

An Empirical Study of the Impact of Question Structure on Recipient Attitude during Knowledge Sharing

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Abstract: This paper contributes to the body of literature on knowledge sharing through insight into the relationship between the format of questions asked of individuals who are sources of knowledge and the attitudes of those that have been given the opportunity to cognitively integrate this knowledge into their own knowledge base. Aspects of the theoretical model proposed by Bircham (2003) are empirically evaluated, with results supporting the model.

Keywords: knowledge sharing; question response structure; recipient attitude

1. Introduction

In today's knowledge driven economy, the acquisition, use, and leveraging of knowledge are important for success. They also are important merely for survival, as organisations everywhere have generally begun to understand the knowledge management process. Grant (1996), regards knowledge as the "most strategically important resource" that an organisation possesses (p.376). A number of authors suggest that organisational knowledge resides in the interactions between individuals and therefore, forms the basis of competitive advantage (Argote & Ingram, 2000; Nonaka, 1991; Spender & Grant, 1996). However, implicit in these transactions is the assumption that individuals will share with and transfer their knowledge to others, which may or may not occur in circumstances where knowledge sharing is regarded as a voluntary action (Dougherty, 1999).

What is known about knowledge sharing stems mainly from studies focussed on the individual who is the source of the knowledge. Such studies take the perspective of factors that impede its sharing, including, Kalling's (2003) study of motivation to share, various studies on attitude (Bock & Kim, 2002; Ryu, Hee Ho, & Han, 2003), and Foss and Pedersen's (2002) study of the source's innate ability to share. Although a number of studies have concentrated on exploring factors that may influence the recipients of the shared knowledge (Simonin, 1999; Szulanski, 1996), some still consider that

this research area has been neglected (Dixon, 2002).

Calls are currently being made in the literature for more research on knowledge sharing in organisations, particularly in the area of questioning (Cooper, 2003). This paper addresses both this call and the lack of research on recipients by examining how the form of questions posed to a person holding the desired knowledge (i.e. the source) might impact the recipient's attitude toward any knowledge received from the source. Specifically, the form of the question was manipulated in a laboratory experiment to observe its impact on recipient attitude toward knowledge received.

The paper is organised as follows. We start with a review of the literature on knowledge sharing, focusing on source and recipient individuals and the potential effect of question structure when sharing knowledge. This is followed by a discussion of the experimental methodology, design and the measures employed, and the results obtained and closes with a short discussion and conclusion.

2. Background literature

Knowledge sharing can be defined as the process of capturing knowledge, or moving knowledge from a source unit to a recipient unit. Knowledge transfer is regarded as more than this, as it also involves knowledge re-use, or the actual use of the shared knowledge by the

recipient (Alvai & Leidner, 2001). Successful knowledge transfer implicitly requires successful knowledge sharing, as "without sharing, it is almost impossible for knowledge to be transferred to other person(s)" (Syed-Ikhasa & Rowland, 2004, p.96). This could imply that there is a requirement to first understand the factors that influence successful sharing before probing into knowledge transfer. However, much of the empirical research undertaken to date relates to knowledge transfer, which possibly is a result of organisations and researchers placing greater significance on the actual use of knowledge, such as new innovation, best practice etc., rather than how knowledge is shared.

Notwithstanding this, empirical research into knowledge sharing has been undertaken from a number of perspectives including organisations sharing knowledge with each other (Hansen, 2002; Lane & Lubatkin, 1998) and inter-business unit sharing (Tsai, 2002). In addition, factors that may influence the source individual to share their knowledge have also been studied (see Bock & Kim, 2002; Ryu et al., 2003; Szulanski, 1996). Some consider however, that the recipient and factors that may impact on them have been, for the most part neglected (Dixon, 2002). This is an interesting point, since one of the consequences of sharing knowledge is the new insight and generation of knowledge gained by the recipient. Further, if a recipient senses value in the shared knowledge (Gupta & Govindarajan, 2000), or relevance of the knowledge to their decision-making requirements (Schulz, 2003), it is more likely that they will use the knowledge; and once it has been used, which may occur at a future date, the knowledge can be said to have been successfully transferred.

Factors that have been suggested to influence the recipient in the sharing process are absorptive capacity of the recipient (Szulanski, 1996) and their willingness to accept the shared knowledge (Gupta & Govindarajan, 2000). Some also consider that a recipient may not be willing to accept shared knowledge from others owing to a lack of trust of the source individual (Huemer, von Krogh, & Roos, 1998), or the 'not-invented-here' syndrome (Katz & Allen, 1982). Another aspect that may influence recipients

attitude is how effectively the knowledge has been articulated by the source (Cummings & Teng, 2003). Bircham (2003) suggests that the structure of the questions asked of source individuals and therefore the corresponding response structure may affect knowledge articulation.

Research into the effect of question wording generally resides in the polling and survey research field, however many of the findings are applicable to knowledge sharing. For instance, when a person is asked to share their knowledge will an open-ended question produce more depth of knowledge than a closed question? According to findings by Dohrenwend (1965) no, open-ended questions do not produce more depth in response. This may not seem rationale to many; surely their can be more depth provided in a response if the respondent is not constrained to categories and rather given the ability to respond in an open manner? However, the objective of the questions, for example are they part of a survey, together with the type of responses sought after by the individual asking may influence what structure of question produces more depth. According to Sudman and Bradburn (1982), the way a question is asked does influence the response. In addition, the tone of a question - whether it is worded in a negative, positive or neutral manner - has also been found to influence response depth and the generation of ideas (Brennan, 1997). Brennan (1996) also found that a greater number of ideas were shared by participants when more space was provided in mail surveys for responses to questions of an open-ended structure. Perhaps acknowledging the implicit assumptions that underlie questions of both an open-ended and closed structure will assist in the comprehension of why there is variation of findings between studies.

Open-ended questions assume that the respondent has sufficient knowledge on the question subject matter to be able to respond effectively. Closed or binary questions on the other hand assume that the recipient of the answered responses possesses sufficient background information about the responding individual's knowledge to cognitively process the response (Vinten, 1995). The

last assumption may not be accurate when the objective of using closed questions in a survey is only to gather total numbers that answered in a particular category. For instance, 28 managers consider there are no risks and 36 consider there are risks. However, in an organisation when a recipient has to cognitively process the implications of a 'no' response to a question in terms of their decision-making, understanding the situation surrounding the question is of importance.

The importance of questioning to gain knowledge has been highlighted in a recent experiment on intervention methods and group knowledge generation. The results showed that when members of a group were requested to question others on their knowledge domain of the task required, group knowledge generation was superior than if the members were just asked to share their task knowledge (Okhuysen & Eisenhardt, 2002). The potential influence of the structure of questions posed to a source individual and consequently recipient's attitude towards the corresponding response are presented in a theoretical model posed by Bircham (2003). The model purports that as question structure and subsequently the response structure changes, so to does the attitude of the recipient to the knowledge received in the response.

3. Research question and hypotheses

The purpose of this study was to examine the question posed by Bircham (2003): "does the structure of a question to which the source of the knowledge responds influence the recipient's attitude towards the knowledge they receive?" This study was limited to formal documented questions and responses, where the recipient could not inquire of the source for knowledge clarification. This type of questioning is often found in organisations where formal documented legal and regulatory compliance self-assessment and audit surveys are completed by employees and returned to the recipient's (originator) for review and or action.

The different structures of questions employed for this study were binary, open-ended, and directed and the subsequent hypotheses are:

H_{1a}: The responses elicited from open-ended structured questions will result in the recipient having a more favourable attitude towards the knowledge received than for binary questions.

H_{1b}: The responses elicited from directed structured questions will result in the recipient having a more favourable attitude towards the knowledge received than for open-ended questions.

H_{1c}: The responses elicited from directed structured questions will result in the recipient having a more favourable attitude towards the knowledge received than for binary questions.

4. Research method

A laboratory experiment, administered in two phases, was used to test the proposed hypotheses. The objective of the first phase was to collect shared knowledge from source individuals and collate this knowledge for use in phase two. This was achieved by means of asking the source individuals to respond to questions of either a binary, open-ended or directed structure. The questions asked were pertinent to a scenario business case that was provided to the source individuals. In the second phase, the knowledge codified in the responses from the source individuals was provided to recipient individuals for evaluation.

Fundamental to the study was the requirement to assess the measure *attitude* of the recipient. While prior studies have examined the attitude of the source towards sharing their knowledge (see Bock & Kim, 2002; Connolly, 2000; Kolekofski & Heminger, 2003; Ryu et al., 2003), the attitude of the recipient towards receiving the knowledge has received limited attention. To assess the recipient's attitude towards the knowledge the attitude measure that comprise the Theory of Reasoned Action (TRA) was used (Fishbein & Ajzen, 1975). The theory purports that attitude towards a behaviour is a precursor to an individual's intention towards performing the behaviour. For instance, if an individual has a favourable attitude towards sharing their knowledge within an organisation, they are highly likely to share with others. A less favourable attitude may result in little, or

no, knowledge being shared. Since the TRA has been successfully used in earlier studies on knowledge sharing (Bock & Kim, 2002; Ryu et al., 2003), use of this measure was considered justified in this study.

4.1 Phase one

In the first phase the authors developed a scenario case which involved a business investment opportunity. Next, three questions that related to the case were generated. The questions were intended to elicit from respondents knowledge on issues that were implicit in the case; for example, 'are there any risks associated with the investment?' Each question was worded in a manner that would allow for the three different response structures to be created – binary, open-ended and directed. For instance, to restrict the question 'are there any risk associated with the investment?' to a binary response, the categories 'yes/no' were provided. The same question with no predefined categories, but space for a respondent to write, enabled an open-ended response structure. A directed response structure was similar to open-ended but elaborated the question to also require the respondent to provide supporting rationale for their response.

Next, the case and questions were collated into three questionnaires. The first questionnaire contained the case and the corresponding binary response questions. The second questionnaire comprised the case and the questions allowing for an open-ended response. Finally, the third questionnaire was composed of the case and the directed response questions. All three questionnaires informed participants that their responses to the questions would assist senior management in their investment opportunity decisions. Both the scenario case and corresponding questions were generic and simplistic enough that there was no requirement to have specialised individuals as participants in the study. The three questionnaires were pre-tested using both academics and members of the business community.

Subsequent to the questionnaire pre-test the first author approached participants and asked if they would like to partake in the study. Both lecturers and postgraduate students from the Waikato Management

School comprise the sample of participants. Since the objective of this phase was to collect knowledge pertaining to the case, no distinction was made between the responses from lecturers or postgraduate students – all responses were considered bona fide. Of the participants approached, those who verbally agreed were presented with the questionnaire package and for ease of return, an internal mail envelope. Fifteen questionnaires were distributed, 5 binary, 5 open-ended and 5 directed. Within one week of distribution, 13 were returned (86% response rate), of which 4 were binary, 5 open-ended and 4 directed. The last returned open-ended questionnaire was not used in analysis, therefore allocating an equal number of responses for each question response structure.

4.2 Phase two

The second part of the study used the response data collected in phase one. That is, participants from the first phase were considered to have shared their knowledge about the investment opportunity by means of responding to the posed questions. The objective of this phase was to test the three hypotheses and establish whether or not, a recipient's attitude towards received knowledge differed with the structure of the response.

To achieve this, three **new** questionnaires were developed. Each questionnaire contained the same instructions and measurement instrument, but differed in the question structure (binary, open-ended, directed) and corresponding responses. For instance, the first questionnaire contained the questions in the binary structure and their corresponding responses; the second questionnaire the open-ended questions and responses; and the third questionnaire the directed questions and responses. The measurement instrument consisted of the 5-item attitude measure (Fishbein & Ajzen, 1975), assessed using a seven-point Likert scale, with 1 = strongly disagree, through 4 = neutral, to 7 = strongly agree. In addition, the instrument also included a number of items in attempt to explore other aspects, including satisfaction and importance of received knowledge. The instructions informed participants that they were an employee of the scenario organisation and as part of their job they were required to report to senior

management on whether or not the company should make the new investment. The instructions also advised participants that the questions and corresponding responses were those provided by their staff and should be used to guide them with their investment decision. Unlike the first phase, the scenario case was not included in the questionnaires, thereby limiting participant's (the recipients) knowledge on the investment opportunity, to that obtainable from the responses. The new questionnaires were again pre-tested using academics and members of the business community.

The three groups of questionnaires were then distributed to students of a third year business management class during a normal scheduled lecture hour. Prior to distribution the questionnaires had been randomly sorted to ensure that the likelihood of a participant receiving a binary, open-ended or directed questionnaire was comparable. The total number of students enrolled in the course was 168. Exactly one hundred students were present on the day of data collection and 97 participants responded, with 90 usable questionnaires, of which 30 were binary, 31 open-ended and 29 directed.

5. Results

A correlation matrix with descriptive statistics for all variables is provided in Table 1 at the end of this paper, with items Q17 and Q18 negatively worded and transformed for analysis. This matrix reveals high correlation between items Q14-Q18, corresponding to the attitude measure (Fishbein & Ajzen, 1975) and there was also noteworthy correlation between items Q8-Q10, those that used the word satisfaction within the item phrase. Interestingly, little or almost no correlation was found for items Q5-Q7,

which were used to investigate the importance of knowledge.

Bartlett's test of Sphericity was significant at 870.619 ($p < 0.05$) which together with a Kaiser-Meyer-Olkin measure of sampling adequacy ($KMO = 0.801$) suggested that the data may be factorable. Exploratory factor analysis using principal component extraction, with Varimax rotation and Kaiser normalisation was undertaken over three iterations in an attempt to derive a stable factor structure (Churchill, 1979; Taylor & Wright, 2004). After the first iteration 3 items were dropped from the analysis because they did not meet the general guidelines of individual loadings greater than 0.35 or cross-loading of less than 0.35 (Kim & Mueller, 1978). A further 3 items were dropped after the second iteration due to complex cross-loadings. After the third and final iteration 12 items loaded onto three underlying factors and explained 68.3% of the variance.

After Varimax rotation the strongest factor (explaining 31.0% of the variance) was loaded by items Q14-Q18, the variables that comprise the construct attitude. Internal consistency reliability was high for this factor with a Cronbach's alpha of 0.9032. Factor 2, labelled satisfaction, explained 24.7% of the variance with a reliability of 0.8161. The final factor labelled importance of knowledge, was dropped from further analysis due to its reliability (0.6385) being below the acceptable threshold (0.70) suggested by Nunnally and Bernstein (1994).

To test the hypotheses H_{1a} , H_{1b} and H_{1c} , the means for the items that comprise the factors were calculated and analysis of variance (ANOVA) performed (Table 2). Using an alpha of 0.01 the results indicate a difference between the three groups of question structure for the factor attitude and satisfaction.

Table 2: ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Attitude	Between Groups	32.399	2	16.199	12.300	.000
	Within Groups	114.577	87	1.317		
	Total	146.976	89			
Satisfaction	Between Groups	8.727	2	4.364	4.288	.017
	Within Groups	22.544	87	1.018		
	Total	31.272	89			

The posthoc test of Tukey HSD ($\alpha = 0.01$) was conducted for pairwise comparison. Only the results for the factor

attitude are reported (Table 3) because there was no significant difference

between the three question structure groups for the factor satisfaction.

Table 3: Tukey HSD Multiple Comparisons and Homogenous Subsets – Attitude

Multiple Comparisons	Question (I)	Question (J)	Mean Difference (I-J)	Std. Error	Sig.
Tukey HSD	Binary	Open	-1.1596*	.29391	.000
		Directed	-1.3674*	.29885	.000
	Open	Binary	1.1596*	.29391	.000
		Directed	-.2078	.29647	.764
	Directed	Binary	1.3674*	.29885	.000
		Open	.2078	.29647	.764
Homogenous Subsets		Question Structure	N	Subset for alpha = 0.01	
Tukey HSDa,b				1	2
		Binary	30	3.0533	
		Open-ended	31		4.2129
		Directed	29		4.4207
		Sig.		1.00	.764

Means for groups in homogeneous subsets are displayed

a. Uses Harmonic Mean Sample Size = 29.978

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

- Mean difference significant at the 0.01 level

The test revealed two homogenous subsets, which suggested that attitude to responses with the influence of a binary question structure (Subset 1, Table 3) differed to those with the influence of an open-ended or directed question structure (Subset 2, Table 3). The difference between open-ended and directed questions structures for the factor attitude was small and not significant ($p < 0.01$).

The Likert scale instrument labels ranged from strongly disagree = 1 through neutral = 4 to strongly agree = 7 and the calculated means for the attitude measure increased when question structure complexity increased (binary to open-ended and directed). This suggests that the recipients were more favourably disposed towards the knowledge they received when questions of a complex structure were used (Figure 1). This finding supports hypotheses H_{1a} and H_{1c} . However, there was no significant difference in attitude between questions of an open-ended or directed structure, even though directed questions had a slightly higher attitude measure. Therefore, hypothesis H_{1b} is not supported.

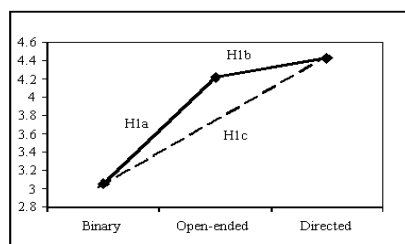


Figure 1: Mean Plots from Tukey HSD for Attitude

6. Discussion

The purpose of the study was to test components of the theoretical model proposed by Bircham (2003) and to address the question of whether or not question structure is of importance in the knowledge sharing process. The results of the study support the notion that question structure does matter; questions of a binary structure had a lower attitude measure than those questions for either an open-ended or directed structure. These findings complement the literature on knowledge sharing by answering the call for further investigation into questioning (Cooper, 2003) as well as focusing on factors that may influence the recipient.

There are some potential limitations to the study. First, the question designer was not the same individual as the recipient of the responses. If the two were the same individual then potentially the findings of this study may not hold. For instance, if the person who designs and asks the question is also the recipient of the responses, then in many circumstances it would not be unreasonable to assume that they already possess substantial knowledge associated with the domain of the question. The question response structure preferred in this circumstance could be of the closed type, rather than open-ended or directed. However, in many organisations, if not the majority, the person required to make the decision, based on the knowledge received, is not the same individual as the question designer (e.g. a finance director may make

the decision and an auditor may design the questions).

Second, while this research has established that question structure does influence attitude, there is a potential limitation in the attitude measure. The purpose of Fishbein and Ajzen's (1975) model was to predict behaviour given attitude and intentions. While the 5-item attitude measure has been successfully used in various studies (many external to the field of knowledge management) future investigation into a recipient's satisfaction with the knowledge may result in the development of a more vigorous measure. For example, a recent development and validation of a measure for website user satisfaction (Muylle, Moenaert, & Despontin, 2004) expanded the definition of satisfaction to include identifying underlying dimensions of the construct, inclusive of comprehensibility, comprehensiveness, accuracy, relevance and format. Future research could expand the definition of satisfaction with knowledge received to include such underlying aspects.

Finally, the constructs attitude and satisfaction were examined from the perspective that the knowledge received could be used for future decision-making. From a speculative perspective the attitude and satisfaction of the recipient towards the knowledge received could be a proxy for a recipient's perceived value of knowledge received. A low attitude and low satisfaction towards received knowledge could indicate that the recipient does not perceive it to be valuable for future decision-making. On the other hand, high measures for both could indicate that the recipient of knowledge perceives it to be valuable for future decision-making. This supports the comments of Gupta *et al.* (2000) who suggest that the more valuable the shared knowledge the more likely it will be utilised.

7. Conclusion

The relationship between question structure and the attitude of the receiver of shared knowledge proposed by Bircham (2003) is supported by the results of this experiment; as question structure increases in complexity, so too does the measure of attitude of the recipient towards the knowledge they have

received. While it is not possible to definitively conclude from the results of this study that this increase reflects more favourable attitude in the recipient towards the knowledge received, neither can such a conclusion be confidently dismissed. The findings of this study strongly indicate that a recipient's attitude towards knowledge received varies with the structure of the questions used to elicit knowledge from a source. Therefore, understanding the influence of question structure in knowledge sharing is potentially of major significance to business and government.

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Table 1: Correlation Matrix and Descriptive Statistics

	Mean	Std Dev	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
Q1	4.59	1.483	1																	
Q2	3.36	1.417	.439**	1																
Q3	4.66	1.350	.383**	.194	1															
Q4	4.26	1.387	.560**	.336*	.354**	1														
Q5	6.44	.672	.039	-.003	.010	.154	1													
Q6	6.20	.864	.100	.006	.050	.088	.484**	1												
Q7	6.12	.910	.004	-.165	.007	.278**	.314	.455**	1											
Q8	3.58	1.390	.454**	.448**	.203	.401**	.143	.034	-.181	1										
Q9	2.96	1.365	.446**	.456**	.309**	.386**	-.015	-.002	-.104	.641**	1									
Q10	3.40	1.305	.376**	.518**	.296**	.247*	-.038	.008	-.193	.559**	.553**	1								
Q11	3.82	1.303	.340**	.345**	.290**	.212*	.027	.112	-.095	.504*	.356**	.703**	1							
Q12	2.90	1.407	.206	.323**	.301**	.209*	-.083	.072	-.148	.311**	.431**	.493**	.493**	1						
Q13	4.07	1.444	.286**	.208*	.427**	.300**	.073	.124	.165	.288**	.383**	.409**	.442**	.413**	1					
Q14	3.56	1.462	.329**	.213*	.172	.356**	-.037	-.027	-.060	.393**	.474**	.359**	.288**	.268*	.397**	1				
Q15	3.53	1.432	.380**	.188	.201	.327**	.054	-.033	-.128	.448**	.432**	.167	.202	.211*	.314**	.753**	1			
Q16	3.57	1.492	.411**	.281**	.321**	.391**	.071	-.071	-.110	.463**	.476*	.263*	.237*	.252*	.394*	.761**	.877**	1		
Q17	4.21	1.590	.318**	.231*	.113	.429**	-.026	-.080	.029	.270*	.279*	.121	.073	-.016	.199	.606**	.587**	.655**	1	
Q18	4.60	1.585	.359**	.129	.234*	.512**	.021	.010	.143	.310**	.298**	.100	.134	.057	.321**	.499**	.491**	.520**	.796**	1

Q1-Q4, Q8-Q13 Variables used to examine satisfaction

Q5-Q7 Variables used to examine importance

Q14-Q18 Variables used to examine attitude (Q17 and Q18 negatively worded and recoded for analysis)

n=90

* Correlation is significant at the 0.05 level (2-tailed) / ** Correlation is significant at the 0.01 level (2-tailed)