Analysing Knowledge Brokering Activity on Social Media: An Exploratory Study

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Social media is changing health care interaction between individuals and health care community. Little research has been conducted on knowledge brokering activity that helps patients in their health care management. This paper presents an exploratory study which aims to examine a conceptual model to analyse knowledge brokering activity conducted on social media platform. Preliminary investigation based on a case study is used to illustrate the application of a conceptual model derived from a framework of seven building blocks of functionality and knowledge brokering functions. The case study result shows that the knowledge brokering function is of knowledge management in nature consisting of identity, conversation, sharing, relationships and reputation functionalities. The use of functionality framework serves as a basis to better understand how social media activities can be facilitated to achieve a higher level of knowledge brokering activity. Future research is proposed to analyse the proposed conceptual model in a larger scale in terms of sample size and to develop guidelines and strategies for effective deployment of knowledge brokering activities on the social media platform.

Keywords: Knowledge management, knowledge brokering, knowledge transfer, social media

INTRODUCTION

Since the progress of the Internet technology twenty five years ago, Internet access has driven information access and social media has also rapidly evolved as an online communal space for health information seeking [10] [14]. As the Internet plays a large role in today’s society, patients are becoming more aware and educated about health issues such as intervention options and available choices [16]. More patients are educated about evidence-based practice and are developing an attitude of inquiry by thinking about questions such as “Why do I need to do this way to improve my health?”; “Is there any evidence that can guide me to understand how this treatment will work in a more effective way?” [16]. Knowledge transfer from research into health care practice and policy making is a challenge around the world [2] [8] [37]. A typical obstacle to transferring knowledge into practice is the presence of a gap between research creators and knowledge users. It is suggested that knowledge brokers can be used to bridge this gap by facilitating knowledge exchange, building rapport with target audiences and assessing users’ knowledge and capacity for informed decision making. Current literature shows knowledge brokering is effective in supporting evidence-based practice in health care [6] [11] [13] [30]. However knowledge brokering activities have mainly focused on supporting clinicians and policy makers, and little research has been conducted in knowledge brokering activities that help patients in their health care management.

This paper aims to investigate a conceptual model to examine the role of social media in knowledge brokering. The research applies a framework of seven building blocks of functionality [18] to three knowledge brokering functions consisting of knowledge management, linkage and exchange, and capacity building [35]. The proposed conceptual model is applied to analyse the knowledge brokering roles undertaken by a not-for-profit organization in the domain of cerebral palsy. The rest of the paper is structured as follows. Section 2 presents literature review on knowledge transfer, knowledge brokering and social media use in health care. Section 3 describes a conceptual model for knowledge brokering in social media platform using a framework of seven building blocks of functionality proposed by Kietzmann et al. [18] and the knowledge brokering model proposed by Ward et al. [35]. Section 4 presents analysis of results based the conceptual model on a case study of not-for-profit organization in Australia. Finally conclusions and future research direction are presented in Section 5.

LITERATURE REVIEW

Knowledge Transfer and Knowledge Brokering

Knowledge transfer aims to translate research findings to practice and policy decisions [17]. The goal is to raise knowledge users’ awareness of research findings and to facilitate the use of these findings in evidence-based approach where various evidence sources are collated so that clinical decisions can be made to result in beneficial care for individual patients [15] [33]. Knowledge transfer can be described in four key themes: sharing, generating, applying and brokering [25]. In the theme of sharing, relevance, accessibility, format and methods are important aspects that required attention. In the subject of generating, knowledge exchange is important and can be achieved through collaboration, communication and dissemination. In the aspect of applying, the goal is to apply knowledge to achieve optimal application. Thus issues on how best to manage barriers and to support facilitation of knowledge application should be reviewed carefully to ensure knowledge can be applied to achieve optimal outcome. Finally in the theme of brokering, the objective is to ensure knowledge broker can facilitate linkage and exchange between different stakeholders to achieve sharing, creation and application of knowledge.

Traditional knowledge transfer model usually depicts a linear process of transferring knowledge from knowledge producers to knowledge users. However this linear process does not reflect the dynamic and continuity nature of knowledge. Thus a dynamic knowledge transfer capacity model consisting of four capacities is proposed: generative, disseminative, absorptive and adaptive-responsive [25]. The generative capacity focuses on knowledge discovery, whereas diffusion is the primary focus.
of the disseminative capacity in which knowledge is expected to be contextualized, shared and diffused to all stakeholders. The absorptive capacity refers to the ability to recognize the value of new knowledge and to apply the knowledge that can lead to new and improved practices. Finally the adaptive-responsive capacity focuses on continuous learning and renewal of knowledge. Graham et al. [15] proposed a model of knowledge-to-action process to describe the transfer of knowledge process. This model consists of two phases: knowledge creation and action cycle. An analogy of funnel is used to describe how knowledge is distilled, refined and synthesized in the knowledge creation phase to create three generations of knowledge. The first generation knowledge is knowledge inquiry in which unrefined, unsynthesized knowledge is collected. The second generation knowledge is the knowledge synthesis phase in which knowledge is produced using process of aggregation, synthesis and appraisal to produce relevant, quality and useful knowledge. The third generation is the knowledge tools and products. In this stage, decision aids, rules and best practices were organized and presented in clear and concise format to be used and consumed. The action cycle phase is an iterative process of knowledge implementation and application. It involves identifying problem that needs addressing, selecting appropriate knowledge relevant to the problem, adapting knowledge to local context, assessing barriers, promoting use and evaluating outcomes [15]. When this model is applied in the health care environment the ultimate outcome is to ensure evidence-based health care can find its way to clinical practice.

In each of the above models, knowledge brokering can be used as a strategy to facilitate knowledge transfer as a means of achieving evidence-based decision making in health care management. Knowledge brokers facilitate access to new information, resources and knowledge exchange by building rapport with target audiences, addressing barriers, coordinating with different stakeholders in the knowledge network, adapting and applying knowledge for evidenced-informed decision making [6] [13]. It is worth noting that knowledge brokering activity focuses on organizing the interactive process between knowledge producers and knowledge users [34]. Knowledge brokering is defined as “all the activity that links decision makers with researchers, facilitating their interaction so that they are able to better understand each other's goals and professional cultures, influence each other's work, forge new partnerships and promote the use of research-based evidence in decision-making.” [20] [28]. Jackson-Bowers et al. [17, p.1] described the role of knowledge broker as “the link between different entities or individuals that otherwise would not have a relationship”. Knowledge broker brings various stakeholders together, helps them to build relationships, discovers their needs and shares ideas and evidence that enable stakeholders to do their job better [26]. The common features of knowledge brokering can be described using the terms such as boundary spanner, bridge, broker, consultant, go-between, liaison, mediator, peripheral specialist and representative [21]. Examples of knowledge brokering activities can be found in different health care disciplines such as children's rehabilitation [6], senior health [11], cerebral palsy [12] [29] [30], health policy [34] and public health [13].

Oldham and McLean [24] proposed a three-framework model in which knowledge brokering activities can be applied. These frameworks are: knowledge system, transactional and social change. In the knowledge system framework, knowledge is created, diffused and used. The knowledge brokerage role in this framework is to know how to create, acquire, assimilate, use and diffuse knowledge. In the transactional framework, the focus is on the interface between knowledge creators and knowledge users to enable a transaction in the form of knowledge interchange to occur. In the social change framework, knowledge brokering is viewed from the users’ perspectives in which enhanced knowledge can lead to positive social outcomes. Extending from the Oldham and McLean [24] model, Ward et al. [35] described knowledge brokering functions as knowledge management, linkage and exchange, and capacity building. In the knowledge management model, knowledge broker navigates, manages and shares knowledge. In the linkage and exchange model, knowledge broker acts as an intermediary to develop positive relationships between knowledge creators, decision makers and users. In the capacity building model, knowledge broker focuses on developing self-reliance in decision makers and users to enhance knowledge sharing and dissemination.

Social Media Use in Health Care
Given the rapid changes in the communication technology landscape, social media has impacted on health communications and changing the way patients communicate with each other [9] [14] [36]. Coiera [10, p.1] defined social media as “a diverse and rapidly evolving cluster of technologies that create online communal spaces where groups of people can interact, discuss, coordinate or coproduce”. There are a growing number of social network sites that enables sharing and receiving health information from friends within the online social networks [19]. Examples of social networking sites that connect patients include PatientsLikeMe (www.patientslikeme.com) and Livewire (www.livewire.org.au). PatientsLikeMe is an online community space to enable patients to share their personal health experience with other patients with similar conditions to gain social support and for patients to share and learn more about outcome-based health research and Livewire is an Australian-based online community that enable young patients with serious illness, chronic condition or disability and their families to connect and share experiences and to support each other.

Kietzmann et al. [18] proposed a honeycomb framework consisting of seven building blocks of functionality to examine different levels of social media functionality in terms of user experience. Figure 1 shows the honeycomb framework consisting of seven building blocks of functionality: identity (I), conversation (C), sharing (S), presence (P), relationships (R), reputation (Rp) and groups (G). In this model, identity represents the extent to which users reveal their identities in a social media setting; conversation represents the extent to which users communicate with each other in the social media setting; sharing indicates...
the extent to which users exchange, distribute and receive content. The fourth building block, \textit{presence}, represents the extent to which users know if other users are available; \textit{relationships} represents the extent to which users relate to each other; \textit{reputation} refers to the extent to which users know the social standing of others, and \textit{groups} functionality is the extent to which users form communities [18].

![Figure 1: The honeycomb framework of seven building blocks of functionality [18]](image)

The implications of the seven building blocks of functionality can be described as follows [18]. The \textit{identity} functionality implies the importance of the ability to control privacy and user profile and the needs to strike a balance between sharing and revealing identity and to address privacy concerns in the social media environment. The implication of the \textit{conversation} functionality denotes the need to monitor conversations in the social media platform. It is also explained that the conversation functionality should not focus only on conversation frequency it should also centres on whether the conversation will result in positive or negative influence or impact. The implication of the \textit{sharing} functionality is to have a mechanism to facilitate a sharing network. In this functionality it is imperative to evaluate what types of entities or objects should be used to mediate the shared interests; for instance whether videos or textual information should be used to facilitate sharing. In this regard, content management system can be used as a tool to support this functionality. The implication of \textit{presence} functionality infers perception of requirement to create and manage reality, intimacy and immediacy of the content. This will require tools that enable availability and visibility presence of users to be controlled. The issue of trust has an impact on the \textit{reputation} functionality. This functionality is an important criterion to address quality and reliability issues, which is often expressed as credibility concerns in social media. The \textit{group} functionality has implication on membership rules and protocols such as whether open or close membership should be advocated. Among the seven building blocks of functionality, some of them are interrelated. For instance, \textit{the presence} functionality can influence the \textit{conversation} and \textit{relationships} functionalities and the \textit{conversation} functionality in turn can be influenced by the \textit{group} and \textit{identity} functionalities.

**THE CONCEPTUAL MODEL**

This research analyses the three knowledge brokering functions consisting of knowledge management, linkage and exchange and capacity building using the honeycomb framework of seven building blocks of functionality put forward by Kietzmann et al. [18].

The first function of knowledge brokering is \textit{knowledge management}, which is based on knowledge management processes to generate, capture, codify and transfer knowledge. The role of knowledge broker in this model necessitates the skills of navigation, management and dissemination of knowledge. To ensure successful knowledge dissemination, the knowledge broker needs to translate research into a form that can be understood by users. As the knowledge users in this study are patients and their family, thus issues of language and cultural barriers between researchers and patients also need to be addressed by ensuring information is comprehensible, relevant and usable to users [31]. Thus in the \textit{knowledge management} model, codification of knowledge in the form that can be delivered as knowledge products to help patients to gain and understand the requisite information effectively is important. The following building blocks of functionalities should be considered: \textit{identity}, \textit{sharing}, \textit{presence}, \textit{relationships}, \textit{reputation} and \textit{groups} [18]. The \textit{identity} functionality represents the extent to which users reveal their identities. In the case of knowledge brokering, it is important to know who the target users are and the source of research evidence in order to facilitate uptake of the knowledge transfer. In term of the \textit{sharing} functionality, we need to consider what mechanism or tool as well as what types of objects should be used to facilitate the sharing. The \textit{sharing} functionality is critical in this model as it enables condensation and crystallisation of information to be presented in a particular form of knowledge to ensure successful knowledge transfer. The \textit{relationship} functionality represents the extent to which users are related to other users. This way appropriate information needs of different users should be identified. Knowing the relationship also helps to identify the type of information to share as information that is required by a patient is different from that required by a family member. The \textit{relationship} functionality will influence the \textit{group} functionality as groups can be formed based on common needs and how information is to be disseminated can influence the objects of sharing. The \textit{group} functionality can also influence relationships in which relations may be established through invitations and group participation.
The reputation functionality enables judgement to be made based on establishing trust by identifying sources of knowledge. This building block of functionality enables factors relating to credibility, generalisability, reliability and objectivity to be determined to ensure robustness of evidence-based resources [31].

The second function of knowledge brokering is linkage and exchange in which the knowledge broker acts as an intermediary to develop positive relationships between knowledge creators and knowledge users [35]. There are two aspects in this model: linkage and exchange. The model may place more emphasis on the linkage aspect and a lesser extent on the exchange angle. In this regard, the knowledge brokering activity involves establishing linkage through some form of matchmaking services [31]. For example a knowledge broker may help to bring a knowledge creator to a knowledge user. On the other hand, if the knowledge brokering activity includes both linkage and exchange components, the focus should be on developing positive relationships between research creators and knowledge users. This can be achieved either by establishing one-to-one or collaborative relationships through networking and partnerships. Thus the main aim of knowledge brokering in the linkage and exchange model is to facilitate communication between different stakeholders and breaking down barriers between researchers and users. The knowledge brokers in this model use their communication skills and interpersonal contacts to increase the success of knowledge transfer and exchange. Careful examination of relationship, presence, identity and group functionalities is critical if the emphasis is on the linkage component. If this model involves the process of linkage and exchange then all seven building blocks of functionality should be considered carefully. In particular the conversation functionality can contribute to the way exchange can take place between knowledge creators and knowledge users. In this model, it is also desirable if user pull model be used to guide the linkage and exchange. In the user pull model, knowledge brokering is based on using networks and communities of practice to facilitate knowledge transfer and exchange [17].

Finally the third knowledge brokering function is capacity building, in which the knowledge broker focuses on developing self-reliance in knowledge users to enhance knowledge sharing and dissemination [35]. In this model, knowledge broker attempts to address shortcomings in the ability of users to interpret and use research evidence. In this case the knowledge broker facilitates the capacity for evidence-informed decision making by ensuring knowledge users are able to build capacity to access and apply knowledge. The role undertaken by knowledge brokers in this model can be described as translators and processors [31]. Thus there is a need to develop capacity through constant interactions and negotiations to enable learning and adaptation to arise between knowledge creators and knowledge users. A simulated learning environment and promotion of beliefs and values of patients can also help to develop capacity in knowledge acquisition process. Engagement and participation of user community in research projects can be an effective mean to engage users. In this regard, identity, conversation, sharing, relationships, reputation and group building blocks should be examined carefully. In particular the sharing and conversation building blocks of functionality can facilitate learning and capacity building. This is specially the case in deciding the most appropriate form of knowledge to aid in learning and knowledge acquisition. In addition the ability to recontextualize knowledge in the process of knowledge codification is important too. Finally capacity building also includes sharing cultural beliefs, norms and values of potential knowledge users [22] [31].

CASE STUDY

Research Aim

This research aims to investigate the knowledge brokering activity undertaken by a not-for profit organization in Australia using the proposed conceptual model described in the previous section. This research uses the case study approach to explore how the organization uses social media platform to aid in knowledge brokering activity. The study is exploratory and descriptive to understand the knowledge brokering activity conducted via the social media platform.

Background

Cerebral palsy (CP) is a permanent physical disability caused by damage to the brain in a baby or infant due to non-progressive interference in the developing brain [4]. It is the most common childhood disability with prevalence of 2.0 to 2.5 incidences per 1,000 live births [3]. The most common type of CP is spastic CP, affecting 70–80% of people with CP [1]. The severity of disability associated with CP is highly variable, depending on which limbs are affected and the type of impairment. Abnormal muscle control or spasticity (increased muscle tone) is the most common impairment. Often there are other impairments associated with CP such as epilepsy, speech, visual, hearing and intellectual disabilities. Caring for a child with CP affects all facets of parents’ lives. The World Health Organization recommends the use of evidence-based approach for assessing children with CP and the families are to be supported with practical assistance and evidence-based information to help parents and caregivers to gain knowledge about CP and to enable them in making informed decision that can help to improve quality of life for their child [32]. In this regards, parents and caregivers of children with CP should be educated with evidence-based knowledge to show how a prescribed treatment plan will help their child [23]. In fact research has shown that parents of children with CP want to be educated to understand effectiveness of individual interventions [23]. Thus close engagement between evidence providers (clinicians) and users (parents) should be encouraged.

The CP organization investigated in this research is the Cerebral Palsy Alliance (CPA), a not-for-profit organization that provides family-centred therapies, life skills programs, equipment and support for people living with CP and their families in Australia [7]. It represents the interests of people with CP and their families and undertakes the knowledge brokering role to act as a bridge between the research community and the CP patients and their families. Successful knowledge transfer, exchange and
brokering activities among researchers, practitioners and policy makers have been reported in the CP literature [12] [27]. However there is little research on issues relating to knowledge transfer of evidence-based knowledge that involve patients and their families. In particular when patients are children and the decision needs to be made by parents, which is commonly the case for children with CP.

**Method**

The CPA website has links to social media platform that include Facebook, YouTube, Twitter, LinkedIn, Instagram and Google+. The content posted in the Facebook pages and Twitter messages of the CPA between the periods January to June 2014 is visually examined by the author.

**Result**

During the period of investigation, there were 78 Facebook posts and 155 Twitter messages. The content of YouTube, LinkedIn, Instagram and Google+ was not examined in this study. The Facebook posts and Twitter messages are categorised into four groups: workshops/events announcements, news, donations/appeals and CP knowledge. Among the Facebook posts it was found that 36%, 48%, 12% and 4% of the posts were related to workshops/events announcements, news, donations/appeals and CP knowledge respectively. In the case of Twitter messages, 96% of the messages can be categorised as news and 4% of the messages were related to workshops/events announcements. Content analysis of the Facebook posts for the workshop/event announcements category included information session for school leavers (June 17), drop-in clinic during the school holidays (June 15), National Disability Insurance Scheme funding session (June 5) and new therapy programme (May 12). There were also messages related to knowledge transfer on CP knowledge such as announcement of a question and answer (Q&A) workshop session on CP knowledge (June 23) and invitation to participate in research study (May 27). Among the Twitter messages, it can be observed that the vast majority (96%) of the messages were related to news. There were limited number of messages on events announcement related to CP tools and aids such as the “leap motion” device (May 21) and the new controller device (June 10) suitable for children with CP. Among the Tweeter messages, it can be observed that messages that were tweeted were mainly related to programs conducted by the CPA, such as the Ignition Mentoring program (April 25), volunteer program (April 17) and Siblings Day (April 15). The announcement messages also included re-tweeting of CP-related research outcomes (April 23).

In addition the CPA website content was also visually inspected to gain a better understanding on the knowledge brokering role undertaken by the CPA. There are resources related to CP information in the website that explain what CP is, causes, signs, symptoms, treatments and information related to improving quality of life of patients with CP such as communication and language development and assistive technology. These resources are presented as textual information on the CPA website as well as YouTube videos. There is also a link on the CPA website to blogs written by people with CP and employees of the CPA.

**Discussions**

From the case analysis, it can be concluded that there are some knowledge brokering activities undertaken by the CPA using the social media platform. However it is observed that the CPA website is still the main source of CP resources and the use of website for knowledge transfer and dissemination can be described as the producer push model [17]. In the producer push model, the knowledge transfer strategy focuses on credibility and trust with the use of opinion leader and experts. In this case study the reputation of the CPA as one of the leading CP agencies in Australia enforces this strategy.

The knowledge brokering role undertaken by the CPA is of knowledge management function. The role of CPA as a knowledge broker helps patients and their families to navigate, manage and share knowledge in all knowledge and information related to CP. The knowledge is synthesised and codified to present in a form that is comprehensible and easy to use format. It can be construed that the role of social media platform focuses on communication with the aim to maximise the reach. The majority of the messages in the social media are related to news, indicating the role of social media is focusing on social interaction, information dissemination and broadcasting. It provides an opportunity to spread information such as events, workshops and announcements quickly. It is also used to mobilize people, such as appeal, donation and research participation, very quickly [5]. User experience is also shared through news posted on Facebook, Twitter and blogs space in the CPA website. This is consistent with the use of blogs space to create relationships among users to engage and share common interests and concerns.

The analysis of the case also indicates the following building blocks of functionality are practiced by the CPA: identity, conversation, sharing, relationships and reputation. The identity and reputation functionalities enable the source of knowledge and users be disclosed, thus enhancing the trust and credibility concerns of knowledge. The conversation and relationship functionalities enable different users to communicate, thus facilitating engagement, exchange and interaction. The sharing functionality determines the objects to be shared and the best way to share these objects. In the case of the CPA, it is found that YouTube videos and textual information are used as objects of sharing. At this stage there is no evidence to show that presence and group building blocks are being practised.

It is recommended that a content analyst be engaged to assist knowledge broker in the knowledge brokering activity. Responsibilities of the content analyst would include gathering information that meets the requirements of quality criteria, researching evidence-based information that meets knowledge users’ needs and coordinating with knowledge broker to ensure
CONCLUSIONS AND FUTURE RESEARCH

Ubiquitous access to the Internet and proliferation of social media use has changed the way health care information and knowledge are transferred and disseminated. This study examines the knowledge brokering functions using a framework of seven building blocks of functionality on social media platform. The conceptual model is applied to the domain of CP by investigating the role of a CP organization functioning as a knowledge broker to transfer CP knowledge to patients with CP. The seven building blocks of functionality framework serves as a basis to better understand how social media platform can be used to facilitate knowledge brokering activity. Result from the case study shows that the CP organization is effective in using social media platform to transfer knowledge to knowledge users. The knowledge brokering model practise by the CP organization can be described as knowledge management function and the functionalities of identity, conversation, sharing, relationships and reputation have been identified.

This study has its limitation as only a specific health domain has been investigated based on one organization in Australia. Future research is proposed to analyse the proposed conceptual model in a larger scale in terms of sample size and to develop guidelines and strategies for effective deployment of knowledge brokering activities on the social media platform.

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