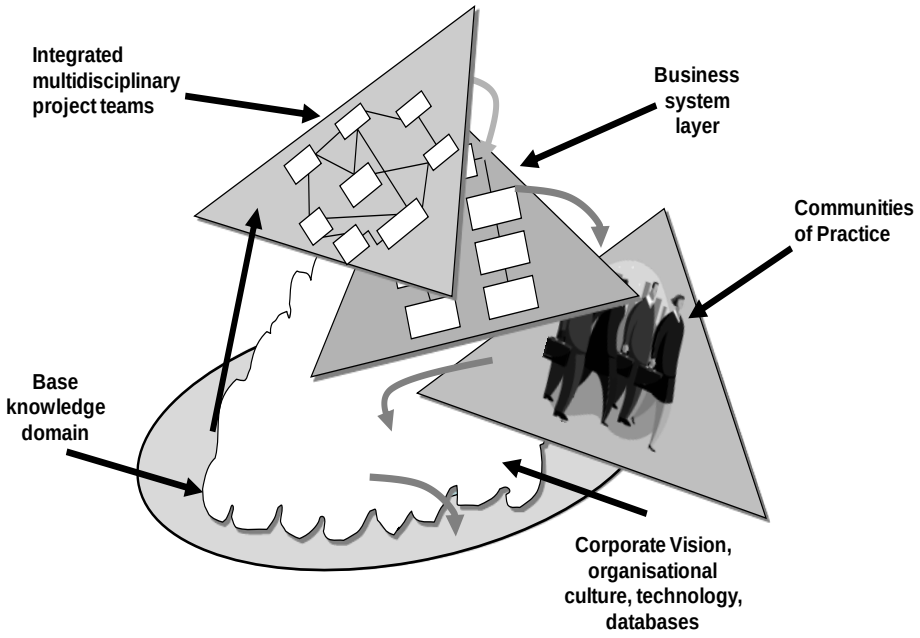
Although multidisciplinary project teams are well known across both industry (Holbeche, 2005) and the public sector, especially in the provision of health care services (Clark, 1993: Wilson and Pirrie, 2000; Payne, 2000), multidisciplined individuals are not. The emphasis on individual specialisation commences early and, as Klein (2006:1) pointed out, "it's more and more difficult for a generalist to survive in today's academic climate, which encourages hyper-specialisation by rewarding increasingly narrow, technical studies". This pressure continues throughout the individual's working life (Tealdi et al, 2006).

2. Literature Review

Terminology was a key issue early in the research. "Multidisciplinary" is a much used term holding a range of meanings, both inside academia and across the wider industry spectrum. It is one of a number of words often used to describe teams where the members are drawn from different disciplines and/or professions. There are few references to multidisciplined individuals and it is possible that this scarcity serves to confirm the lack of recognition within the literature as well as within industry of these individuals, and of the unique contribution they can bring to the workplace (Kline, 1995; Clark, 1993). Exploring bundles of meanings (D'Andrade, 1965) lying behind the term, revealed the quality of being able to produce "metaperspectives" on the part of both the teams and individuals employed. A facet further developed inside the research.

A loose framework was constructed including professional societies and communities of practice upon which to hang the literature review, Figure 1. This adaptation was based upon Nonaka and Konno (1993) model depicting knowledge flows through an organisation.

Figure 1: Key Elements - Workplace



The review commenced with knowledge domains and disciplines focussed on geosciences and engineering which formed the knowledge base. Disciplines are simply a methodology for dividing work inside the knowledge domains (Brand and Karvonen, 2007:22) which require ever increasing division drilling down into deeper and deeper layers as the knowledge reservoir grows. This deepening of knowledge necessitates individuals becoming more specialised as specific disciplines evolve with narrower areas of knowledge with the consequent loss of opportunities for interaction (Becher, 1989).

Disciplines are contained by “boundaries” (Bergquist, 1995) dictated either by convention or the predominant paradigm (Sil and Doherty, 2000). Becher (1989) emphasised that these boundaries could be considered as “territorial possessions [which] can be encroached upon, colonised and reallocated” (ibid:37), with some boundaries being more flexible than others. Boundaries do not fall neatly side by side but overlap or not match up leaving gaps (Becher, 1989) and are rich learning areas where “perspectives meet and new possibilities arise” (Wenger, 2000:223). A defining attribute of a discipline is the sense of community that the discipline provides (Brown and Duguid, 1994), and these are often viewed as containments or “communities of practice”; a view reiterated by Lave and Wenger (1991) and Richter (1998).

The case organisation is best described as an organisation reliant upon experts (Buchanan and Badham, 1999) with its emphasis on “collegiality, peer evaluation and autonomous, informality, and flexibility of structure” (Starbuck, 1997:152-3). Its multidisciplinary teams housed the richest disciplinary interaction platforms. The review focussed on the different ways teams work together, specifically Øvretveit's (1997:11) suggestion relating to “degrees of integration” continuum based on how closely the team members worked together to achieve the team’s purpose. One end of the continuum was represented by a network and the other, by “a closely integrated team”, (Øvretveit, 1997:11).

Using twenty three examples of team descriptions drawn from the literature it was possible to divide teams into two categories. Team A or “integrated interprofessional teams” best described teams comprised of differing disciplines appropriate to the team’s purpose assembled to carry out discrete tasks to achieve their objectives. Although described as multidisciplined teams, they are only multidisciplined because of the different areas of expertise in the membership makeup.

Team B or “integrated multidisciplinary team”, are teams which work together to achieve objectives which stronger than if the individuals acted alone. These teams “share a common mission, and the members identify themselves as part of a collective effort” (Pence and Wilson, 1994:13). Furthermore, they provide solutions arising out of the shared efforts of the team and which are focussed on team goal or problem (Grigis et al, 1995).

This difference between the two teams is again emphasised by van Der Vegt et al (2003) of a “collective” effort, namely not just a different view of one discipline, but a view arrived at by combining views to form a new and different view. To combine views is to share information, understand different discipline perspectives, and then integrate the understanding gained from this knowledge to be able to produce new insights and perspectives which would not have been achievable working inside an integrated interprofessional team. This may be expressed as at least “having a preference for a deep expertise in one discipline combined with enough breadth to see its connections with others” (Belasen, 2000:137). It is precisely this interaction that has been found to enhance the personal growth and professional development of team members (Hackman, 1990).

The transfer of knowledge process situated inside integrated multidisciplinary teams is informal and appears to be much more the result of social interaction or "learning by participation" (Ashton, 2004) than a formal learning process or "learning by acquisition" (Ashton, 2004). Four theories; Communities of Practice (Lave and Wenger, 1991), Interpretative-Cultural (Yanow, 2000), Cultural Historical (Felstead et al, 2005) and the Actor Network (Nicolini et al, 2003) which are underpinned by social learning (Bandura, 1977) were reviewed. These theories provide ways in which individuals learn from others or from their environment, although in themselves they do not have the necessary ability to explain the actual process taking place. This area was more appropriately addressed by Threshold Concepts (Meyer and Land, 2003, 2005) which also addresses the issue of "troublesome knowledge" (Perkins, 1999) inside the workplace.

3. Methodology And Research Design

The research set out to determine the existence of multidisciplined individuals and given the lack of literature had no priori hypothesis to test in the field. Therefore it was exploratory and descriptive in nature, seeking to understand how social actors (Weber, 1991) change their world view (Annells, 1996) inside their working environment. Although the literature review outlined what elements might contribute to the learning process data collection and analysis had to take place before it was possible to define the end product and determine whether the phenomena would be found elsewhere, if it existed at all.

The research focussed on the "lived experiences of people" (Marshall and Rossman, 1999:112) surfacing details concerning their learning experiences at work. The adopted philosophical paradigm, interpretivism (Bryman, 2004), was that which set out "to give voice to people inhabiting hitherto hidden areas of social life" (Seale, 1999:15). The research was intended to develop an understanding of how individuals gained expertise outside their core discipline, indicating that the theory was generated after the fieldwork had been undertaken. An inductive approach was a necessity. 41 technical staff became involved in the fieldwork over a period of five years which included active participation in project work by the researcher and full access to organisational documentation.

Interviewing formed the primary research tool being utilised in groups to identify "shared mental models" of what knowledge domains and disciplines consisted of (Craik, 1943; Senge, 1990). Then individual in-depth unstructured interviews to explore individual's views on the case organisation, projects and confirming data collected on the disciplines. Lastly, structured interviews were held to obtain quantitative data yielding more precise information which triangulated data drawn from other sources. Moreover quantitative data also facilitated the measurement of learning by the individuals concerned so as to prove learning by participation had taken place and to what extent. As researcher practitioner, involvement in projects together with access to a wide range of organisational records and documentation satisfied the requirement to have a "thick" (Lincoln and Guba, 1985; Geertz, 1973), detailed description of the research enhancing its transferability.

4. Discussion Of Findings

The findings revealed that the participants were highly educated, predominantly male with a distinct bias in favour of middle-late aged individuals holding significant experience inside the petroleum industry. This makeup reflects the industry sector (Ryder, 2007). Furthermore, the study was not concerned with a large population (less than 73 total workforce in the location) but with a concentrated group of individuals focussed on the application of technical knowledge and skills. The data revealed four characteristics which were shared, in some cases by all of the participants and in others, by the majority, Table 1.

Table 1: Shared Characteristics

Characteristic	Quality
Highly educated	Capable of identifying and expanding knowledge base using own initiative
Education:science based subjects	Share "scientific" approach to learning
More adventurous nature	More predisposed towards a risk taking posture
Curiosity	Listening, participating, questioning attitudes

It is apparent that these shared characteristics facilitate multidisciplinary development making some individuals more predisposed to acquiring additional disciplines. Being curious and less risk adverse explains why some individuals find it easier than others to move across disciplines. Furthermore, the shared scientific background makes it easier to follow the thought processes utilized by other disciplines. At the same time, their educational background makes it more likely that the individuals concerned will be able to assess their knowledge and take necessary steps to remedy any perceived knowledge gaps. Notwithstanding, to acquire additional disciplinary expertise it was essential that the individual held the underlying requirement of the new discipline. For example, for engineering disciplines the individual has to be proficient in mathematics

Being able to measure and subsequently chart the participants' knowledge levels across the disciplines to demonstrate the existence of multidisciplined individuals overcame one of the major inherent difficulties associated with informal learning processes; the measurement of individual learning (Hager, 2007; Ashton, 2004). A scale emerged based upon how the participants' viewed the various degrees of learning. The lower end of the scale was perceived to be recognition of how the individual's core discipline fitted alongside other disciplines working on a project. Moving along, the next significant step was acquiring sufficient understanding of the adjoining disciplines so as to understand how to tailor the individual's work output in the most acceptable format, in order that it

could be more appropriately and easily used. An example would be the geophysicist working alongside the reservoir engineer to facilitate the change from a static model to a dynamic model at the point where the model itself is passed between geophysics to reservoir engineering. This is in opposition to the geophysicist completing the model and sending it to the reservoir engineer. Moving further along the scale, increasingly individuals would display the ability to participate in discussions and undertake work in new areas, either alongside their own core area as in the fringe areas or, in another different area. An example is the engineer undertaking some aspect of economics, or being engaged in a minor role on a corporate acquisition.

Finally, the higher end of the scale would be represented by the individual who is able to fully participate outside of their core expertise in a range of projects across the hydrocarbon chain. In other words, the multidisciplinary development for individuals is a process through which they move, and varies from person to person. In practise, the term was being used to describe someone who had simply moved outside of their original comfort zone, or someone who had sufficient understanding to evaluate the results of other disciplinary work and assess the impact upon their own discipline and then lastly, somebody who was doing someone else's job.

The data suggested that as the participant worked inside the project team they accessed the work of other team members in different disciplines and, in doing so, they encountered what might be termed as "troublesome knowledge" (Perkins, 1999). This troublesome knowledge takes the form of different terminology and/or theoretical concepts being applied to data or processes with which they may already be familiar. When encountering and solving these problems, the individuals enter a "portal" where they are able to see how their work and the data flows into the other discipline, and how that discipline handles the information. This knowledge they then integrate into their existing knowledge base (Meyer and Land, 2003). The individual then moves into "luminal space" (Meyer and Land, 2003) as they begin to understand and absorb the new knowledge. At some point this new knowledge becomes fully integrated with their existing knowledge base, thereby enabling the individual to cross the knowledge threshold (Meyer and Land, 2003). This process supports Kerka's (1995) contention that disciplines more readily integrate through the social interaction taking place within the team environment. More specifically, this research identified the integrated multidisciplinary team (Team B) as being the ideal learning team environment.

The data suggests that all of the social interaction processes exert considerable influence inside the workplace. The data indicated that communities of practice are not processes which work to the advantage of the development of multidisciplinary individuals. They exert a negative influence in terms of restricting individuals to their core disciplines preventing an "outward facing" perspective to be developed and encouraged by their members. Moreover, as these informal communities strengthen, then the less likely it is for an organisation to "grow" its multidisciplinary capabilities.

Furthermore, the case organisation could be described as a "double knit" organisation (McDermott, 1999) wherein it contains both cross disciplinary teams and communities of practice. In this case the "double knit" does not prove particularly beneficial to the case organisation as it is trying to cultivate solutions across a broader front than many

comparable organisations. It held a number of what were termed “safety nets” for individuals moving outside their core discipline thus providing an environment where multidisciplinary expertise could flourish. It was also noted that there were differences between the project teams as described in the literature and that these differences meant that some teams were richer in learning opportunities than others;

5. Conclusions

This research set out with the relatively simple aim of determining the existence of multidisciplined individuals which it has done through measuring informal learning levels inside the case organisation. This study has strengthened the case for individuals acquiring additional disciplines, or at least some knowledge of other disciplines, noted by Cross (1991) and Armstrong (1999). Holbeche termed these individuals as “boundary spanners” (2005:154) developing ideas from diverse sources. The contention here is that multidisciplined individuals do more than simply combine ideas. The integration of disciplinary knowledge enables new and different perspectives to be drawn. The research has also been able to set out what factors are essential for the successful multidisciplinary individual development.

In practical terms, the existence of such individuals with their capacity for faster, innovative problem solving would prove attractive to many organisations. There is potential for a blended learning environment containing both “learning by participation” (Sfard, 1998; Felstead et al, 2005) and “learning by acquisition” elements (Ashton, 2004; Poikela, 2004) to facilitate their development in larger organisations.

Moreover, linking Threshold Concepts (Meyer and Land, 2003) and troublesome knowledge (Perkins, 1999) to informal learning processes adds a different dimension to the discussion. This linkage, with its emphasis on providing disciplinary insights as a way of opening up new knowledge has a very practical application since it points to different ways to handle knowledge transfer both in the workplace and inside training classes within industry

By examining project teams as a whole rather than the membership and roles inside the team, this research has been able to throw additional light into learning within teams. In defining the attributes belonging to different types of project teams, it has been able to identify the difference between an integrated interprofessional and integrated multidisciplinary team. This definition has highlighted the added value that integrated multidisciplined teams, with their capability to produce innovative metaperspectives, can bring to bear to problem solving. This may prove an appropriate mechanism by which to harness the power of these groups as suggested by the knowledge management literature.

In reaching the research aim which was to determine the existence of multidisciplined individuals and how they acquire additional disciplines it was possible to reach the following conclusions which summarised the learning process as requiring the following components:

- Most significantly, organisations must be willing to "risk" the provision of such a platform within their operations;
- Project teams must be organised in such a way as to promote interaction between their members (Van der Vegt et al 2003);
- The individual themselves must have what has been termed here an "adventurous" nature, namely be prepared to move out of their "comfort zone" (Bardwick, 1995; White, 2008); and, lastly
- The individual needs to possess, or be willing to acquire the fundamental abilities required when working across disciplinary or knowledge domain boundaries; for instance a geologist with an ability to cope with some level of applied mathematics or an engineer with a creative mind.

As originally contented this work concludes that multidisciplined individuals demonstrate better methods of doing business, leading to both faster and more imaginative solutions, more frequently, and with significantly less effort. They offer scope for improvement to established processes by providing better solutions, speed and completeness. By establishing their existence and value in the case organisation this research seeks to bring wider attention to their value and to encourage industry to provide the appropriate environment for their development.

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