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Teleconsultation: An Insight from the Knowledge Management Perspectives

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Abstract:
The fact that knowledge is being recognized to be the intangible assets that can be leveraged on by organizations, the use of Knowledge Management Systems (KMS) has become one of the major investments organizations are making today. One type of KMS that mirrors the main business process of medical practitioners is teleconsultation, a system that supports remote consultation between doctors to patients as well as doctors to doctors. Two well-known KM models are used in this study to establish that teleconsultation is indeed a category of KMS based on the knowledge acquisition, development and sharing activities that are evident in the teleconsultation process. In confirming this fact, future studies on teleconsultation can be conducted with KMS in mind. Upcoming research on teleconsultation can refer or be based on the many KMS models and frameworks available knowing that teleconsultation is indeed KMS.

Keywords: *Knowledge Management, Teleconsultation, Health Care Services, KMS models*

1. Introduction

Information have long since been acknowledged as a commodity in organizations. Lim et al. (199) viewed knowledge as a competitive instrument that needs to be manage well by organization. With the advancement of technology in managing information for the good of the business, the term knowledge management has gone hand in hand with the use of Information Technology. Today, organizations are going big on IT enabled knowledge management systems (KMS). Different industries have invested on different types of KMS to manage the information and knowledge needs of the business.

The healthcare organization uses information for two main purposes. Like any other businesses, the day to day business processes need to be captured and its information needs to be processed and made available to better manage the arising operational or strategic requirement such as the number of patients at one given time, the projection of medical practitioners in the upcoming years, equipment inventory and many more.

Another important use of knowledge in healthcare lies within the activities between the main players, namely the medical practitioners. Dealing with the job that require enormous reference to knowledge has called for the use of KMS among medical practitioners (Lim et al., 1999, Nicolini et al., 2007). Among KMS technologies implemented at healthcare organizations are telemedicine for elderly patients between geriatrics hospital and specialists (Esterle et al., 2013), private online health care service for staff and family of an oil and gas company in Iran (Hojabri et al., 2012), KMS for nurses (Hsia et al., 2006) and tele medical assistance for emergency medical service (Skorning et al., 2012).

One of the most emerging telemedicine application is teleconsultation. (Maarop et al., 2012, Zanaboni et al., 2009). This study looks into establishing the existence of relationship between medical consultation and knowledge management which can lead to confirm that teleconsultation is indeed a category of KMS. This is largely due to the extensive occurrence of knowledge sharing and knowledge creation activities that take place in the process. Though there are two types of health care consultation in healthcare organizations; between doctors to doctors and between doctors to patients, this study concentrates on the former type for it provides the most prominent platform for knowledge sharing and knowledge creation activities in healthcare organizations. Saliba et al.'s (2012) systematic review on telemedicine shows that out of 94 samples discussed, a majority of 87 had been found to focus on activities between doctors to doctors. This have suggested that more substantial knowledge management practices and activities are evident in the telemedicine activities between doctors to doctors.

2. Teleconsultation

Medical practitioners provide medical consultation to their patients. The process involve the doctors to diagnose the conditions of the patients and to come up with the prognosis. In a traditional setup, this process will take place via face to face, and often will involve palpable inspection. Developing familiarity on patients' medical conditions and treatments makes a common business process for medical practitioners in healthcare organizations.

The nature of the medical practitioners' jobs requires them to put into practice the knowledge they have acquired at the medical school and continue to be acquired while they are on the job. During consultation, medical practitioners seek information from the patients and may also refer to the other medical practitioners before making a deduction of what had been learnt about the patients' condition in order to support their next stage of action.

There is a big chance that every day, new knowledge and skills are developed by the medical practitioners as they are presented with different types of patients and different types of medical conditions. From organizational perspective this knowledge is a commodity and it is in the interest of the organization that it remains in the organization for future use. In healthcare services, this tknowledge, if managed and stored well can come in handy in improving the quality of the healthcare service, where diagnosis and treatment can be delivered in a shorter time with better accuracy.

With the advancement of technology, healthcare organizations have moved a step forward through leveraging on the Wide Area Network, allowing for remote medical consultation or better known as teleconsultation. This development has been proven to be an added value to the quality of health care services worldwide. Literatures have acknowledged the benefits teleconsultation has brought over health care practices. (Ali et al., 2009, Chapman et al., 2010, Bertani et al., 2012, Esterle et al., 2013, Ramli et al., 2014). Patients who live very far from health care facilities are able to receive medical attention without having to make the long trip to the clinics or hospitals as discussed in Esterle's (2013) studies on the use of teleconsultation in geriatric care. Waterman et al. (2014) has established in his studies that teleconsultation in warzone has helped to avoid unnecessary medical evacuation and bringing down the rate of fatality.

The benefits do not stop only at providing a better healthcare service to patients. Health care organizations have also recognized teleconsultation strengths at supporting knowledge and skill development among medical practitioners. (Chapman et al., 2014, Esterle et al., 2013). The common practice for consultation under this setup, will usually involve the more experienced and skilled medical practitioners providing remote assessment to medical cases presented by the more junior and less skilled practitioners.

3. Teleconsultation from Knowledge Management Perspectives

There have been many KM definitions from different scholars. Wiig (1993) described Knowledge Management to be about creating benefits from knowledge by understanding how it is created, acquired, processed, distributed, used, harnessed, and controlled. Knowledge Management involves organizational activities of acquiring, developing, sharing, and effectively using knowledge which leads to value creation for the organization. (Alavi et al., 2005). Birkinshaw (2001) identifies three elements that make up Knowledge Management, the first being the interaction between members of organization in seeking and developing knowledge, the second is recording the knowledge in some form of repository so that it can be shared with others in the organization and the third one is seeking knowledge from outside the organization. Maarop et al. (2011) and Zanaboni et al. (2009) have referred to teleconsultation as KMS. In principle, Knowledge Management involves seeking and creating knowledge and later on sharing it for the benefits of the organization.

In order to validate that there is indeed association between teleconsultation and knowledge management, this study will look at teleconsultation activities from the perspectives of two models frequently used by literatures in discussing KMS; they are the SECI model by Nonaka and Takeuchi (1996) and Knowledge Management Cycle Model by Wiig (1993). Nonaka and Takeuchi's SECI model is chosen for it being the one of the prevalent models being referred to in many literatures discussing KM (Sian et al., 2013, Jelavic et al., 2010), even Gourlay (2003) in criticizing the SECI model, still acknowledged the fact that the model is "the most widely cited theory in KM". Wiig's Knowledge Management Cycle Model is chosen for the reason that it consists of four easy to relate knowledge handling activities which can be commonly experienced in any type of business operation.

4. Discussing Teleconsultation Based on Nonaka and Takeuchi's SECI Model

Nonaka and Takeuchi's SECI discusses four modes of knowledge conversion as shown in Figure 1

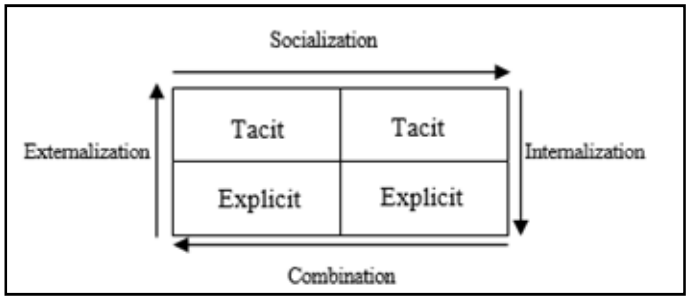

Figure 1: Nonaka and Takeuchi's SECI Model (1996)

The following demonstrates a mapping of activities in teleconsultation to the SECI model of knowledge conversion by Nonaka and Tekuchi (1996) as illustrated in Figure 1, where the transfer and development of knowledge is discussed from the perspectives of each quadrant in the model.

Through socialization, the knowledge being conveyed is in a form of tacit and at the recipient end this knowledge is to be developed also in a similar form. Via teleconsultation, medical practitioners exchange technical expertise, views and experiences online. Examples are through email, online discussion forum or telephone. Often it is rather challenging for the recipient to process, retain and utilize the knowledge being conveyed as it requires time to contemplate and understand what is being shared (Nonaka, 1996). This way of knowledge sharing and development may also lead to problems such as uncertain ownership and liability of diagnosis as well as the feeling of intimidation between the two parties involved in teleconsultation. (Saliba et al., 2012). Esterle et al. (2013) highlighted while teleconsultation promotes alliances between medical practitioners, there is a need for "humility" on the part of the medical practitioners seeking consultation as by seeking advice, they may give out an idea that they are not capable of taking care of their patients. In some cases, as established by Bertani et al. (2012), doctors will have to deal with differences in opinion. Largely in such a discussion the type of knowledge being exchanged will be tacit.

Through internalization, experienced based knowledge is to be transferred into a form of document that can be explicitly referred to for new knowledge development. Nonaka et al. (1996) have identified this process to be particularly challenging albeit important. Looking from teleconsultation viewpoints the knowledge sharing and development activities will require a medical practitioner at the receiving end to record and transformed the tacit knowledge from the consultant into a form which can be easily referred to. This process is exactly the same with those happen in the socialization quadrant with an added action of transforming the knowledge into a tangible material which can be explicitly used as a reference. The United States Military Orthopaedic Teleconsultation systems is already practicing this where a programme manager is assigned as part of the resources to compile transmitted data during consultation for future use. (Waterman et al., 2014) In France, a teleconsultation system for geriatric care has included in its procedure a requirement for report-writing by the medical practitioners involved to be included in electronic medical records. (Esterle et al., 2013)

Through combination where explicit knowledge is shared and developed, the consultation can be conducted based on a report, an x ray image or other documented material which can be studied and responded to between the parties involved during teleconsultation using communication technology such as email or in-house teleconsultation system. Paul (2006) described this type of knowledge exchange through a system called teleradiology where still radiographic images were sent to radiologist for consultation. The radiologist will be in touch with the medical practitioners through email or telephone to further discuss the patient's condition and provide the diagnosis. In a Sri Lanka's hospital, a teleconsultation pilot project where medical history and current health report of patients are uploaded into the teleconsultation system to be reviewed by the secondary healthcare provider (Chapman et al., 2010)

Through externalization, it is expected that the medical practitioners will develop knowledge and experience by referring to the documented material provided during the teleconsultation process. Primary health care provider seeking consultation (Esterle et al., 2013, Waterman et al., 2014)

5. Discussing teleconsultation based on Wiig's Knowledge Management Cycle Model

Wiig [15] describes knowledge management cycle in four steps as illustrated in Figure 2.

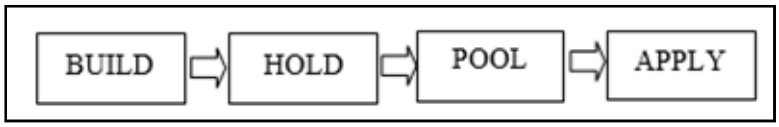

Figure 2: Wiig's Knowledge Management Cycle Model (1993)

The first step identified in the knowledge management cycle is building the knowledge. In teleconsultation, medical practitioners initiate knowledge acquisition through referring to the more senior and skilled practitioner. This is especially true in the event where patients are being treated in a remote community clinic by a general practitioner who may need to seek advice from the specialist stationed at the city hospital. (Esterle et al., 2013, Van der Meer et al., 2013)

The next step following knowledge acquisition is holding the knowledge in a more tangible form by recording it in a repository (Evans et al., 2014) An example is the teleconsultation initiative by the Malaysia's Ministry of Health, where the infrastructure for the project had been designed to include resources in a form of computing facilities to hold and disseminate knowledge between participating health care organizations (Van der Meer et al., 2013)

The next step in the cycle is pool where knowledge is being accumulated in a system that is designed to allow for knowledge coordination such as discussion and brainstorming (Kayani et al., 2012) expertise locator system and knowledge based system (Evans et al., 2014). This is evident in most teleconsultation activities where participants among the medical practitioners actively share and develop their knowledge using a dedicated KMS with functions developed in supporting the knowledge acquisition, sharing and development activities. (Chapman et al., 2010, Van der Meer et al., 2013).

The final step is when knowledge is applied to assist with the decision making and to generate beneficial outcomes. (Evans et al., 2014). From teleconsultation perspectives, through consulting the more experienced and skilled practitioners, the primary health care personnel may then make used of the knowledge being acquired to provide a better health care service to his/her patients. The patients would also enjoy the benefits of not having to make the long trip to the hospitals to see the specialist as the primary health care practitioners have now been empowered with new knowledge to offer better care (Esterle et al., 2013, Van der Meer et al., 2013)

6. Conclusion

In observing what took place in various teleconsultation initiatives from the perspectives of two prominent KMS models, it is evident that most of the common practices and elements in knowledge management are exhibited in teleconsultation activities. Nonaka and Takeuchi (1996) model clearly demonstrated how knowledge can be developed and transformed into an asset that can help with the decision making among the medical practitioner whereas the components of Knowledge Management Cycle by Wiig (1993) relate well with all the teleconsultation activities being investigated. By confirming that teleconsultation is indeed a category of KMS, further studies to determine directions and strategy for teleconsultation implementation in the landscape of health care services can be conducted with KMS scenario or frameworks in mind.

7. References

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