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The aim and motivation of this research is to investigate ways to support and encourage knowledge sharing. Specifically we examined ways in which 'play' can be used to enhance collaborative work practices. In this process we elicited subjective views and opinions on playing games and the extent to which the participant's felt these could enhance their collaboration in work. The ancient Chinese strategy game of Go was employed in an online team version as a means to evaluate and advance the knowledge sharing culture in a network centric environment. The results of this research identified that play has the power to engage participants into the collaborative work practices and that it can provide an opportunity for teams to see the value of sharing information, and hence to improve the knowledge management practices.

Keywords

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Disciplines

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The Power of Play in Knowledge Management

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Abstract

The aim and motivation of this research is to investigate ways to support and encourage knowledge sharing. Specifically we examined ways in which 'play' can be used to enhance collaborative work practices. In this process we elicited subjective views and opinions on playing games and the extent to which the participant's felt these could enhance their collaboration in work. The ancient Chinese strategy game of Go was employed in an online team version as a means to evaluate and advance the knowledge sharing culture in a network centric environment. The results of this research identified that play has the power to engage participants into the collaborative work practices and that it can provide an opportunity for teams to see the value of sharing information, and hence to improve the knowledge management practices.

1. Introduction

Play has been defined as an activity performed for pleasure (Groos, 1976; Henriot, 1969; Huizinga, 1972). But for many, play is much more than a leisure activity; it is a particular (creative) way of thinking about and of approaching activities. Many researchers (Bowman, 1987; Glynn & Webster, 1992; Boxionelos & Boxionelos, 1997, 1999; Guitard, *et al.*, 2005) identified that playfulness still exists in the adult world and this kind of creativity, curiosity, sense of humour, pleasure, and spontaneity can enhance their work. The features of play imply it will encourage people to use positive interpersonal behaviour, promote empathy, conflict resolution, and social and communication skills.

With playfulness, difficult situations are perceived as challenges, providing, occasions to learn, and possibilities to increase one's competence and skills. Furthermore, mistakes are no longer considered (serious) failure but rather a possibility to learn and to grow. In adulthood, playfulness crosses the boundaries

of play and extends to all life situations (Guitard, *et al.*, 2005).

These benefits of play foster this research to explore a new approach to knowledge management by applying the metaphor of play, as a way to engage and motivate employees, into knowledge based work practices. This research will explore and use metaphor theory with the intent to facilitate human interaction using, play and playfulness specifically, to extend the flow of knowledge practices and hence knowledge within the organisations.

Knowledge is often equated with power, to the extent where 'knowledge is power'. While various characteristics an organisation determine the value of knowledge within it, it is recognized that corporate knowledge is an important resource. Corporate knowledge can determine a company's distinct performance and when handled effectively enhance the firm's competitiveness. To achieve effective knowledge management, it is important to encourage workers to contribute their knowledge for the best interests of the firm.

The importance of knowledge sharing for collaborative work has already been established in past studies (Hendriks, 1999; Goodman & Darr, 1998). Renzl (2006) for example, highlighted that the ability to share knowledge between units as a significant contribution to the organizational performance of firms. The means by which knowledge is shared within organizations and the factors that facilitate knowledge sharing/transfer are core issues in knowledge management. However, knowledge sharing is a fragile process.

2. Objective

The main motivation of this research is not only to identify which factor/factors will drive the knowledge sharing, but also to investigate specifically how 'play' can be used to enhance the collaborative work. Research based upon the subjective views and opinions on playing

games are studied with a view to enhancing their collaboration work practices. This was achieved by studying the participant's experience of Go*Team collaboration. This online team version play based upon ancient Chinese strategy game of Go.

3. Research Design

In this research, Q Methodology and Activity Theory together function as appropriate techniques for conducting the research and interpreting the results. Q methodology was used to elicit the subjective views and ideas and then to allow and support the participants' in the process of clarifying their personal views. Activity Theory was used as framework to provide the work with an overarching context.

3.1 Activity Theory

Activity Theory is recognised as a powerful tool to investigate the 'artefacts in use'. The use of Activity Theory in this study provides a holistic and dynamic framework by informing the interpretation of results, in that it offers a language, to describe the less tangible outcomes of the research.

Activity Theory is a social-psychological theory that has its roots in the work of the Russian psychologist Vygotsky during the first half of the 20th century. Vygotsky saw human activity as quite distinct from that of non-human entities, in that it is mediated by tools, the most significant of which is language (Vygotsky 1978). Essentially, Vygotsky defined human activity as a dialectic relationship between subject and object, simply a person or group of people, working at something. He also proposed that all human activity is purposeful, that it is carried out through the use of tools and that it is essentially social. Vygotsky believed that tools play a mediating role in all human activities and mental processes.

To be able to analyse complex interactions and relationships, Engeström (1987) proposed a research framework with an activity system as the unit of analysis. This is represented in the triangle shown in **Figure 1** which has been widely used in social science research over the last two decades.

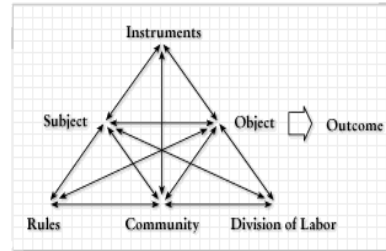


Figure 1: Engeström's collective activity system model

In the model above, the subject refers to the individual or sub-group whose agency is chosen as the point of view in the analysis. The object refers to the 'raw material' or 'problem space' at which the activity is directed and which is transformed into outcomes with the help of physical and symbolic, external and internal mediating instruments, including both tools and signs. The community comprises multiple individuals and/or sub-groups who share the same general object and who construct themselves as distinct from other communities. The division of labour refers to both the horizontal division of tasks between the members of the community and to the vertical division of power and status. Finally the rules refer to the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system (Engeström, 1987).

Applying Activity Theory in this research, as a theoretical framework, provides us with the opportunity to increase the understanding of why play, with its inherent playfulness, can enhance knowledge management practice and engage employees with knowledge management practices and hence to improve the collaborative work. Q methodology is employed as a discovery tool for this research to open up and dig into the objectives of the participants'.

3.2 Q-Methodology

Q Methodology was invented by William Stephenson in 1935. Q methodology use is important to this study as it supports the discovery of the *range of views* held on a specific topic of investigation, as opposed to most methods that offer one composite view. An advantage of Q Methodology is that it does not require a large population to produce meaningful results (Brown, 1986).

Q Methodology typically includes a Concourse, a Sorting Procedure, and Analysis of the results from the sort process.

- Concourse:
 - The participants are encouraged to produce as many statements as they can on a selected topic. So their thoughts are expressed as statements that fully express the range of their thoughts on the nature of the topic
- Sorting procedure
 - The participants are asked to sort the statements which they generated in the concourse stage in accordance with their degree of agreement or disagreement with the statements.
- Analyse
 - Once all participants have completed the individual sorting process, all Q sorts are statistically analysed to find correlations and identify Factors (stream of thought). The factor analysis is typically based on the choices made by participants, between the statements, and thus the process takes the individual's subjectivity into account.

In brief, by adopting Activity Theory as a holistic and dynamic framework in this study, it allows us to analyse the activity systems and their components and dynamic relations, such that we can increase our awareness of the knowledge management situation and allow us to explain the tangible outcomes of the research.

Q Methodology is shown to be useful as an action research methodology and as an investigative method. Q methodology is particularly effective in that it permits the systematic study of subjectivity. In addition, its use, can also contribute to activities of community building, open discussion, reflection, individual decision making and provide outcomes that can guide the development and use of knowledge building technologies.

4. Case Study

The Australia University used in this study is an international community that draws students from around Australia and from 70 other

countries. There are 9,114 international students out of 22,754 in total. The main campus is in Coastal community in regional, NSW, Australia.

This research involved the use of Q Methodology combined with Zing Technology. Australian University students' were invited to have a group discussion (Brainstorming) on their experience of what the key issues in the knowledge sharing and collaborative working are. Then they used Q Technique for the sorting of these thoughts

Following the sorting, students played GO using GO* Team. Unlike the traditional Go game which is played by two players, in Go*Team the opposing sides are comprised of two (or, possibly, more than two) teams of players rather than individuals. Individual players in a team have only a local view of the overall *Go*Team* 'world' in which they are embedded. This modification is used to introduce the problem of information sharing and integration into the game. Since each player has only a local and partial picture of what is going on, it is necessary that they share what they can see with the other members, in order to develop an integrated overall picture of the state of the board – and even if they can accurately achieve this in the time available. They will then have to decide not only what the best next move is, but who should make it. Thus the situation they are trying to grapple with is dynamic, since, unlike many other games, *Go*Team* does not have to be turn-based (*Go user guide*).

After the playing of game, students were asked to do a second sort in which used the same statements as first time. Based on these two sorts, this study is able to see whether the 'game' has impacted or not on participants' view of collaborative work practices.

5. Results

This project carried out with 86 participants who were studying a large undergraduate Commerce subject in their 1st year at University.

As participants in a Q methodology study, they took part in the concourse session first. This concourse session can be described as a 'brainstorming' session where the students in small groups, in this case, supported by an innovative group learning technology (ZING technology), were asked to supply their ideas on the topic: *Your view on how practices and*

procedures can support collaboration in team work?

In all this activity resulted in the generation of 41 statements which reflected the range of views that the participants held on how practices and procedures could support collaborative work. To help us understand the statements, and to later understand the results of the sorts, the statements were reviewed by the researchers and broken down into 6 categories (**Appendix 1**).

The next stage of the Q Methodology is the sorting session, which allows each participant's to represent their own view on the topic by making a decision in regard to the ranking of statements presented in the process of sorting (Brown, 1980).

In the sorting session of this study, the participants were asked to rank the 41 statements from the concourse session, based on their own opinion of the statements in relation to the instructions provided. In this case, participants were asked to sort statements in accordance with your degree of agreement or disagreement with the statements in respect to the topic '*Your view on how practices and procedures can support collaboration in team work?*'

The following diagram is the sample of a Q grid which is used to record participants' ranking of the statements.

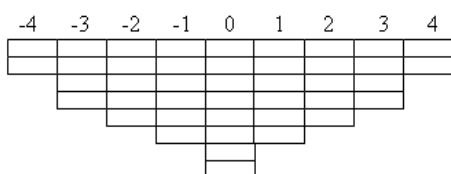


Figure 2: Q sort grid for ranking of the statements

There were 41 statements generated from concourse session, so they were provided with 41 places in Q sort grid, which means all of the statements will be sorted and recorded in the Q sample. Where +4 is high agreement and -4 is high disagreement and the scales between +4 and -4 reflect shades/levels of agreement. Therefore, each participant's view will be presented in this study. Students who joined this research did the sorting twice on the same topic, one was done prior to playing the Go* Team, one was done following their interaction in the game of GO* Team.

The last process in Q methodology is factor analyses, where the sorts are compared with each other, resulting in a number of Factors being developed. The factors reflect the grouping of participants in accordance with views held by them (Cottle & McKeown, 1980).

After the 1st sorting, 56 out of 86 sorts have been accounted for in 4 factors (**Appendix 2**). There were 3 consensus statements generated from these 4 factors in the 1st sorting. (**Appendix 3**)

There was 50 participants who played the game and did the sorting a 2nd time. In the analysis of the 2nd sorting there were 32 sorts accounted for in 3 factors (**Appendix 4**) and in the 2nd sort they generated 9 consensus statements for these 3 factors (**Appendix 5**).

This increase in the level of consensus occurred as the participants indicated more agreement on the importance of moral support and encouragement, and how it can be used to nourish collaborative work. However, they still tended to disagree on the material support, including, such as incentives, as lunch and food in support of doing the collaboration team work.

6. Outcome

The results of these two sorts showcase the subjective views of collaboration gained from the participants' from their experience of the Go* Team. This experience was structured to afford the students/participants the opportunity to experience the power of play in knowledge sharing and to experience how new technologies can be used to enhance knowledge management practices.

Before the playing of the game, participants held a wide range of views on how to carry out collaborative team work. After the play, participants increased their shared understanding of groups; even through the 3 factors still represent different views on the collaborative work. However, they increased their level of agreement indicating that *moral support* is very important in accomplishing team work, such as, motivation, helping each other and encouragement.

Regina, (2009) stated that it is hard to motivate employees at all, as people typically do what they want to do. However, he has proved that there is a strong relationship between happy employees and productivity. Regina also

claimed that one thing that employers can do is to create a 'motivating environment' is to explicitly include play/games in the workplace.

This research project while preliminary and exploratory should have applicability in a range of other business areas within University or any other organisations. The results of this study provide a way of applying the metaphor of play into the collaborative work to enhance the knowledge management practices.

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Appendix 1

41 Statements

| # | Statements | Category |
|----|-------------------|-------------------------|
| 1. | Trust | Community |
| 2. | Being open minded | Personal Characteristic |
| 3. | Supportive | Community |
| 4. | Confidence | Personal Characteristic |
| 5. | Focus | Community |
| 6. | Positive attitude | Personal Characteristic |

| # | Statements | Category |
|-----|------------------------------------|---------------------------|
| 22. | Knowledge of societal expectations | Personal Knowledge/Skills |
| 23. | Following rules and procedures | Governance |
| 24. | Lunch or food | Inducement |
| 25. | Positive feedback | Communication |
| 26. | Taking interest in others | Personal Knowledge/Skills |
| 27. | Collaboration | Communication |

| | | | | | |
|-----|--------------------------------|---------------------------|-----|-----------------------------------|---------------------------|
| 7. | Common goals | Community | 28. | Group hugs | Community |
| 8. | Sharing information | Communication | 29. | Supportive environment | Community |
| 9. | Useful feedback | Communication | 30. | Creating support networks | Community |
| 10. | Incentives | Inducement | 31. | Encouragement | Inducement |
| 11. | Emotional intelligence | Personal Knowledge/Skills | 32. | Enthusiasm | Personal Characteristic |
| 12. | Desire for rewards | Inducement | 33. | Good leadership | Governance |
| 13. | Cultural understanding | Personal Knowledge/Skills | 34. | Respect | Community |
| 14. | Helping each other | Community | 35. | Less expectations | Personal Characteristic |
| 15. | Listening skills | Communication | 36. | Empathy | Personal Characteristic |
| 16. | Motivation | Inducement | 37. | If technology is used effectively | Governance |
| 17. | Clear communication | Communication | 38. | Learning through different views | Personal Knowledge/Skills |
| 18. | Self esteem | Personal Characteristic | 39. | Positive relationship | Community |
| 19. | Understanding culture barriers | Personal Knowledge/Skills | 40. | Bringing opposites together | Personal Knowledge/Skills |
| 20. | Experience | Personal Knowledge/Skills | 41. | Utilising diverse capabilities | Governance |
| 21. | Negotiating skills | Communication | | | |

Appendix 2

56 sorts have been accounted for in 4 factors

Numbers of Confounded and Not Significant

| Factor | Number of Sorts | Sorts | Number of Sorts | Sorts |
|--------|-----------------|--|-----------------|--|
| 1 | 22 | 5,6,7,12,18,21,22,23,24,25,26,28,30,32,46,52,57,64,67,69,82,84 | 18 | 3,13,15,16,19,20,31,32,33,34,36,42,51,54,60,62,63,72,77,78,79,83 |
| 2 | 23 | 1,4,8,9,11,17,27,29,39,40,42,43,48,49,50,54,61,66,70,75,80,81,86 | 12 | 2,35,41,44,53,56,59,65,68,74,76,85 |
| 3 | 8 | 10,14,45,55,58,71,73,83 | | |
| 4 | 3 | 37,38,47 | | |

Appendix 3

3 consensus statements for the 1st sorting

| # | Statements | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Category |
|----|------------------------------------|----------|----------|----------|----------|---------------------------|
| 18 | Self esteem | -2 | -1 | -2 | -2 | Personal Characteristic |
| 22 | Knowledge of societal expectations | -3 | -2 | -2 | -2 | Personal Knowledge/Skills |
| 28 | Group hugs | -4 | -4 | -4 | -3 | Personal Knowledge/Skills |

Appendix 4

32 sorts have been accounted for in 3 factors

Numbers of Confounded and Not Significant

| Factor | Number of Sorts | Sorts | Number of Sorts | Sorts |
|--------|-----------------|---|-----------------|-------------------------------|
| 1 | 20 | 2,5,8,13,14,15,20,21,22,23,26,28,30,37,38,42,45,46,50 | 11 | 1,3,6,11,18,19,24,25,36,43,48 |
| 2 | 9 | 4,29,31,33,34,35,41,44,49 | 6 | 7,9,16,17,27,47 |
| 3 | 4 | 10,12,39,40 | | |

Appendix 5

| # | Statements | Factor 1 | Factor 2 | Factor 3 | Category | # | Statements | Factor 1 | Factor 2 | Factor 3 | Category |
|----|--------------------------------|----------|----------|----------|---------------------------|----|------------------------|----------|----------|----------|---------------------------|
| 16 | Motivation | 2 | 3 | 2 | Inducement | 5 | Focus | -1 | 0 | -1 | Community |
| 14 | Helping each other | 2 | 1 | 1 | Inducement | 13 | Cultural understanding | -2 | -1 | -1 | Personal Knowledge/Skills |
| 31 | Encouragement | 1 | 1 | 2 | Inducement | 10 | Incentives | -2 | -2 | -2 | Inducement |
| 19 | Understanding culture barriers | -1 | 0 | 0 | Personal Knowledge/Skills | 24 | Lunch or food | -4 | -3 | -3 | Inducement |
| 30 | Creating support networks | 0 | -1 | 0 | Community | | | | | | |