

# Measuring Knowledge Exchange

Naomi JACOBS

University of Lancaster

In this paper, the reasons for studying knowledge exchange in the context of design are discussed, including the benefits of knowledge exchange and the contributions that design can bring in improving its implementation. The paper explores why there appears to be a lack of rigorous comparative framework. If indicators were to exist, they would allow for examination of whether certain strategies for improving knowledge exchange processes are more effective than others.

A potential solution to this is proposed in the form of knowledge exchange proxies which can be developed to give an objective measurement of successful knowledge exchange, without requiring extensive longitudinal studies of each intervention which might otherwise be necessary. It is speculated that measures relating to use of language and shared mental models might function as these proxies, but it is also noted that significant further work in this area is required, and more effective proxies may emerge from this.

*Keywords: knowledge exchange, evaluation, comparative measures*

## Introduction

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Knowledge exchange has been significant a focus of research in the last decade, by policymakers, innovators and design researchers (Hall, 2001; Mitton et al, 2007; Abreu et al, 2008; Yusuf, 2008; Cruickshank et al, 2012 among others). Knowledge exchange has been defined as, 'the iterative cycle of sharing ideas, research results, expertise or skills between interested parties that enables the creation, transfer, adoption and exploitation of new knowledge in order to develop new products, processes or services and influence public policy (Lockett et al, 2008)

This is an extremely wide definition, since it does not place any restrictions on 'interested parties'. Indeed, Cruickshank, Whitham and Morris (2012) say that– 'every good meeting, creative conversation or even an interesting Twitter exchange is an example of good knowledge exchange'.

It could therefore be argued that these definitions encompass all collaborative research practices. However when KE is studied extensively, it is usually used in the context of exchange of knowledge between those who do not traditionally collaborate in this way, focusing on universities as creators of knowledge. Yusuf (2008) talks about universities as 'knowledge hubs' which can act as a channel for transmission of knowledge and lead to commercial innovation.

## Why design of KE is important

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If KE is an existing phenomenon and a description of a particular set of occurrences which already take place as a matter of course during interaction, why is it increasingly a focus of design research? Bringing together individuals or groups who do not traditionally exchange or share knowledge is thought to contribute significant value in terms of outputs. Interdisciplinary research has been shown to stimulate innovation and facilitate knowledge creation (Jacobs and Amos, 2012). 'Breakthrough' research is more likely to result from combining specialists and ideas from different areas (Carayol and Nguyen Thi, 2004). Alongside this, universities can provide businesses with access to a supply of knowledge previously unavailable (Yusuf, 2008), and thus contribute positively to national economies. For this reason, as Hagan (2008) notes: "Measuring the impact of the knowledge transfer/knowledge exchange process in universities and ultimately on users, i.e. business and the economy, has now become a preoccupation of governing and funding bodies, as well as the Commission policy-makers." Designers enter the picture because while knowledge exchange is clearly perceived to be of value, it is not something which always occurs naturally without facilitation. Abreu et al (2008) point out that "Knowledge exchange is not easy; it may be costly, difficult to implement and take a long time to succeed and these issues may be particularly difficult for small and medium-sized enterprises." Authors such as Mitton et al (2007) and Dobbins et al, have looked at barriers to knowledge

exchange, and possible ways to overcome these. In various fields from business to academia knowledge exchange, to interdisciplinary research collaboration, barriers have been identified, and there is clear correlation between the factors that have been listed by different authors as barriers.

Strategies to overcome these barriers are often reported as being successful by those who undertake them. Mitton et al (2007) do however note that (in the healthcare setting) there is little evidence to adequately inform what manner of strategies work in which contexts, and question the continued focus on KE if this is not provided.

While the area of knowledge exchange therefore has attracted significant focus, and many individual studies have been undertaken on the most effective setting for KE and methods to facilitate it (e.g. Cruickshank et al, 2010), there appears to be little rigorous investigation of methods for evaluation of KE success itself rather than outcomes it produces, and little comparative analysis of different interventions designed to improve the KE process. As discussed above, the impact of knowledge exchange is frequently evaluated, but the question not often asked is: How can we tell how much knowledge exchange has taken place?

## **Comparing knowledge exchange interventions**

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When design approaches are used to develop new KE tools, these are often holistic innovations rather than improvements on existing techniques. For example, several examples of novel tools for knowledge exchange are described by Cruickshank, Whitham and Morris (2012) such as 'fruit stickers' and the NETS toolkit. The development of these is grounded in theory, and evidence for their effectiveness has been described. Experts in design are able to study their interventions and provide detailed case studies of how this has facilitated knowledge exchange. Informal evaluation can also take place throughout the design process, for example the separation of good ideas from bad ideas (McDonald & Atwood, 2013). But, can the success of these interventions be measured relative to each other? In order for innovations to be utilised in further settings, it may be necessary or beneficial to identify or examine which aspects of a design are effective, and what are the critical factors in its success, in order to undertake an iterative process of improvement. It is a question not of individual researchers reinventing the wheel, but inventing many different subtly different wheels without questioning what all the more effective wheels have in common. In order for this comparison to happen, an objective measurement of successful knowledge exchange is required, which can be used to consider the effectiveness of many different interventions and set them within a framework of knowledge exchange processes.

This is an extremely challenging proposition. In order to develop such a measure, several questions must be considered. What is knowledge? What constitutes an exchange? What is success, in this context? It must also be considered that any knowledge exchange programme can be examined and understood from a number of different stakeholder perspectives and this can influence the evaluation criteria and methodologies (Hanberger and Schild, 2004).

It is challenging to quantify knowledge which has been transferred from one person to another. This is particularly the case in regards to tacit knowledge, which almost by definition may be intangible and not within the consciousness of the person possessing it (Tsoukas, 2005). Self-reporting may not be able to accurately capture knowledge gained by an individual from an interaction when they themselves are not explicitly aware how their knowledge base has increased or changed. This is therefore a fundamental challenge to interviews and other self-reporting methods of evaluation, particularly when these are administered directly after the knowledge exchange intervention. The extent of knowledge transfer and exchange which has taken place may not be evident to the individual until some time after the intervention, when the utility of the knowledge gained becomes apparent. For this reason, longitudinal studies which look at broad timescales are critical. These types of studies are not always possible in the context of knowledge exchange research, where new tools are developed based on individual context and requirements, and once the intervention has been perceived as successful there is little impetus or facility for continued study of the participants.

A suggested solution to this problem is to develop knowledge exchange proxies. These would be measurable changes (in behaviour of participants or other factors), shown to correlate with whether longer term knowledge exchange might be taking place and to what extent. If successful knowledge exchange is understood to be a fundamental change in the knowledge, both tacit and explicit, held by the participant, this should impact in a variety of ways on their behaviour and work during and

subsequent to the knowledge exchange interaction. What is proposed is that while the full extent of this may only be evident over time, indicators may exist which can be measured at a much earlier point which are highly correlated with the ultimate success of the knowledge exchange.

The identification and development of such indicator proxies will need significant future work, and it is suggested that they can only be confirmed by undertaking of at least one longitudinal study to identify which factors measurable immediately following an intervention correlate to long-term evidence of successful knowledge exchange. A meta-analysis of previous knowledge exchange evaluation outcomes may provide useful starting points for factors which might act as knowledge exchange proxies, and for the long-term outcomes.

One possible avenue for these proxies may be an examination of the use of language by participants in knowledge exchange. Previous studies have shown that language is a critical barrier to collaborative working, and that a shared lexicon develops as collaboration is undertaken (Fay et al. 2006, Amey & Brown, 2005). It may be hypothesised that this shared lexicon facilitates collaborative working because it allows knowledge exchange to take place more effectively. A possible avenue of further study in this area might be to undertake an analysis of the development of shared mental models and vocabulary by those undertaking knowledge exchange. A quantitative study or studies could be designed to examine the changes in language use among participants during a knowledge exchange intervention, while simultaneously evaluating long term knowledge exchange success using qualitative and quantitative methods. If the results show a positive correlation, language changes may provide a tool with which future interventions can be measured without having to wait for the long term outcomes.

It must be noted that this hypothesis is speculative, and it may be the case that this correlation does not exist or cannot be measured. Additionally, through the process of studying successful knowledge exchange interventions, more effective knowledge exchange proxies may emerge.

## Conclusion

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The challenge of improving and increasing KE activity has been the focus of design research in various contexts. However we must also consider the evaluation methods which are used when undertaking this research. Evaluation is a critical part of design, and improving it is critical. We should take cues from other fields of design research such as computer-human interaction, in which there is a drive to find more effective evaluation techniques (MacDonald & Atwood, 2013).

Ultimately, an experimental framework to test efficacy of different groups exchanging knowledge would benefit the study of this area and provide grounds for iterative improvements of particular tools and protocols. But for this to be developed, we must first identify methods of measuring knowledge exchange. This is challenging particularly when those undertaking knowledge exchange gain tacit knowledge which may not become evident from self-reporting mechanisms of evaluation. Development of proxies for knowledge exchange may present a potential solution, but developing these will be a significant undertaking. Some initial proposals for research in this area have been discussed above, but others may emerge as further focus is given to comparative measurement of KE.

Ultimately, although there is general agreement that knowledge exchange is both a driver of innovation and a producer of economic benefits, we must be vigilant in producing measures which are robust enough to enable specific rather than general improvements to policy and practice. Otherwise designers risk duplication of effort which could otherwise be avoided, and may themselves suffer from not being able to exchange knowledge because of a paucity of shared reference points. By undertaking research of this type, the discourse can be moved forward because a framework is provided by which researchers in the field can benchmark their work and build a shared grounding of research expertise.

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