Investigating the efficacy of techniques affecting information exchange in virtual teams

Ananth Chiravuri
Department of Business Administration,
College of Business and Economics,
UAE University,
P.O. Box 15551, Al Ain, UAE
Email: ananth.chiravuri@uaeu.ac.ae

Abstract: It still remains a challenge for members of a virtual team to share or exchange information with one another. This is despite the benefits of information sharing on a team’s performance, which include overcoming bias and making better decisions. One of the primary reasons for the lack of information exchange might be the difficulty of a team member in eliciting their unique information, which remains tacit. This study aims to examine this issue by testing the efficacy of two cognitive based techniques: Delphi and Repertory Grid, in eliciting such unique information. Our results indicate that groups using either technique (Delphi and Repertory Grid) elicited more unshared/unique information than the control group that was using none. But more importantly, our findings indicate that the Repertory Grid technique helped capture more unique information from members of a virtual team than the Delphi technique.

Keywords: information sharing; virtual teams; RepGrid; Delphi method; biased information sharing.


Biographical notes: Ananth Chiravuri is an Assistant Professor in Management Information Systems (MIS) at UAE University in Al Ain-UAE. He has a PhD in Management Science (Specialisation: MIS) from the University of Wisconsin Milwaukee. His current research interests are in the areas of virtual teams, IS strategy, knowledge management, and e-commerce. He has published over 23 papers in refereed/ top MIS journals and conferences such as Journal of Management Information Systems, Information Systems Journal, Information Systems Frontiers, Requirements Engineering, HICSS, PACIS, AMCIS etc. He is serving as a reviewer for various IS journals and conferences such as JMIS, OMJ, BIT, ICIS, ECIS, HICSS, AMCIS, PACIS.

This paper is a revised and expanded version of a paper entitled ‘Investigating the efficacy of techniques affecting information exchange in virtual teams’ presented at the 14th Annual World Congress of the Academy for Global Business Advancement (AGBA), Eldoret, Kenya, 23–25 November, 2017.
1 Introduction

In today’s world, virtual teams are being used more than ever before, and studies indicate that the use of such teams will continue to increase (Gilson et al., 2015). Presently, most multinational organisations are moving to a decentralised structure, whereby different functions are being handled at multiple location sites. Therefore, it is not surprising that global firms make use of virtual teams more because it allows them the flexibility to select the best employees for a task while being cost effective. These and other advantages of virtual teams to organisations have been well documented in the IS literature.

A major advantage of using virtual teams is that they reach better decisions than individual experts because of the availability to a greater pool of expertise and knowledge or information (for the purposes of this study, we treat knowledge and information as interchangeable terms because of the context) (Ocker et al., 1996). More information might lead to better information exchange when its evenly distributed, in terms of both content and context, to all team members (Cramton, 1997). Better exchange or sharing of information amongst all members in a team could give teams more access to shared information (information that is available to all in a team) than unshared or unique information, i.e., information that is held by only one member (Strasser and Titus, 1985). Access to shared information is beneficial to teams because shared information replaces individual biases with unbiased group opinion resulting in better decision making and enhanced team performance (Diptee and Diptee, 2013). However, despite these advantages, a virtual team member might not share their unique information with other team members because of reasons such as relevance, social motivation and subgroup formation (Wittenbaum et al., 2004; Dennis, 1996; Hightower and Sayeed, 1996; Yilmaz and Peña, 2014). As a result, teams might end up discussing only the shared information and do not get the benefit of the ‘unique’ information held by their individual members thereby leading to poor decisions. This has been termed in the literature as a biased information sampling model (Strasser and Titus, 1985) or shared information bias or biased information sharing.

Biased information sharing among members of a virtual team might occur because they are not efficient in information exchange (DeMeyer, 1991). This can be traced to

- a lack of elicitation of tacit information, i.e. unique knowledge or information that is so deeply ingrained that it might not be easily elicited
- a failure to communicate the existing knowledge.

However, for the purposes of this study, we only examine the former problem, which is an inability to elicit tacit information. We define tacit information as information that is hard to articulate because it is ingrained within someone and is formed as a result of many years of experience or other factors. On the other hand, explicit information (the other form of knowledge) can be communicated and codified easily as it can be expressed or articulated easily.

One approach to elicit tacit information from a member in a virtual team (so that it can be later converted to shared information which can then be used to foster communication amongst experts) could be the use of cognitive techniques. One such technique that has been used by virtual teams for many years is the Delphi technique which is based on questionnaires and is iterative. This technique is simple and a very
A virtual tool to elicit and share information with others in a virtual team. Hence, it would be useful to examine it in the context of this study. The other cognitive technique that we examine in this study is the Repertory Grid Technique (RepGrid). RepGrid allows a virtual team member to elicit and share information with other team members as well but is more complex in terms of methodology as it is based on construing (comparing and contrasting multiple objects under investigation). We posit that the construing methodology of the RepGrid might force a deeper understanding of the issues resulting in the elicitation of more unique information, and therefore, leading to more shared information. Also, the cognitive maps produced by the RepGrid help communicate the shared information to others in the virtual team, thereby resulting in better decisions.

To sum up, the objective of this study is to examine the efficacy of the two cognitive techniques discussed above (Delphi and RepGrid) in terms of eliciting unique information from members in a virtual team. Our study contributes to the theory on virtual teams by proposing a better method for the teams to capture more unique knowledge. In doing so, findings from our study also add to the theory on biased information sharing. Results from our study can help virtual teams better capture unique knowledge from each other so that it can lead to more shared knowledge, and make better decisions as a result.

The rest of the paper is structured as follows: We begin by providing the theoretical background to this study. Following this, we present our propositions and methodology. We will then present findings of our study following which we will conclude with a discussion on the potential implications of our study including limitations and future research directions.

2 Theoretical foundations

2.1 Virtual teams

Virtual teams (VTs) are defined as “groups of geographically and/or temporally dispersed individuals brought together via information and telecommunication technologies” (Piccoli and Ives, 2003, p.365). Members of a VT interact with each other in order to accomplish common goals (Lipnack and Stamps, 1997). Most studies agree that VTs have two distinctive features (Zaccaro and Bader, 2003): Teams either work in geographically separated work places (geographic dispersion), or they may work in the same space but at different times (asynchronous), AND most interactions among team members occur through Computer mediated communication channels (CMCS). Therefore, the nature of VTs creating a lack of face to face contact among VT members has given rise to many issues, that have been examined over the years by many studies as discussed next.

Prior research on virtual teams in the domain of information systems has looked at issues such as knowledge sharing (Alsharo et al., 2017; Griffith et al., 2003), trust (Jarvenpaa et al., 1998; Paul and McDaniel, 2004; Picoli and Ives, 2003), leadership effectiveness (Kayworth and Leidner, 2001–2002), conflict (Chiravuri et al., 2011; Paul et al., 2018) and decision-making effectiveness (Schmidt et al., 2001). In addition, there have been many meta analytic studies on virtual teams examining the different research themes. One such recent study was the one conducted by Gilson et al. (2015).
Investigating the efficacy of techniques affecting information exchange

The authors examined virtual team literature over 10 years from 2004–2014 and found 10 themes across 243 empirical studies. These themes were broadly classified into research design, team inputs, team virtuality, technology, globalisation, leadership, mediators and moderators, trust, outcomes, and ways to enhance VT success. These are discussed next in order to set the context of where VT research presently is.

Theme 1-Research Design: According to meta analyses, VTs are now being examined across disciplines and the focus has moved from labs to in-depth case studies. While student teams are still being used, there is a move towards using more real world teams. There has been a move towards more qualitative studies with an objective to examine various constructs over time. Much of the work is consistent in terms of inputs, mediators, moderators and outcomes.

Theme 2-Team Inputs: Presently, studies are focusing on composition (size, age, personality), culture, multi-team membership, experience in a team, familiarity, and tasks, thus moving away from examining member demographics, knowledge skills and abilities. Task characteristics such as interdependence and degree of formalisation is being examined under issues related to tasks.

Theme 3-Team Virtuality: Studies examining team virtuality are focusing on geographic dispersion and technology usage and are examining it both as an input and as a moderator.

Theme 4-Technology: Most of the time, technology is being examined as an input to enable communication and performance monitoring. The majority of studies are still focusing on traditional tools such as e-mail, chat and discussion boards with relatively little focus on social networking.

Theme 5-Globalisation: Most studies are focusing on cultural diversity, and Hofstede’s (2001) dimensions of national culture. More importantly, studies are examining the development of trust.

Theme 6-Leadership: Research in this theme is focusing on leader behaviors and traits. This includes leadership styles such as emergent, transactional, transformational and the effects of such leadership style on leader member exchange (LMX).

Theme 7-Mediators and Moderators: Research in this area has largely examined action and interpersonal processes. Studies examining action processes have focused their attention on communication, coordination and knowledge sharing. Similarly, studies looking at interpersonal processes have focused on conflict management. Increasingly, research is looking at other areas such as cohesion, team identity and empowerment and shared mental models.

Theme 8-Trust: Trust is the most studied variable in VT literature. Most studies are trying to understand how trust develops and why, including the conditions.

Theme 9-Outcomes: Research in this area is looking at team effectiveness, project quality, and satisfaction. Organisational commitment of team member’s is also being explored.

Theme 10-Enhance VT success: This area has attracted the attention of a large number of studies which have focused on the mechanisms to enhance VT success. This included the role of training as well.
As indicated earlier, this objective of this study is to examine the efficacy of the two cognitive techniques discussed above (Delphi and Repgrid) in terms of eliciting unique information from members in a virtual team. This is related to the action processes of VTs as classified under Theme 7, thereby confirming the importance of this study.

Also, VTs are very different from collocated teams, which explains why the findings from the latter cannot be applied to VTs. These differences relate to characteristics such as conflict, communication, culture, relationship building and cohesion (Chiravuri et al., 2011; Powell et al., 2004). For example, when it relates to conflict, collocated teams are better in conflict management than virtual teams in the early stages of a team’s life. VTs reported more task and interpersonal conflict initially than collocated teams, however this decreased with increased shared identity. In terms of communication, while it is common knowledge that virtual teams do not perform well in communicating non-verbal cues, they also fared worse than collocated teams when it comes to information exchange. Therefore, it is important to examine ways to facilitate an efficient exchange of information, forming an objective of this study. As regards culture, VTs are also different from collocated teams because they usually are formed with members from different cultures. In terms of relationship building, the lack of personal face to face contact makes VTs more focused on task than on relationships. Finally, as regards cohesion, collocated teams had higher levels of team cohesiveness at an overall level. However, while virtual teams begin with lower cohesion, virtual team members may be able to exchange enough social information to develop cohesion over time. As a result of these differences, it is important to examine issues related to VTs and not apply findings from the studies on collocated teams. Especially so, when studies in the domain of VTs report conflicting findings as explained next.

While research in VTs has indicated that virtual teams were able to generate a higher number ideas or perspectives and conduct more in depth analyses leading to higher quality (Ocker et al., 1996), these findings are in contrast to other studies (Dennis and Wixom, 2001–2002) who found decision quality to be lower for virtual teams even though they generated the same number of ideas as face-to-face teams using GSS. These studies indicate that decision quality is a factor, and therefore we argue that elicitation of the unique information from a member is an important factor. Unique information of a virtual team member may be superior to what is being shared because it ingrains years of experience and wisdom, which in turn could lead to better decision making. Therefore, it is important to understand more about the different types of shared information, which is presented next.

### 2.2 Biased information sharing or shared information bias

Information sharing in teams has been classified into three types: common/shared, partially shared and unique/unshared (Dennis, 1996). Shared information is known to all members in team, partially shared to just a few members and unshared to just one member in a team. Biased information sharing theory states that teams discuss more of shared information than unshared (Strasser and Titus, 1985), and therefore it is important to collect unshared information. As indicated earlier, team members may find it difficult to share their knowledge or information with others for reasons such as relevance, social motivation (Dennis, 1996) and information recall (Hightower and Sayeed, 1996).
Relevance refers to the match of the information to the topic under discussion (Dennis, 1996). As the author notes, its considered more relevant to rehash the material than to introduce unique ideas during an information exchange between team members because of cognitive inertia. Also, members might not be motivated to share their unique information because they might be required to defend them or the information might be contradictory to the shared ideas. Findings from prior studies examining biased information sharing in virtual teams using Group Support Systems (GSS) confirm the above-studies report that although teams using GSS shared more information than non-GSS teams, most of the information was not unique (Massey and Clapper, 1995). In addition, studies have noted that members in teams find it easier to recall and exchange ‘shared information’ than unique (partial or unshared) information (Hightower and Sayeed, 1996; Gigone and Hastie, 1993). Biased information sharing has been explained using the following theories, which are discussed next.

2.3 Underlying theories

This study investigates biased information sharing which can be explained by the following theories as given below (adapted from Wittenbaum et al. (2004)):

Collective information-sampling model

According to the information-sampling model (Stasser, 1992), information is randomly sampled for discussion from members’ memory.

“One presumption is that group members will mention any piece of information that they recall. So, making information more memorable increases its likelihood of being mentioned and thus discussed. Additionally, increasing the number of members in the group who know a piece of information increases the likelihood that the information will be discussed. If information is being randomly sampled from members’ memories, then shared information is more likely than unshared to be discussed because there are more members’ minds from which shared information can be sampled. Therefore, shared information has a sampling advantage over unshared information.” (Wittenbaum et al., 2004, pp.295–296)

Social comparison

Another explanation for the shared information bias is based on the social comparison processes (Festinger, 1954). When members of a VT work on an unfamiliar task, they may look to others to evaluate the relative importance of their information. Hearing that others possess the same information may make that information appear more valuable, important, and relevant and thus a VT member may evaluate shared information as more valuable, important, relevant, and accurate than unshared information (Postmes et al., 2001; Wittenbaum et al., 1999).

We attempt to address this issue (information recall) in this study and posit that team members might find it difficult to share their unique knowledge primarily because it might be difficult to elicit their tacit knowledge. Therefore, it would be important to examine whether the use of specific techniques could help a member recall and elicit unique information, which might then lead to better information sharing. To help achieve this objective, we borrow concepts from the domain of knowledge acquisition, where the usage of cognitive techniques was found to be more effective in eliciting tacit knowledge than traditional techniques such as the interview (Cooke and McDonald, 1986). Since this
study deals with the issue of unshared/unique information which is tacit, we believe using such cognitive techniques would equally apply for this study.

The cognitive techniques that we intend to examine are the RepGrid and the Delphi. As indicated earlier, we use these techniques because the information that we are planning to examine is unique and not easily shared. In other words, information is not structured. Hence, we choose techniques that deal with unstructured/tacit information such as those mentioned above. These are explained next.

2.3.1 Repertory grid technique (RepGrid)

RepGrid is a “cognitive mapping technique that attempts to describe how people think about the phenomena in their world” (Tan and Hunter, 2002, p.40). RepGrid has been used by studies in IS to understand how project success factors impact project success criteria (Pankratz and Basten, 2018), examine business and IT thinking (Tan and Gallupe, 2006), exploring the skills of successful IT project managers (Napier et al., 2009), and investigating the characteristics of team members (Siau et al., 2010). gather interview data about IS analysts, conduct cross cultural research, modelling knowledge and identify drivers for project risk (Hunter, 1997; Hunter and Beck, 2000; Latta and Swigger, 1992; Moynihan, 1996). RepGrid is based on Kelly’s Personal Construct Psychology (PCP) theory (1955), which argues that individuals use their own ‘personal constructs’ or ‘mental models’ to understand and interpret events that occur around them. One of the basic assumptions of PCP is that people make sense of the events around them by organising them into categories according to their similarities and differences (Marsden and Littler, 2000). It is from this process of contrast and discrimination, known as ‘construing’ (Kelly, 1955) that bipolar constructs emerge. According to Kelly, a construct consists of an idea and its perceived opposite and hence bipolar.

RepGrid consists of three major components: Elements, Constructs and Links (Easterby-Smith, 1980). While elements are the objects of attention within the domain of investigation, constructs represent the research participant’s interpretation of the elements (Tan and Hunter, 2002). Finally, links are ways of relating elements and constructs, for example, a 5-point rating scale. For example, a study on systems analysts had the different systems analysts as the elements; bipolar constructs were formed by comparing and discriminating elements and included terms such as delegator-does work himself, knows details-confused etc. Following this, the elements were ranked on the bipolar constructs using a 1–7 scale (linking) and data so collected on such scales were used to produce maps and other artefacts to aid decision making. RepGrid is a useful technique because it provides data that can be analysed both qualitatively and quantitatively using statistical methods (Tan and Hunter, 2002). More importantly, as stated above, RepGrid can be used to produce cognitive maps that can display the understandings held in common by these groups, i.e., shared information (see below). In doing so, such cognitive maps can provide the platform for an enhanced information exchange upon which the overall group can collectively make better decisions.

Advantages such as the ones explained above make the RepGrid an ideal technique for use in our study. As explained earlier, the objective of this study is to examine the efficacy of the RepGrid with another cognition based technique that is often used in studies namely, the Delphi technique. We explain the technique further next.
2.3.2 Delphi technique

Delphi has been defined as a group process that uses written media to solicit and aggregate the judgements of a number of individuals or experts with an intention to seek consensus (Brancheau and Wetherbe, 1987). It has also been described as a “method for the systematic solicitation and collation of judgements on a particular topic through a set of carefully designed questionnaires interspersed with summarised information and feedback of opinions derived from earlier responses” (Delbecq et al., 1975, p.10). The Delphi technique was developed by Dalkey and others at Rand Corporation with an objective to develop a technique for obtaining the most reliable consensus of a group of experts. It does not require that members or experts meet one another face to face. The members or experts are anonymous and work via questionnaires and feedback reports till they reach a consensus. The main objective of using Delphi technique is to improve the quality of the group’s work (Brancheau and Wetherbe, 1987) primarily by improving information sharing, as noted above.

In the past, Delphi technique has been used in IS research extensively for varied tasks such as to elicit key IS management issues and reach a consensus on their importance (Brancheau et al., 1996; Niederman et al., 1991; Brancheau and Wetherbe 1987; Dickson et al., 1984), select and redesign business processes in business process reengineering (Kettinger et al., 1997), understand the key factors affecting knowledge transfer across national boundaries (Duan et al., 2010), understand senior executive and project manager’s perception of risk (Liu et al., 2010), resolve cognitive conflicts (Chiravuri et al., 2011), understand problems concerning the role of IT operations in systems development (Iden et al., 2011), identify processes affecting the alignment between information assurance, information systems and corporate strategies (McFadzean et al., 2011), understand and manage user resistance to business integration systems (Shang, 2012).

According to prior research, only those studies that show four generic characteristics should be classified as Delphi studies (Rowe and Wright, 1999; Skinner et al., 2015). These characteristics are given as follows (adapted from Strasser (2017)):

- **Anonymity:** Respondents are given a series of questionnaires and their responses are made anonymous. This anonymity allows respondents to express their judgements individually and without social pressure that could arise from dominant individuals.

- **Feedback:** Controlled feedback is provided to respondents between each questionnaire iteration. Each participant is informed about the responses of their anonymous fellow participants.

- **Iterative process:** Capturing responses from respondents includes a number of iterations. Each iteration constitutes an opportunity for participants to reflect and revise their judgements with the help of the information they receive from the rest of the participating experts.

- **Statistical aggregation of group response:** All responses contribute to form a part of the answer after the final round. Following this, a quantitative and statistical treatment of these answers can then be carried out.
To reiterate, the objective of this study is to examine the efficacy of the above two techniques: RepGrid and Delphi, in capturing unique information elicited by an expert of a virtual team, and present our proposition(s) next.

3 Propositions

Prior findings confirm that cognitive techniques are more effective and efficient than structured ones in capturing tacit information (Cooke and McDonald, 1986). In the context of this study, it translates into examining the effectiveness of the two information elicitation techniques: RepGrid and Delphi. We operationalise the efficacy of a technique in terms of the completeness of knowledge/information such as the number of knowledge factors or statements (pertaining to a solution) elicited by experts. Based on prior studies, we hypothesise that cognitive techniques such as Delphi and RepGrid which involve more deliberate mental thinking and processes involving convergent and discriminant thought processes should result in more factors than when using no technique. This should apply to the unique pieces/aspects of the information as deliberate mental processes would enable capture of tacit information. Therefore, we hypothesise:

**H1**: Capture of unshared information will be higher in groups using the cognitive techniques than in groups using no technique.

When compared with one another, the methodology of the Delphi technique is simpler to comprehend unlike the relatively more complicated methodology of RepGrid which involves eliciting factors or information using a construing approach. However, the construing approach of the RGT makes it possible to capture more information as it involves greater cognitive processing. Under the construing approach, participants critically think about the similarities and dissimilarities between the different elements and this forces them to elicit information out in the form of constructs which otherwise would remain ingrained. Therefore, we posit that the methodology of the RepGrid should lead to more capture of tacit information than the Delphi and propose:

**H2**: Capture of unshared information will be higher in groups using the RepGrid than groups using the Delphi technique.

Next, we discuss the methodology.

4 Methodology

We planned and conducted a study with real world experts for better external validity. For the purposes of this study, we defined an expert as someone who had relevant experience with networking related technologies, concepts, and planning. For our study, an expert included experienced networking engineers, project managers as well as CIO’s. We chose to include experts across different positions and industries to make our study more representative and consequently increase the external validity of our study thereby preventing any bias. The chosen experts were then randomly assigned to two teams of five each, which were equally divided among the three groups: no technique group (control group), Delphi group and RepGrid group. Following this, they were asked to elicit information using three scenarios. We used three scenarios across all groups
Investigating the efficacy of techniques affecting information exchange

because it was needed to facilitate the RepGrid process, and conducted the study across two rounds which are explained below:

**Round 1:** Experts across the three groups were asked to read a networking case/scenario and elicit solutions for the problems in the form of constructs or statements. The solutions represented knowledge or information required to design telecom networks. The networking case was considered an appropriate task as it lacked a definite answer. Members in the control group were asked to come up with solutions for the problems on their own, without the use of any technique. Similarly, each team member using the RepGrid was asked to elicit constructs using a triadic approach. Under the triadic approach, each subject was administered the three scenarios and asked to identify specific options to solve the problem by comparing two scenarios at a time and contrasting it with the third. These options were treated as elements and used for eliciting the constructs on the basis of similarities and differences. Experts could provide as few or as many factors or constructs as they wished. The data from this round was consolidated into a set of relevant factors, after eliminating overlap and addressing the use of synonyms. Similarly, members of a team using the Delphi technique was asked to read all the cases together and elicit solutions (knowledge) for the problem in the form of statements.

**Round 2:** The statements or factors elicited in round 1 by all the subjects in a group was collated and screened to remove duplicated entries. Following this, the collated set of unique statements/factors was presented to the participants of both techniques for confirmation. Thus round 2 was inclusive of the iterative process found in Delphi.

First, we conducted a pilot study using five experts to ensure that the solutions to the scenarios was not clear. The experts unanimously agreed that the cases presented issues that were not immediately discerned. They added that only experts with ‘reasonable experience’ could tease out the factors that would help in information sharing thereby validating our cases.

Following this, we set out to recruit subjects for the main study. Since acquiring a reasonable sample of real world network experts to participate in the study was very difficult, we contacted IT firms at several locations across the globe across many months. It must be noted that experts agreed to participate in the study at different periods. Finally, we ended up with 60 experts. To ensure a balanced design, we did not assign experts into teams until we had secured the cooperation of 15 experts. These 15 experts were randomly formed into three teams of five each, following which we randomly assigned each team to one of the three groups. Although, we started out with a total of four teams for each group, many experts dropped out over time citing work related reasons. Consequently, we were left with two teams of five members for each group. The data collection period spanned four months.

5 Findings

Findings indicated teams using cognitive techniques such as the Delphi and Repgrid generated more factors than the control groups (see Figure 1). Two teams using the
RepGrid generated 55 and 63 unique factors. The factors were higher when compared to 46 and 38 factors of the Delphi team. Control groups generated 30 and 27 factors.

**Figure 1**  Example of a cognitive map (see online version for colours)

The numbers of factors elicited across teams using the RepGrid clearly indicate that RepGrid elicited more information. In fact, the lowest number of factors (55) elicited by a RepGrid team was higher than the highest factors elicited by both Delphi and control groups (see Figure 2). This supported our Hypothesis 1. On an average, the number of factors elicited by RepGrid and Delphi was far higher than those in the control group and thereby giving support to our first hypothesis (see Figure 2). Figure 2 also indicates that, on an average, the number of factors elicited by RepGrid was higher than Delphi by 17 and thereby giving support to our second hypothesis (see Figure 3).

Therefore, we can conclude Hypotheses H1 and H2 were supported. Subsequent interviews with respondents/participants indicated that the construing methodology of the RepGrid forced them to think more about the issues at hand in terms of similarities and dissimilarities. This led them to recall relevant projects, which might have made them elicit more factors. Similarly, participants using the Delphi technique came up with more statements/factors than the control group as they wanted to make sure that all the relevant factors were ranked high. However, they did not deploy the extensive construing mental processes that were used by the RepGrid participants and fell short.

Results from ANOVA indicate that the groups were significantly different (see Table 1).
Investigating the efficacy of techniques affecting information exchange

Figure 2  Total number of unique factors elicited by experts (see online version for colours)

Figure 3  Average unique factors elicited by experts across the groups (see online version for colours)
Table 1  ANOVA results

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>SS</th>
<th>Df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>934.3333</td>
<td>2</td>
<td>467.1667</td>
<td>20.45985</td>
<td>0.017852</td>
<td>9.552094</td>
</tr>
<tr>
<td>Within groups</td>
<td>68.5</td>
<td>3</td>
<td>22.83333</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1002.833</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 6 Contribution and limitations

Prior studies have noted that the decision making of teams get affected due to biased information sharing, i.e., members tend to exchange shared information than unique information. This study attempted to address the above problem by focusing on information recall. The objective was to test the efficacy of cognitive techniques in eliciting information (unique) from experts and thereby make a greater percentage of unique information available for exchange with others. Findings indicate that the use of cognitive techniques (Delphi and RepGrid) resulted in the capture of more tacit/unshared information. In addition, RepGrid did help experts elicit more unique information than the Delphi. As mentioned earlier, the compare and contrast methodology of the repertory grid helped participants elicit unique information by thinking more deeply about the issues at hand. One of the participants remarked that “I didn’t realize the effectiveness of this technique till I saw the detailed results…. It brought out the insight that was within me”.

We posit that the capture of more unique information by the technique could result in more information exchange of previously withheld (partial and unshared) information thereby leading to better decisions. Therefore, findings from this study helps CIOs and project managers overcome the issues from biased information sharing and enhance the decision making of virtual teams. Our study adds to the findings of an earlier study (Chiravuri et al., 2011) by indicating whether the techniques are able to capture unique knowledge and if so, will help create a shared consensus.

Also, future studies could examine the efficacy of the two techniques in information sharing and exchange across different tasks, and perhaps look at other cognitive techniques as well. The major limitation of this study relates to the problem of external validity stemming from the small sample size. Also, as indicated earlier, participants may not actively participate in information sharing because of their reluctance to share knowledge. We did not examine this issue in this study, so it is an issue for future studies to look into. However, this is one of the few studies to use data from real world experts and we posit that findings from this study would have greater relevance than other studies using students as subjects.

### References


Investigating the efficacy of techniques affecting information exchange


Investigating the efficacy of techniques affecting information exchange


