

**How Do They Know What You Know: A study of knowledge exchange
when managing projects.**

Dr. Chivonne Algeo

School of the Built Environment, University of Technology Sydney, Australia

Email: chivonne.algeo@uts.edu.au

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ABSTRACT: *This paper presents an investigation into how knowledge is exchanged while managing projects. A qualitative study was conducted utilising action research methodology to collect data from experienced project managers and their colleagues. The data was analysed using grounded theory techniques to identify the individual and collective approaches to exchange knowledge from multiple perspectives. An interpretivist paradigm was used to identify convergence and divergence between the literature and the data. The findings indicate that project managers exchange knowledge predominantly in an impersonal manner and in a formal context in socialised settings. Further examination is recommended to extend this research to identify how project managers use new knowledge to benefit an organisation through enhanced project outcomes.*

Keywords: knowledge transfer and management; interpersonal communication; socialisation; active learning; project-based organisation and group dynamics.

INTRODUCTION

The aim of this paper is to demonstrate how project managers exchange knowledge in managing a project, where activity is bounded by a start and end date and is ‘temporary’, existing alongside the management of ongoing enterprise and organisation activity (Thakurta, 2015; van Donk & Molloy, 2008; Walker & Lloyd-Walker, 2014). Within the project management community there is an ongoing frustration that a regular and significant number of projects underperform against expectations (Mazur, Pisarski, Chang, & Ashkanasy, 2014; Sage, Dainty, & Brookes, 2014; Sandeep & Ravishankar, 2014). Increasingly, attention is being focused on people and organisational issues as one source of project underperformance. Managing project knowledge has been explored through organisational approaches into how individual project managers exchange knowledge in the course of their work. There is an opportunity for further reflection and paradigm examination in the realm of effectively and efficiently exchanging knowledge (Algeo, 2015) when project managing.

A review of project and knowledge management literature and practice was conducted to lay the foundation from which to collect and then analyse data. To accommodate the research paradigm, iterative cycles of intervention and reflection were established to examine the project manager’s situation. To identify research-led themes, a systematic process was designed to collect, transcribe,

and analyse the data. Themes were generated by the data and related to how project managers exchange knowledge while managing projects, contributing to social exchange theory.

LITERATURE REVIEW

Morris (2000) suggested to refocus project management through building knowledge, learning and competency. To build knowledge in an evolving and dynamic environment Nonaka, Toyama and Konno (2000) developed a 'Model of Dynamic Knowledge Creation' to convert tacit knowledge to explicit knowledge through socialization, externalization, combination, and internalization. To ensure knowledge has meaning, it "...must be continuously re-created and re-constituted through dynamic, interactive and social networking activity" (Swan, Newell, Scarbrough, & Hislop, 1999, p. 14). This social process is contingent on histories, professional perspectives and local conditions (Algeo, 2014). In the context of managing a project, knowledge management can be defined as "... the application of principles and processes designed to make relevant knowledge available to the project team ... throughout the duration of the project". (Reich, 2007, p. 8). The PMBOK® Guide (Project Management Institute, 2013), the most influential and dominant guide in project management, suggests managing project knowledge using Ackoff's (1989) hierarchal data, information, knowledge, and wisdom model.

Complimentary perspectives have been explored across domains of knowledge management, knowledge transfer, and knowledge exchange, each seeking to facilitate the creation, distribution, movement, and capture of knowledge in organisations. A process-centric approach (Mentzas, Apostolou, Abecker, & Young, 2003) emphasises "... ways to promote, motivate, encourage, nurture or guide the process of knowing". The alternative is a product-centric approach which treats "... knowledge as an entity rather separate from the people who create and use it" (Mentzas, et al., 2003, p. 4). Understanding how project managers exchange knowledge may at times focus on "... problem-solving processes which are based on experience and induction" (Ward, Smith, House, & Hamer, 2012, p. 298). This process where individual project managers communicate, collaborate and cooperate occurs "... because they have common work practices, interests or aims" (Mentzas, et al., 2003, p. 4). Ultimately, "... knowledge is transferred through a process in which individuals both

share their own knowledge [and] acquire knowledge from their co-workers” (Tasselli, 2015, p. 843). This “... transmission of knowledge from sender to recipient, as well as its integration and application by the recipient involves four stages: initiation, implementation, ramp up and integration” (Williams, 2011, p. 338). Hislop (2013) suggests “The receiver then takes this knowledge and is able to understand it and use it without any other form of interaction with the sender” (Hislop, 2013, p. 26). A knowledge transfer process model developed by Szulanski (1996, 2000) identifies factors which predict difficulty at various stages when “... exchanges of information [occur] between the recipient and the source of knowledge” (Szulanski, 2000, p. 11).

If project managers are to exchange knowledge, “... projects and project organizations require exceptionally efficient knowledge management” (Kasvi, Vartiainen, & Hailikari, 2003, p. 578) systems. These systems involve many components, with this research focusing on one: knowledge exchange (McElroy, 2002, p. 12). The literature is limited when identifying how project knowledge is exchanged, and in particular when project managing (Ward, et al., 2012, p. 2).

RELATED THEORY

The act of exchanging knowledge when project managing, requires the project manager to engage with project stakeholders. This interaction is conducted in a social setting and, as such, social exchange theory was examined as a related theory for the research. Several other theories were reviewed, including the Theory of Action (Argyris, 1995; Argyris & Schön, 1978, 1996; Klev & Levin, 2012) where beliefs, attitudes, and values link thought with action. The Theory of Reasoned Action also offered an alternate framework to predict behavioural intention as a result of both individual and normative influences (Ajzen, 2005; Ajzen & Fishbein, 1980; Hale, Householder, & Greene, 2003).

Social exchange theory (Blau, 1964; Cropanzano & Mitchell, 2005; Homans, 1958) involves the exchange of a tangible or intangible resource at the lowest cost, in terms of money, time and other resources, after evaluating alternative courses of action. The relationships formed when project managing are based on a subjective value-benefit analysis of alternatives negotiated between parties. The necessary components required to undertake an exchange include actors, being individuals or

groups, and resources, of tangible and intangible value. The exchange process, once initiated, results in a negotiated or reciprocal transaction where several parties exchange a tangible or intangible asset. The examination of social exchange by Emerson (1976) suggests this can occur at a micro level between the same individuals, as well as at a macro level between multiple individuals and groups.

The foundations of social exchange theory were extended by Molm (2001) to include: power-dependence relations where "... both reward power and coercive power are derived from dependence on others, either by obtaining rewards or avoiding punishment" (2001, p. 265); resistance theory, where beliefs and the position of power held by the people involved in an exchange can impact their current negotiations, and potentially any future exchanges; and risk, where uncertain situations require, and can result in, an increased level of trust which can facilitate a fair exchange, and if not present the stability of the network may be threatened.

METHODOLOGY

An overreliance on structure, reinforced by the paradigm of creating order to deliver expected project outcomes may limit "... access to techniques on how to effectively exchange knowledge between individuals and groups" (Algeo, 2015, p. 121). To accommodate the effects of this paradigm in the research, iterative cycles of intervention and reflection were established to examine the project manager's situation. To identify data-led themes, a systematic process was designed to collect, transcribe, and analyse the data as it materialised. Themes were related to how project managers exchange knowledge while managing projects, and contributed to social exchange theory. An inductive approach was used to explore if project knowledge exchange could generate "... assumptions about motivations or intentions" (Runeson, 1999, p. 40) to contribute to theory. Examining how project managers exchange knowledge within a temporary, loose grouping of individuals could be underpinned by social exchange theory, where Molm (2001) suggests the structure of an exchange can either be a direct approach in a dyadic or network; indirect approach through a generalized exchange; or in a productive exchange.

The 'problem' was to identify how project managers exchanged knowledge when managing projects. Dynamic activity within a project is suited to the use of an action research methodology as a

framework for "... liberating discourse to resolve mutual problems and to achieve an emancipatory outcome" (Cardno & Piggot-Irvine, 1996, p. 23). Action research "... pursue[s] the dual outcomes of action and research ... profit[ing] from the use of a cyclical or spiral process in which the researcher alternates action with critical reflection" (Dick, 2002, p. 159). The rhetoric of project managers was examined by observing actual behaviour through an interpretivist paradigm. The research design was intended to focus on the activities of the project manager and not specifically identify if the exchange of knowledge generated new knowledge or enhanced project outcomes.

Project managers were selected to participate in this study to focus "... on a workgroup in an organisation or community, all of whom are involved in the cycle of planning/ acting/ observing/ reflecting" (Zuber-Skerritt & Perry, 2002, p. 173). Six project managers with at least 10 years of experience were chosen for the study. The sample size of six represented a valid number to use for in-depth research (Hales, 1986; Kotter, 1999a, 1999b; Mintzberg, 1980a, 1980b; Mumford & Gold, 2004; Tengblad, 2002). The project managers who participated in the research worked in varied industries, spanning information technology, engineering, financial services and public infrastructure. All project managers held a formal degree qualification, although not exclusively in project management, and four held a project management professional certification. In addition to observing the project manager, a work colleague was interviewed to obtain another perspective of how the project manager was actually exchanging knowledge while project managing. The colleague was selected by the project manager, based on the direct contact they had in their project work, ability to have observed the project manager engage with others, and the availability of the colleague to be interviewed.

The approach to "... action research holds that profound and lasting development of practice will only occur in collaboration with other persons concerned with the situation under research and not against their will" (Altrichter, 1999, p. 3). Appointments in the workplace were scheduled to collect the data, and participants were de-identified. The use of multiple, overlapping sources of data, such as interviews, observations, and journals by each project manager provided rigour to validate the research (Dick, 1999). To demonstrate quality in the naturalistic setting typical of action research

sites, Guba and Lincoln's (1982) criteria was adopted. This purposeful approach to the research ensured "... rigour and credibility in the knowledge or theory [was] generated through real life interactions" (McKay & Marshall, 2001, p. 57). In addition, an experienced external reference group, representing academia, professional associations, and industry, reviewed the research method at regular, planned intervals.

The data on how project managers exchange knowledge was collected through four interventions to examine the existing situation; implement a change; and then examine the impact of the change. Data was collected in one-on-one semi-structured interview with the project manager; a separate similar interview with a colleague; full day *in situ* observations of each project manager; and a journal completed by the project manager. This approach was designed to accommodate the complex dynamics in the project manager's workplace, and allow for the researcher to reflect and analyse the data after each intervention. The limitations of the methodology include lack of generalised findings due to a small number of participants, and an inability to understand if the knowledge which had been exchanged was converted to generate new knowledge.

DATA ANALYSIS

Data was analysed using several grounded theory techniques adapted into the action research context. The flexibility needed during the interventions was within the grounded theory 'family' of being able to develop ideas by affirming, checking and refining (Charmaz, 1990). The approach did not construct a new theory (Charmaz & Bryant, 2011, p. 292), but augmented the grounded theory methodology to apply and extend an existing theory relevant to the study. This adaptation was based on the approaches developed by Charmaz (1990); Douglas (2003); Glaser (1992); Glaser and Strauss (1967); Mintzberg (1979); Strauss (1987), and Strauss and Corbin (1990, 1998).

The data collected during the interventions was transcribed from digital recordings, researcher notes and memos, and the project managers' journals. The transcriptions occurred within two weeks of each intervention, and the journals were transcribed for analysis after completing the interventions. The project managers' dialogue and activity was analysed using grounded theory techniques with information recounted and organised into 'Open Codes'. This process required similar incidents and

phenomena to be identified in words, lines and phrases. The output was represented as ‘Conceptual Data Clusters’ which emerged over time as the data was reviewed. The relationships within these emerging clusters, identified in the open codes, resulted in ‘Axial Codes’, or categories with clearly identifiable themes. The recounted information was entered into Excel spreadsheets to organise and calculate their predominance relative to each project manager and as a group. The process of organising the data visually in spider diagrams allowed patterns and dominant themes to emerge. The underlying data for each component in the spider diagrams was equivalised on a scale of 100 for comparison. Diagrams were created for each project manager, as well as for the whole group, for each intervention to enable further comparison.

To remain close to the data and reduce the risk of filtering through a computer software tool, data was analysed using a manual paper-based sorting and classification approach. Fielding and Lee (1998) suggested one of the issues with using computer software for analysing data was that it creates distance between the research participants and the researcher. This technological barrier to the creative writing process is reflected by Mintzberg (2005) when he stated “I write on a flat desk [as I am doing now] with my papers around me. I can pull them in every which way” (p. 370). A limitation of not using a software tool is the potential for inconsistent interpretations of the data over time, and being unable to conduct multiple queries at a granular level.

WHAT WAS REVEALED

Determining ‘how’ project managers exchanged knowledge was the central aim of the research. Overall, project managers were found to exchange knowledge in a predominantly impersonal manner, in a formal context, and the exchange was both systematic and social. There was a common outcome between what the project manager said they did to exchange knowledge with what their colleague said the project manager did, and what was observed in the workplace by the researcher. The significance of these different perspectives allows for inconsistencies to emerge between the self-perception of the project managers and the observed reality. While it was expected there may be differences between the observations and the project managers’ self-perceptions, the

results from the different colleague's evaluation of their project manager were aligned, which was unexpected given they were all from different organisations, and industries.

Analysing the data led to categories identifying project managers exchanged knowledge in either a highly structured, or formal context, in "Our post implementation reviews and our business realisation reviews" (Delta); or in a casual or informal context. Within these two categories of formal and informal, the data was clustered into whether the exchange was impersonal or personal. These two additional categories referred to the manner in which the knowledge was exchanged, such as handing over a report with no discussion would be referred to as impersonal, where "There are a lot of informal discussions which are constantly occurring in our team" (Sierra). In addition, there were a mixture of other responses within each of the formal and informal categories, and these were classified as 'blended'. Figure 1 depicts the responses to the interview question asking the project managers how they exchanged knowledge while managing projects, classified according to the categories of formal; informal; personal; impersonal; and blended.

Insert Figure 1 about here

The key outcomes from analysing the responses to this interview question indicated the combined group showed a pattern of using an impersonal approach to exchange knowledge with responses from five of the six project managers indicating this was their preference. Further analysis of the responses indicated nearly a third of the project managers exchange knowledge in a formal context, for example "We've got an IT system that enables project staff to put lessons learned in when they come across an issue on a project" (Whiskey). Most of the project managers were aligned in responses, with Bravo, Delta, Sierra and Whiskey closely aligned with the group prevalence, and Mike demonstrating a preference for a more formal context when the exchange was personal, . However, Lima was an outlier due to a tendency to be more personal in an informal context when exchanging knowledge: "If I notice that somebody is staying really late and getting stressed out or whatever I usually try and go and find out what's going on".

A second intervention involved interviewing a colleague of each project manager who was asked about how they observed the project manager exchange knowledge. The responses emerged and formed into the same categories used in the analysis of the responses to the interviews with the project manager. The key outcomes from analysis of the responses suggest the combined group indicated the colleague saw their project manager exchange knowledge more often in an impersonal manner and in a formal context. The colleagues of five project managers, Delta, Lima, Mike, Sierra and Whiskey, were less inclined to exchange knowledge in an impersonal manner and informal context. Bravo was observed by their colleague to only exchange knowledge in an impersonal manner and a formal context, and Delta preferred an informal context yet used both personal and impersonal manners.

The third intervention involved *in situ* observations, which were conducted in the project managers' workplaces for a full workday. The observation data was classified as either impromptu or planned, and involved a wider group of internal and external stakeholders at varying levels of seniority. The analysis of the observations indicated the project managers exchange knowledge in either a highly structured formal, or a casual and informal context. Within these formal and informal categories, the data was clustered into whether the exchange of knowledge occurred in an impersonal or personal manner. The data was further analysed to understand if the knowledge was exchanged according to the observation protocols of being impromptu or planned. The different levels of seniority impacted on how knowledge was exchanged during the observations. The primary way project managers exchanged knowledge with those more senior was in an impersonal manner, and in a formal context. The second most prevalent pattern identified knowledge exchange with those in junior roles occurring in a personal manner but a formal context. However, at a peer level this approach was not used, as the project managers used an impersonal manner and in an informal context. Further analysis of the data focused on understanding whether each interaction was planned or impromptu and found the project managers approached these situations in different ways. When exchanging knowledge in a planned situation the project managers were overwhelmingly impersonal in their manner using a formal approach to exchange knowledge. When the exchange of knowledge was impromptu, a shift occurred and the project managers approached their senior managers in a

personal manner although still in a formal context. Interactions continued to be impersonal in their manner and in a formal context when the project managers interacted with people below their level of responsibility, with peers and in mixed groups, but they shifted toward being more informal in their manner. This perhaps indicated that project manager's behaviour was modified depending on hierarchy.

To compare what the project managers did *versus* what they said they did, the data which had been analysed separately was merged to identify common and disparate patterns. The analysis was again presented in spider diagrams with a percentage of the raw number of codes in each category used to compare and highlight results. These results indicated the data for the combined group *said* they exchanged knowledge in an impersonal manner and in a formal context. The observations and colleagues' comments were also closely aligned with what the project manager *said* they did, however there was a shift in the subsequent preferences when the project managers were observed, noting the impersonal manner remained constant. A summary of what the overall group *said* they did when they exchanged knowledge, what they actually *did*, and what the colleague said they *did* is shown Figure 2.

Insert Figure 2 about here

A comparison of what the project manager *said* about how they exchanged knowledge, what they actually *did* when observed, and what their colleague *said* they did highlighted common areas which confirmed approaches, and differences. As a combined group, the leading categories for the project managers were impersonal and formal, with the observations confirming this tendency.

The purpose of the fourth intervention was to provide a structured framework for the project managers to record how they exchanged knowledge in their own language using a journal. The journals were designed to capture and encourage reflection-in-action which recorded the "... competency practitioners display in unique, uncertain, and conflicted situations in practice" (Schön, 1987, p. 13). When reflecting on exchanging knowledge, four project managers indicated in their journals they would solve their immediate project issues by focusing on tasks or people, with minimal self-reflection. The reflections from Bravo were focused on responding to people, although there was

little evidence the exchange of knowledge generated new insights. Delta identified the value in reflecting on a regular basis to focus attention on how to share knowledge, and used the journal to gain a deeper understanding of team behaviours. Lima understood how knowledge needed to be exchanged, in particular with senior management due to the impact organisational politics was having on projects. In reflecting on Mike's work with clients, an understanding emerged of the value of asking self-oriented questions to identify areas needing attention, as well as creating 'listening opportunities'. Unlike Lima and Delta, the focus of Mike's reflections was predominantly on relationships and communications, and the impact on people's reactions in knowledge exchange situations.

The literature themes were compared with the data analysed to understand what project managers said they did, what they actually did, and what their colleagues said they did when exchanging knowledge. The interactions between decision-makers and other individuals, or groups of people who were working together to achieve an outcome, is socially constructed. These social interactions can both facilitate and constrain the exchange of knowledge (Tasselli, 2015). Various contingent histories, professional perspectives, and local conditions interact in a systematic, mutual way to convert tacit knowledge to explicit knowledge. Project managers understood the value of exchanging knowledge to ascertain what was, and what had been, occurring on a project in order to progress their work. The ability to engage in formal and informal exchanges enabled the project manager to connect with those involved on a project, and share tacit and explicit knowledge. Some of the most valuable exchanges generated insights into negative outcomes so lessons could be learnt and captured for future projects. As Whiskey stated when reflecting on the outcome of a project meeting "It was termed a lessons learned review but one of the critical things about it was about knowledge exchange". The outcomes of the data analysis supports the literature in the requirement for key people engaged with the project to deliberately exchange knowledge as it is a "... powerful way to share, replicate, and scale up what works in development" (Kumar & Leonard, 2011, p. I). The findings from analysing the data also support the literature where socialisation occurs for knowledge to be exchanged in a mutually beneficial and systematic manner.

CONCLUSION

While project managers worked on delivering projects, knowledge was found to be predominantly exchanged in an impersonal manner and in a formal context. The socialised setting where knowledge exchange occurred was examined through the literature and data using an action research methodology. This examination was framed by social exchange theory, where knowledge exchange occurred through negotiated reciprocal transactions of tangible or intangible assets between project stakeholders. Data was collected from four interventions involving interviews, *in situ* observations, and journals to create multiple inputs for analysis. Using grounded theory techniques to analyse the data after each intervention required the researcher to be "... active-reactive-adaptive in analysing situational variations" (Patton, 1986, p. 308). As themes emerged from the data, they were clustered into categories for comparison with the literature, and with social exchange theory. The comparisons were framed by what the project managers think they did when they exchanged knowledge with what was observed *in situ*, and then compared to their colleagues' perceptions.

The study demonstrated how an action research methodology could be applied to illuminate approaches and identify opportunities through exchanging project knowledge. It is proposed that project managers need to consider and balance their focus in multiple ways: first, managing the desire to espouse the virtues of embedding knowledge-based practices with demonstrated success across multiple domains; second, embedding these practices so they are relevant beyond the temporary project environment and any *ad hoc* approaches; and third, clearly defining the language used to describe multidirectional flows of knowledge to minimise confusion. Creating an awareness of how, and providing a structured approach for project managers to exchange knowledge can facilitate an improvement in project outcomes. Being aware of what is required to establish an ideal approach in which to exchange knowledge provides project managers with an opportunity to reduce misunderstandings and accelerate positive outcomes for organisations when managing projects. The different perceptions of knowledge exchange may indicate project managers have a partially informed view of how they exchange knowledge, potentially limiting their understanding of the project environment and requirements

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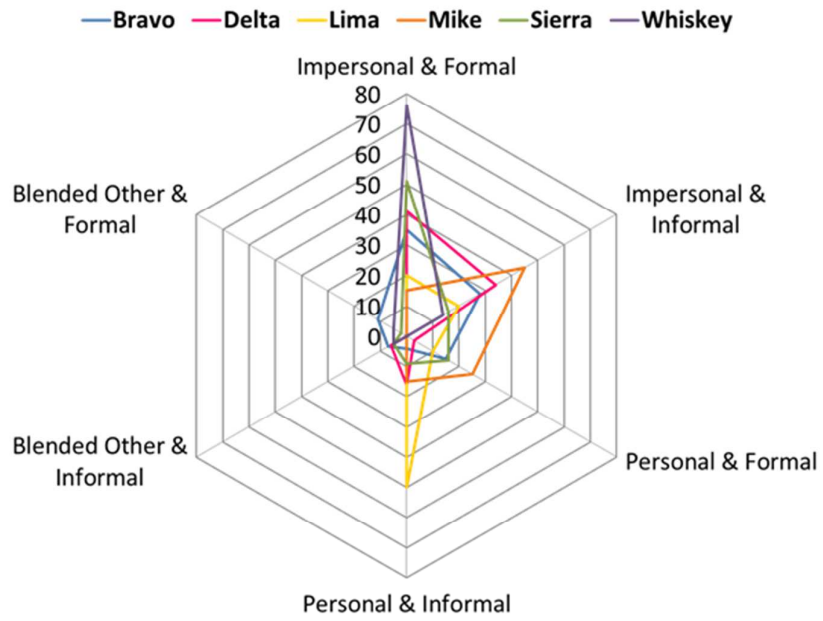
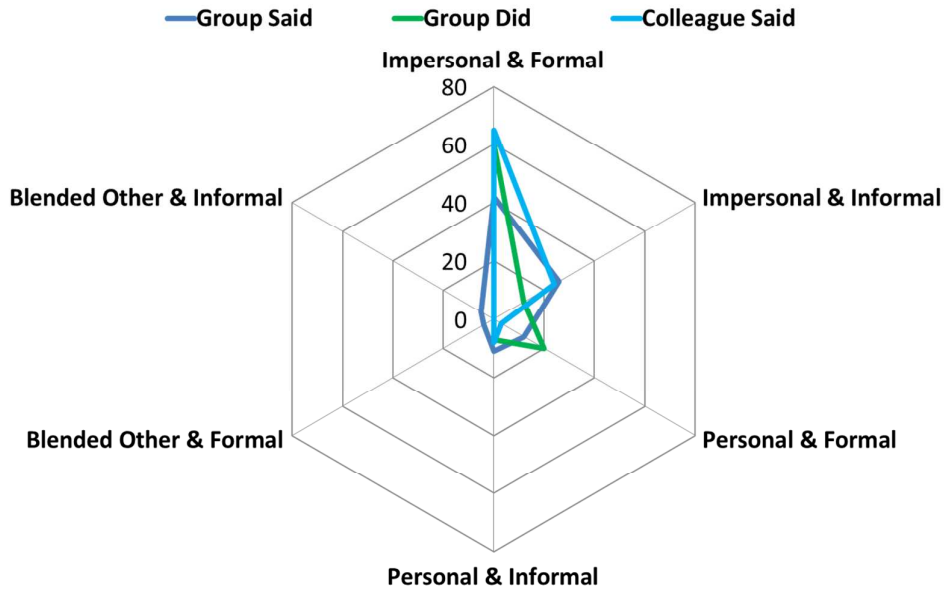


Figure 1: Project managers interview response on how they exchange knowledge



Category of Responses	Group Said	Group Did	Colleague Said
Impersonal & Formal	42	60	65
Impersonal & Informal	26	12	24
Personal & Formal	12	20	3
Personal & Informal	11	7	8
Blended Other & Formal	4	0	0
Blended Other & Informal	5	0	0
Prevalence-Group % of Total Responses			

Figure 2: Comparison of what the group said, did, and what the colleague said about how knowledge was exchanged