

Meta-Documentation: The Dissemination of the Tacit Knowledge Inherently Attached to Organisational Documents

Steven A. COOK ^{a*}, Hiroaki OGATA^b, & Mark G. ELWELL^c

^a*School of Knowledge Science, Japan Advanced Institute of Science and Technology, Japan*

^b*Department of Information Science and Intelligent Systems, Tokushima University, Japan*

^c*Hakusan International School, Japan*

*scook@jaist.ac.jp

Abstract: In this paper, we discuss the addition of technologically supported informal social networks for the exchange of previously implicit information attached to documentation within formal organisational frameworks. Focusing on the implementation of technologies to support this social interaction, we first look at why social networks are a topic discussed in recent times, then we put forward plans for a new system developed for this purpose.

Keywords: information technology, informal networks, ubiquitous computing

1. Introduction

The complexity and value of informal social networks is a topic that has been discussed and examined for many years in various disciplines such as social psychology, sociology, anthropology, and knowledge management (Radcliffe-Brown 1930/1940, Wasserman et al. 1994, Mullins 1973). Within organisational frameworks, research highlights the importance and consequences between both formal and informal actors and interactions (Gulati and Puranam 2009). However, understanding the complexity, and guiding the underlying processes in this context are said to be not thoroughly understood (Soda and Zaheer 2012).

Computational methods aimed at analysing and supporting the massive amounts of data generated within these social networks are increasingly becoming the mainstay of academicians and organisational administrations alike (Palonen 2000, Wasserman 1994, Cranmer 2011). More recently however, advances in technology are changing the way interactions themselves occur within social networks, thus leading academicians and practitioners striving to develop technologies to foster the creation of effective social networks.

Within the following sections of this paper, we present unique plans outlining the use of mobile devices and ubiquitous technology to not only facilitate informal social networks contained internally within a formal organisational setting, but in addition monitor the dynamic process relating to the creation of the informal social network itself. Using currently existing mobile and ubiquitous technologies, we look at the possibility of externalising the formerly tacit user knowledge attached to documentation distributed within an organisation.

2. Informal Social Networks within Formal Organisational Settings

Informal social networks have been referred to as a separate entity functioning in parallel with its formal counterpart, and interactions taking place within these informal networks are largely unseen (Smith-Doerr and Powell 2005). Benefits surrounding the technologically facilitated connection of these two networks is an area of research still in somewhat infancy. Being that informal social networks are in many ways invisible, and that connecting these networks to formal networks is seen as difficult by traditional methods, presents difficulties in how we as researchers monitor the process

and creation of these networks within formal organisational settings. Research demonstrates the importance of informal mechanisms within organisations as beneficial in terms of collaborative problem solving (De Cremer 2008, Maitlis 2005), however facilitating and understanding these informal networks is of course difficult. Casciaro and Lobo (2008) refer to specific benefits associated with informal social networks in organisational contexts, such as advice and friendship, but both of these not only imply a direct connection in time-based synchronisation, but in addition imply a connection of trust.

Social Network Services (SNS), or systems that facilitate the connection of users via online technologies, have been defined as a network of users who are typically connected offline (Boyd and Ellison 2007), however other studies expand on this by demonstrating that SNS is also used as a way for users to venture out and make contact with users outside their immediate circle of offline friends/acquaintances (Joinson 2008, Perotti 2011). Within formal organisational frameworks, of course informal social interactions already exists, and one could also assert that at least some of these interactions are conducted via the use of SNS. However, when looking at how SNS is used within formal organisational settings, it has been suggested that organisations underutilise the technology (Mullarkey 2012).

It is our assertion that it may be possible to bridge informal and formal social networks within the formal organisational structure using current technologies. By allowing users within the formal structure to comment, communicate, and share tacit knowledge surrounding the formal documents within an organisation, we believe that this interaction may provide a structural catalyst for further informal social interaction. Furthermore, the system may also provide valuable insight into what kind of individuals within the organisation are social by nature.

3. Meta-Documentation: Background and Function

As mentioned previously, we aim to use ubiquitous technologies to facilitate an informal social network aimed at sharing and disseminating the previously tacit knowledge attached to documents within a formal context. As we know, within any formal organisational setting, there is a plethora of documentation that must be utilised and distributed throughout any given day. These documents may pertain to simple orders that must be verified and accepted, proposals that need authorisation, or simply registrations of varying descriptions.

However, many types of documents have underlying procedural elements associated, extra information not clearly stated on them directly, or require revisions that are seen by certain users when dealing with these forms. In addition, members within the organisation may simply have questions pertaining the use of these documents, or even simple queries regarding the next step after completing certain procedures surrounding these documents. It is this underlying information and knowledge that is integral to the inner workings of any successful organisation, but unfortunately due to complex hierarchical structures, many of the issues and the knowledge associated, are communicated via informal interactions rather than typical formal procedures. We aim to have this knowledge disseminated and shared via our system, but just how can ubiquitous technology provide an adequate platform on which to help build effective channels of informal communication that can not only be monitored, but also be guided in the direction of choice?

When looking at recent advances in CSCL (Computer Supported Collaborative Learning), CSCW (Computer Supported Collaborative Work) systems (Ohara 2001, Paavola 2002, Stockwell 2007), and in addition, the advances being made in mobile and ubiquitous technologies for use in educational frameworks (Ogata 2004/2010), we assert that there may be many benefits to using these systems to foster and construct informal social networks surrounding the documentation within a formal setting, but what kind of system may work?

3.1. The System Outline, and How it Functions

Our proposed system is based upon mobile devices such as tablets or smartphones. These devices must have the ability to be online, read and analyse QR-Codes, and in addition be able to take photographs. Each document will have a QR-code printed on it that corresponds to stored

information within the system pertaining to the document in question. By accessing the QR code, a user will be presented with any additional information other users thought necessary to have with the document. In addition, other users will be able to share, comment, and add extra information to existing entries. The extra information and knowledge attached by others occur dynamically, meaning that as users have ideas they can simply externalise those ideas via the system instantly.

When users have certain knowledge and information that can be shared regarding a certain document, they would simply scan the QR code and then externalise this knowledge in either text form, with recorded video, or voice recording. This previously unshared tacit knowledge could be associated with procedural elements of the document that may have changed, errors associated with the document, or ideas for changing how the document functions within the organisational setting. Subsequently, all of this knowledge can be then shared, referenced, commented on, and added to, by other users of the system. This then forms an informal social network that is directly attached to the documents within a formal organisational setting.

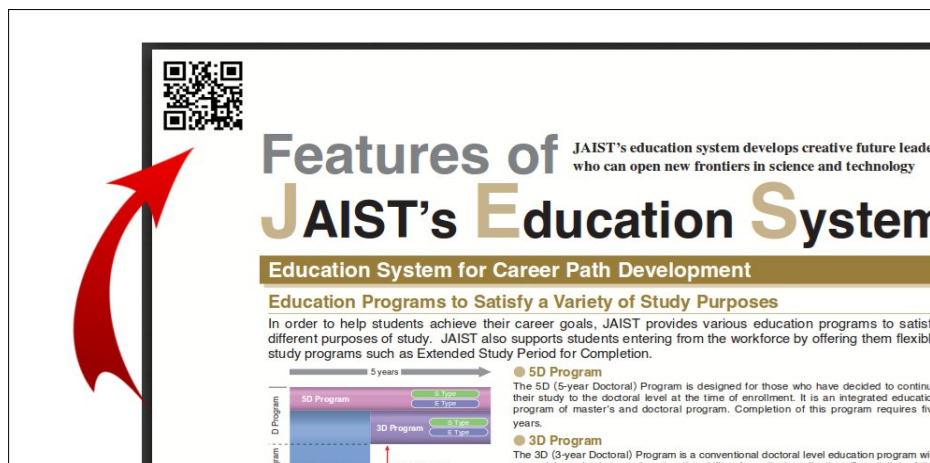


Figure 1. QR-code placement example.

3.1.1 In Practical Use – Hypothetical Sample Scenario Introduction

During the course of the day, an administrative employee will have to handle numerous documents pertaining to various in-house tasks and duties. As an employee becomes experienced with the internal procedures, tacit knowledge surrounding these practices increases in value. Hierarchical structure often dictates how this knowledge is shared amongst other personnel, thus leading to difficulties in knowledge exchange between staff with varying status in the organisation. Social networks tend to be the only way in which tacit knowledge regarding certain procedural elements of the organisation are shared amongst certain employees. Below we present a functional scenario in which our system facilitates this informal social interaction amongst users outside of the individuals own circle of acquaintances. We believe that this not only works to bridge the informal and formal networks within an organisation, but in addition allows experiential tacit knowledge to reach varying levels of administrative personnel.

3.1.2 Hypothetical Sample Scenario - The Issue

An employee finds a problem with a certain document being rendered obsolete. This is due to the creation of another document that is in direct functional contradiction. Based on prior knowledge, this particular employee understands the issue, and sees what she/he is doing as an inefficient practice. Very often hierarchy will dictate if this particular employee has the status to comment or advise her superiors of the perceived issue. If hierarchical structure is steep, and the employee does not have access to superiors, she will often turn to her informal social network to express the issue amongst her

peers within the organisation. We see this as a cumbersome and laborious way of sharing information that may ultimately have an impact on the function surrounding these particular documents.

3.1.3 Hypothetical Sample Scenario - Externalisation

Each document within the organisation has a QR-code printed on the top left-hand corner. These QR-codes represent a doorway to accessing the additional information kept server-side in what we call a meta-document. As stated above, an employee has an issue that pertains to a particular document. What he/she would simply do is scan the QR-code and then externalise any additional information or problems he/she might have surrounding the document in question.

3.1.4 Hypothetical Sample Scenario - Sharing

Once the employee has uploaded any issues or information surrounding the document in question, other employees can then access this information via two methods. The first surrounds other personnel simply scanning the same QR-code on the document. Scanning the QR-code will present the user of the system with any/all the externalisations of others pertaining to the particular document. The second way of accessing these externalisations comes in the form of using the web-based client. Using the web-based client allows a user to access any uploads regardless of individual document scanning. This presents the user with a complete overview of issues or information surrounding the internal documentation of the organisation.

3.2 Benefits

We assert that this system can facilitate the creation of an informal social network that may yield positive changes in the way we distribute information and knowledge, thus possibly impacting the formal areas of the organisation itself. By allowing users to connect and express concerns in an informal manner, yet have those externalisations remain contextually relevant to certain documentation within the formal organisation, we present a tool that could have far reaching applications and benefits in organisational settings.

4. Conclusion and Discussion

In this paper we have outlined a method that uses mobile devices and ubiquitous technology to not only create an informal social network, but also facilitate the externalisation of tacit knowledge pertaining to documents circulating within formal organisational settings. By discussing the benefits of informal social networks within organisations, and also a possible way with which to tap into the knowledge base of these informal networks, we have presented a method surrounding the use of ubiquitous technologies to facilitate the creation of an information social network to externalise tacit knowledge.

Acknowledgements

A very special thank you must go to Professor Hiroaki Ogata and his colleagues at the Department of Information Science and Intelligent Systems, Tokushima University, for their ongoing assistance.

References

Boyd D. M., and Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1), 210-230.

- Casciaro T, Lobo MS. 2008. When competence is irrelevant: the role of interpersonal affect in task-related ties. *Administrative Science Quarterly* 53: pp. 655–684.
- Cranmer, Skyler J. and Bruce A. Desmarais (2011). "Inferential Network Analysis with Exponential Random Graph Models." *Political Analysis*, 19(1): 66-86.
- De Cremer DD, van Knippenberg D, van Dijk E, van Leeuwen E. (2008). Cooperating if one's goals are collective-based: social identification effects in social dilemmas as function of goal transformation. *Journal of Applied Psychology* 38(6): pp. 1562–1579.
- Gulati R, Puranam P. 2009. Renewal through reorganization: the value of inconsistencies between formal and informal organization. *Organization Science* 20(2): 422–440.
- Joinson, A. N. (2008). Looking at, looking up or keeping up with people?: motives and use of facebook. In *Proceedings of the SIGCHI conference on Human Factors in Computing Systems* ACM. pp. 1027-1036
- Maitlis S. 2005. The social processes of organizational sensemaking. *Academy of Management Journal* 48(1): pp. 21–49.
- Mullins, Nicholas. Theories and Theory Groups in Contemporary American Sociology. New York: Harper and Row, 1973.
- Ogata H., Li M., Hou B., Uosaki N., El-bishouty M. M. and Yano Y. (2010) Ubiquitous Learning Log: What if we can log our ubiquitous learning? *Proceedings for the 18th International Conference on Computers in Education*.
- Ogata H. and Yano Y. (2004) Context-Aware Support for Computer-Supported Ubiquitous Learning. *Proceedings for WMTE*.
- O'Hara K., & Brown B. (2001). Designing CSCW technologies to support tacit knowledge sharing through conversation initiation.
- Paavola S., Lipponen L., & Hakkarainen K. (2002). Epistemological foundations for CSCL: A comparison of three models of innovative knowledge communities. In *Proceedings of the Conference on Computer Support for Collaborative Learning: Foundations for a CSCL Community* (pp. 24-32). International Society of the Learning Sciences.
- Palonen, Tuire, and Kai Hakkarainen. (2000) "Patterns of interaction in computer-supported learning: A social network analysis." *Fourth International Conference of the Learning Sciences*. 2000.
- Perotti, V., and Hair, N. (2011, January). User experience in online social networks: a qualitative analysis of key activities and associated features. In *System Sciences (HICSS), 2011 44th Hawaii International Conference on IEEE* pp. 1-10.
- Radcliffe-Brown, Alfred Reginald (1930) *The social organization of Australian tribes*. Sydney, Australia: University of Sydney Oceania monographs, No.1.
- Radcliffe-Brown, A.R. (1940). "On social structure". *Journal of the Royal Anthropological Institute*, 70, 1-12.
- Stockwell, G. (2007). Vocabulary on the move: Investigating an intelligent mobile phone-based vocabulary tutor. *Computer Assisted Language Learning*, 20(4), pp. 365-383.
- Soda, G. and Zaheer, A. (2012), A network perspective on organizational architecture: performance effects of the interplay of formal and informal organization. *Strat. Mgmt. J.*, 33: pp. 751–771
- Smith-Doerr L, Powell WW. (2005). Networks and economic life. In *The Handbook of Economic Sociology*, Smesler N, Swedberg R (eds). *Princeton University Press: Princeton, NJ*; pp. 379–402.
- Wasserman, Stanley; Faust, Katherine (1994). "Social Network Analysis in the Social and Behavioral Sciences". *Social Network Analysis: Methods and Applications*. Cambridge University Press. pp. 1–27
- Wasserman, Stanley; Faust, Katherine (1994). "Social Network Analysis in the Social and Behavioral Sciences". *Social Network Analysis: Methods and Applications*. Cambridge University Press. pp. 1–27