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# Exploring Processes that are Used for Managing Knowledge in the Higher Education Environment: A Case Study in a Queensland Regional University

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**Abstract:** This paper aims to investigate generated themes related to knowledge management processes in the Australian higher education sector as there are practical advantages for universities that are concentrated on improving knowledge. Knowledge is a primary source of competitive advantage for educational institutions. Moreover, knowledge participates in increased rankings and profits of higher education institutions. The university's ranking is aligned with their skilled employees as manipulations of knowledge which contribute significantly to universitys performance by attracting new students and securing funds for further research. This study depends on brainstorming as a key approach for data collection. The sample comprised of six Information Communication Technology (ICT) managers who are working at a Queensland Regional University (QRU). A high-level brainstorming session was transcribed and thematically analysed by using both manual methods and NVivo 11 software to code, recode and generate themes.The brainstorming session led to the identification of eight key themes: knowledge creation, transfer, utilisation, storage, evaluation, capture, sharing, and knowledge construction. This study offers more arguments for adding more new ideas in regards to the policies of Australian higher education in general and Queensland specifically. This study is limited to small sample size.

**Keywords:** Brainstorming, Knowledge management, Higher education

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## INTRODUCTION

For many years, Knowledge Management (KM) research was surprisingly neglected, and without clarity from researchers and authors in the higher education environment (Sunalai & Beyerlein, 2015). However, in the current era, there has been an increasing amount of literature considering Knowledge Management Processes (KMPs) in educational institutions (Hazelkorn, 2017; Masadeh, Shannak, Maqableh, & Tarhini, 2017; Oktavia, Warnars, Hendric, & Adi, 2017; Rambe & Mbeo, 2017; Shams & Belyaeva, 2017; Sunalai & Beyerlein, 2015; Subiyantoro, Sulistyo, Yulianto, & Prameswari, 2017; Veer Ramjeawon & Rowley, 2017). Coinciding with the increasingly strategic role those processes play in the growth and success of higher education institutions (Kasemsap, 2017; Rambe & Mbeo, 2017; Shams & Belyaeva, 2017; Veer Ramjeawon & Rowley, 2017). A strategic key for successful KM in the higher education institutions is the focus on KMPs (Howell & Annansingh, 2013; Veer Ramjeawon & Rowley, 2017).

Due to the importance of empirical research, there are pragmatic advantages for institutions that are concentrated on improving knowledge (Jones, 2010; Shabane, 2017; Urbancová & Vnoučková, 2015). Consequently, focusing on 'knowledge becomes a way of gaining competitive advantage and expanding an institution's knowledge base' (Daraei, Karimi, & Vahidi, 2014; Gateau & Simon, 2017; Hazelkorn, 2017; Jones, 2010; Kasemsap, 2017; Lynch, 2015; Mohammed, Gururajan, & Hafeez-Baig, 2017). Nonetheless, KM research in the higher education sector is limited (Veer Ramjeawon & Rowley, 2017). Current

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empirical research of KM have focused on some aspects, 'such as the individualistic nature of research and loyalty to discipline, or on specific elements of KM, such as knowledge sharing amongst academics' (Agarwal & Marouf, 2017; Veer Ramjeawon & Rowley, 2017). Hence, there is much more research to be carried out in this space using empirical methodologies.

## LITERATURE REVIEW

KM has a history of almost thirty years (Agarwal & Marouf, 2017; Alshehhi, 2016; Girard & Girard, 2015; Hansen & Husmoen, 2016; Kakabadse, Kakabadse, & Kouzmin, 2003; Kasemsap, 2017; Metaxiotis, Ergazakis, & Psarras, 2005; Mohammed et al., 2017). One of the key areas of KM is within higher education settings, where technology becomes critical in creating quality research and educational outcomes. Moreover, KM practices are important for successful and expanding universities (Kasemsap, 2017; Rambe & Mbeo, 2017; Shams & Belyaeva, 2017; Veer Ramjeawon & Rowley, 2017). They provide many advantages to educational institutions, such as using technology for effective teaching and learning, reducing costs of overall research, and improving evaluation as well as administrative activities (Kasemsap, 2017; Veer Ramjeawon & Rowley, 2017). KM can be defined as available knowledge and collection of developed business processes in an institution: these processes include creating, transferring, saving, applying and getting knowledge (Hajiabedin & Amani, 2016; Laudon & Laudon, 2018). It likewise includes processes that allow an institution to share, capture, use, access, and store knowledge (Sibbald, Wathen, & Kothari, 2016). KM is a process of creating intangible assets, easily accessible institutional memory(Hamid, Alireza, & Mohammad, 2015; Zikmund, Babin, Carr, & Griffin, 2013).

Several definitions of KM have been proposed as a dialectical and modern term (Allameh, Zare, et al., 2011). KM can broadly be defined as a critical element of success for all kinds of organisations (Agarwal & Marouf, 2017; García-Holgado, García-Peñalvo, Hernández-García, & Llorens-Largo, 2015; Hansen & Husmoen, 2016; Poor & Lebady, 2017). Chen and Huang (2009) view KM as a method that more actively leverages expertise and knowledge to generate value for effective organisations. Additionally, (Meihami & Meihami, 2014) express KM as methods in which the conversion of both tacit and explicit knowledge are integrated. It is recognised as a crucial method for improving organisational performance and sustaining competitive advantage (Al-Hayaly & Alnajjar, 2016; Fan & Fujimoto, 2018; Kim, Williams, Rothwell, & Penaloza, 2014; Mohammed et al., 2017; Hamid et al., 2015). Hence, KM has the position to support learning and teaching activities, and develop educational performance by appropriateness in the research and development and creation of age diverse, even more transmission of individual and educational knowledge (Kasemsap, 2017; Nuchso & Klayklueng, 2016; Oktavia et al., 2017; Rambe & Mbeo, 2017; Veer Ramjeawon & Rowley, 2017).

## METHOD

### Approach

Brainstorming is a group-based method that is one of the most useful tools to generate multiple creative ideas as well as creative solutions for issues (Haddou, Camilleri, & Zaraté, 2014; HÄgg & Musse, 2016; Helquist, Kruse, & Diller, 2017; Keeney, 2012; Litcanu, Prostean, Oros, & Mnerie, 2015; Rowley & Phibbs, 2012; Shirani, Shahin, & Ghasemi, 2012). Alex Osborn, an advertising executive, developed this technique in the discipline of marketing in the 1940s (Bouguettaya, Benatallah, & Elmagarmid, 2012; Hender, Rodgers, Dean, & Nunamaker, 2001; Shih, Venolia, & Olson, 2011). Osborn (1953) suggested that for a brainstorming process to be most effective, it should contain both group and individual ideation (Johnson & DLauro, 2018; Korde & Paulus, 2017; Levine, Alexander, Wright, & Higgins, 2016; Wilson, 2013). The results of additional experiments have supported the original brainstorming method process (HÄgg & Musse, 2016; Korde & Paulus, 2017). The objective of this methodology is to generate ideas in which group members are given time to brainstorm (Dilshad & Latif, 2013; Gururajan, Hafeez-Baig, Sturgess, Clark, & Gururajan, 2015; Torres & Carte, 2014). Once all generated ideas are highlighted, the group goes through the ideas discussing their helpfulness without criticism, and combining as well as improving similar ideas or solutions (Boddy, 2012; Gribek, 2011; Keeney, 2012; Korde & Paulus, 2017; Rietzschel, Nijstad, & Stroebe, 2006; Rowley & Phibbs, 2012; Shih et al., 2011; Shirani et al., 2012).

The brainstorming method has been employed in this research for the following reasons: (1) the majority of academic empirical research have recommended that brainstorming is an optimal method for generating ideas in terms of both quantity and quality (Boddy, 2012; Goldenberg & Wiley, 2011; Haddou et al., 2014; HÄgg & Musse, 2016; Korde, 2014; Kornish & Hutchison-Krupat, 2017; Levine et al., 2016; Rietzschel et al., 2006; Sekhar & Lidiya, 2012; Wilson, 2013). To explain further, brainstorming provides a great number of creative ideas that are novel, practical, specific and relevant (Brewer, 2017; Dean, Hender, Rodgers, & Santanen, 2006; Helquist et al., 2017). In addition, Boddy (2012); Galatescu and Greceanu (2002); Gribek (2011); Potter and Losee (1996) have given other benefits of the individual brainstorming technique as follows: (2) it equalizes the involvement of group members; by providing each participant with equal time to think and speak (Litcanu et al., 2015); (3) it also encourages creative, fast and organised generation of many ideas (Litcanu et al., 2015; Sekhar & Lidiya, 2012). Finally, (4) brainstorming provides useful input to the focus group session (Fitzgerald, 2015; Gallo & Gonos, 2014; Keeney, 2012; Lee et al., 2015; O'campo, Smylie, Minh, Omand, & Cyriac, 2015). This allows the researchers to identify individuals for participation in the focus group where ideas that may have arisen from the brainstorming session can be discussed further.

However, the brainstorming method has some issues. Firstly, the brainstorming process takes time to learn and requires distinct skills (Potter & Losee, 1996; Wilson, 2013). Secondly, even though the brainstorming methodology is popular, it can be misleading because fewer ideas might be produced through its procedural mechanisms (Goldenberg & Wiley, 2011; Kavadias & Sommer, 2009). Finally, in terms of efficient and effective teams, the logistics of session facilitation in the brainstorming technique is difficult. For example, to get a brainstorming team of professionals to work together at the same time and in the same place can be problematic (Goldenberg & Wiley, 2011; Hender et al., 2001). Nonetheless, to overcome the possible difficulties of the brainstorming method, there were a number of strategies adopted. For example, in terms of learning the brainstorming method, the facilitator has joined an academic research group to increase knowledge and experience of group management before conducting pilot brainstorming. In terms of increasing knowledge and experience of group management, membership in the research group allowed the researchers to learn skills and strategies for managing group dynamics, interaction and discussion; focusing on active contribution and how roles can be distributed among group members; and identifying 'group think' or participants dominating group opinion (Ayar, 2012; Pabari, 2016; Rosenlund, 2017; Toiviainen, 2003).

In the case of less ideas being produced, the study maximised the production of ideas through applying a number of procedures such as: making a session less complex and as straightforward as possible (Helquist et al., 2017); avoiding blocking the production of ideas and evaluation or criticism of group members (Fillion, 2015; Goldenberg & Wiley, 2011); using an expert moderator to manage the brainstorming group; and supplementing brainstorming with focus group discussion which results in concentration of effort (Goldenberg & Wiley, 2011). In the case of the logistics of session facilitation, the researchers limited the number of groups and sessions. There were only one brainstorming group and one session. This was enough to refine the research question, and explore themes (Dilshad & Latif, 2013; Gururajan, Hafeez-Baig, Clark, Moller, & Sankaran, 2014; Shih et al., 2011; Torres & Carte, 2014). Overall by using the strategies discussed above, the brainstorming session can be a useful resource to inform the focus group session (Fitzgerald, 2015; Gallo & Gonos, 2014; Keeney, 2012; Lee et al., 2015; O'campo et al., 2015).

**Sampling procedure**

Optimal group size is a critical factor for any group's success (Liamputtong, 2011). In order to determine the ideal number of participants for the brainstorming session, a number of factors need to be considered. Scholars and researchers have differed in determining an optimal size for a brainstorming group. Some of them advocate a large number for the group. Even though a group with bigger numbers of participants is difficult to manage and control (Lefika & Mearns, 2015; Liamputtong, 2011), a larger group is more likely to exchange expertise among them and create a greater number of diverse solutions (Boddy, 2012; Panchal, 2015). In this case, a large group is more than eight participants (Korde &

Paulus, 2017; P. B. Paulus, Kohn, Arditti, & Korde, 2013). In contrast, a small number of participants is useful to have a full opportunity to express their opinions and perceptions, related to the significant issues under investigation, in-depth (Hopf, Bond, Francis, Haughney, & Helms, 2014; Lefika & Mearns, 2015; Mårtensson & Hensing, 2012; Todd, Jones, & Lobban, 2012). A small group is eight participants or less (Korde & Paulus, 2017; Michinov, Jamet, Métayer, & Le Hénaff, 2015; P. B. Paulus et al., 2013). Researchers such as Shirani et al. (2012) have provided middle solutions; they recommended that the optimal group size is between five to ten participants and that this constitutes a meet-up session. Srivastava et al. (2018) suggested that the optimal group size is between six to nine individuals.

Overall, as mentioned in the literature above, no particular recommendations address the ideal group size (Atanga, 2007; BörekcI, 2016). In this research, a smaller group is recommended, 6-8 participants. This was sufficient to allow a successful session (Hopf et al., 2014; Lefika & Mearns, 2015; Mårtensson & Hensing, 2012; Peek & Fothergill, 2009; Todd et al., 2012). Regardless of the final sample sizes of the brainstorming session, "it is important to invite more participants than necessary, so as to fill gaps left by those who fail to turn up" Hafeez-Baig (2010, p. 98). Besides, the research supposes that the sample size may not be uniformly relying on the site and availability of staff on the day of the brainstorming session (Gururajan et al., 2015). To overcome this issue, the investigators invited 8-10 individuals to participate in the brainstorming session.

**Actual data collection**

The brainstorming process involves the following steps. Invitations are sent to participants by email or phone (Sutton & Hargadon, 1996). The goals and principles of brainstorming will be explained to them with a protocol so that, team members come to the brainstorming understanding the articulated goals of the session, prepared to initiate contributions to the discussion (Boddy, 2012). Group members in a brainstorming session may be resistant to exchanging ideas for fear of derision (Gibek, 2011; Tshehla, 2014). Each team member anonymously addresses possible ideas in a set period, and then the facilitator records the ideas (Gribek, 2011; Saberiyan, 2015). As has been recognised, while ideas are commonly addressed as current concerns in brainstorming (Silver, 2014), a brainstorming procedure is also designed to involve team members in a discussion about future aims (Galatescu & Greceanu, 2002; Saunders, 2013). Optimally, at the session's end, some key solution areas should be identified (BörekcI, 2016). Therefore, the brainstorming session is planned and organised, in which the participants themselves suggest themes (Balasubramanian, Kevrekidis, Sonnemans, & Newby, 2008; Lu & Yuan, 2011; Torres Kompen, 2016).

A high-level brainstorming session was conducted in the first instance to derive themes from KM. The facilitator arrived an hour before the beginning time for preparation of all required materials such as, checking the room is correct, writing materials, and recording devices. In terms of participants' invitations, the researchers approached possible participants with an information sheet of the project including the research objectives was sent via the researchers to the prospective respondents. These ensured participants were fully informed about the nature of the research before being involved in the brainstorming session. Once they agreed to participate, further details were provided as well as the consent form. The participants needed to read the consent form and sign it. The participation in this research is purely voluntary and could be withdrawn at any time without consequence. The brainstorming session began with a short introduction where the moderator and the facilitator welcomed participants, and then introduced themselves and the research topic. A quick summary explanation of the session's purpose was supplied to the six participating managers (four males and two females) who then were tasked with introducing themselves to the group before beginning the formal discussion. This took five to ten minutes. One key question was designed to collect generated information ideas and presented to all participants (Figure 1). This session took 64 minutes on the scheduled day. The brainstorming question was significant in generating valuable ideas which assisted in achieving the main research objective.

The brainstorming session was conducted to assist in generating themes associated with KM to be utilised in developing the study model. This question assessed thoughts by determining worthwhile processes of KM in the Australian higher education sector to be included in the research model. Each round optimally requires five minutes for each participant to answer (BörekcI, 2016). BörekcI (2016,

p. 5) explains this as, 'When his/her turn came, the speaking participant had three minutes to think out loud and share his/her ideas on the problem area, after which, for two minutes the listening participants were allowed to speak and ask questions while continuing with their note-taking'. This research is similar to BörekcI (2016) study in that it followed the same method. The six participants shared their ideas, thoughts and information about KM which in total took forty to fifty minutes in their institution. Before the brainstorming session ended, the researchers asked participants for any final opinions or additional comments. Finally, the moderator and facilitator acknowledged and thanked participants for their time and effort. This took five to ten minutes. After the session, the researchers evaluated the details and formulated a synopsis of events to complete the procedures of audio recording and transcribing. The brainstorming session was audio-recorded in MP3 format, then transcribed without eliminating the speeches' spontaneity. The following diagram shows the main processes with estimated times of each process.

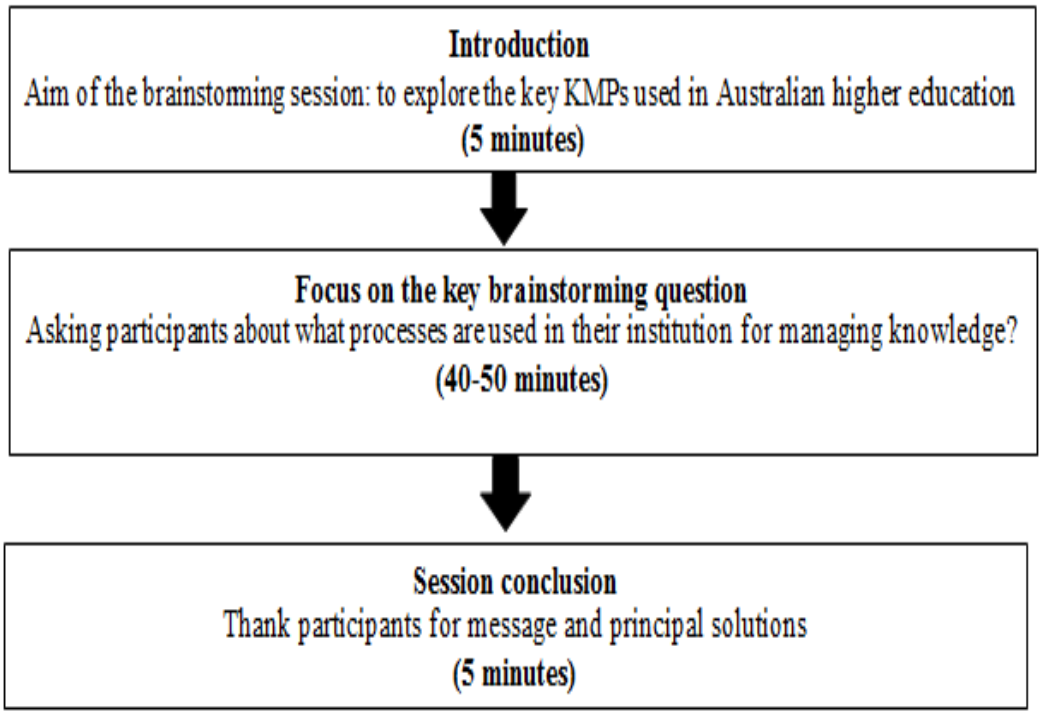


Figure 1. The schedule of the brainstorming session

## RESULTS

The qualitative data analysis 'is the application of reasoning to understand the data that have been gathered' Zikmund et al. (2013, p. 68). It provides detail, process, sensitivity and richness to context (Tharenou, Donohue, Cooper, et al., 2007). Prior to data analysis, the researchers provided all participants with a copy of the transcript of the brainstorming session for their reading and approval prior to inclusion in the definitive data collection. With focusing on data analysis, all procedures and processes associated with how the analysis has been conducted, and processes utilised to extract constructs, themes, and variables from the qualitative data were analysed. Altogether, transcripts and written notes were analysed utilising both manual methods and NVivo 11 software to code, recode and generate themes (Ngulube, 2015; T. M. Paulus & Bennett, 2017). Participants provided valuable ideas of the KMPs which are used in their university for applying information. The brainstorming session identified eight key themes of KMPs: knowledge creation, transfer, utilisation, storage, evaluation, capture, sharing, and knowledge construction. The results have been detailed below, using abbreviation to preserve participant anonymity. For example, B1P2 means brainstorming one, participant two. Table 1 below, summarises the results of the brainstorming session.

Table 1: Overview analysis of the business model canvas toward new entrepreneurs in 5 type of businesses

| No. | Themes | Participants of a brainstorming session | | | | | | ∑ | % |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | |
| 1 | Knowledge creation: | | | | | | | 5 | 83.3 |
| | Combination | | ✓ | | ✓ | | | | |
| | Socialisation | ✓ | | | ✓ | | | | |
| | Internalisation | ✓ | | | | | | | |
| | Externalisation | | ✓ | ✓ | ✓ | | | | |
| 2 | Knowledge transfer: | | | | | | | 5 | 83.3 |
| | Personalisation | ✓ | ✓ | ✓ | | | | | |
| | Codification | ✓ | ✓ | ✓ | | ✓ | ✓ | | |
| 3 | Knowledge utilisation | ✓ | ✓ | ✓ | | ✓ | ✓ | 5 | 83.3 |
| 4 | Knowledge storage | ✓ | | ✓ | ✓ | | ✓ | 4 | 66.6 |
| 5 | Knowledge evaluation | ✓ | ✓ | | ✓ | | ✓ | 4 | 66.6 |
| 6 | Knowledge capture | | | ✓ | | | ✓ | 2 | 33.3 |
| 7 | Knowledge sharing: | | | | | | | 2 | 33.3 |
| | The culture of knowledge sharing | ✓ | ✓ | | | | | | |
| 8 | Knowledge construction | | | | ✓ | | | 1 | 16.6 |

**Knowledge creation**

It can be seen from Table 1, five professional participants emphasised that educational institutions generate information through internal learning processes. Explicit knowledge is created during social interaction through various formats (documents, video, electronic, audio, visual, etc.) and in various organisational units (faculty, academics, students, and administration). Similar terms are 'generation, creation, build, improvement, and learn' Sunalai and Beyerlein (2015, p. 293). For example, five participants said:

(...) "helping people to understand and learn it," (..). "This is a USQ focus on improving a search ability of the knowledge" (...) (B1P1).

"Yeah, but there is a lot that goes out, I mean, I think getting access to historical stuff, particularly information on courses four or five years old" (...) (B1P3).

(...) "when someone creates a task, they can bring up automatic links to knowledge articles" (B1P4).

"I guess that's our process, that's what we're building, that's what we're building our processes around, so it's our central strategy" (...) (B1P1).

(....) "having knowledge written in a document or is one thing, but to have that communication and collaboration around it, so that people work together I guess that's what makes it work" (B1P1).

(...) "And so that itself will create that consistency end, search ability for one place to be able to get that kind of information" (B1P4).

"So any knowledge articles that people have access to, they can give feedback on it, and say, 'This is incorrect' and then we do something about it. So that it helps with that constant updating" (B1P2).

"Create a technical knowledge article. So that we can reuse that information to help solve the next issue that comes" (...). "B1P5 will create knowledge from that problem. (...) The benefit for our staff being able to access knowledge" (B1P6).

More clearly, a Text query searches in Figure 2, Figure 3 and Figure 4 indicate that knowledge creation has strong use at educational institutions in Australia.

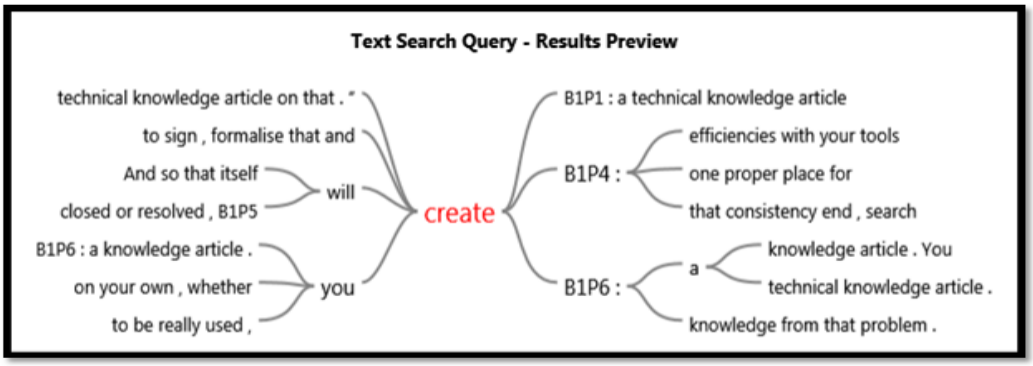


Figure 2. Text search query for knowledge creation theme


Figure 3. Text search query for knowledge creation theme

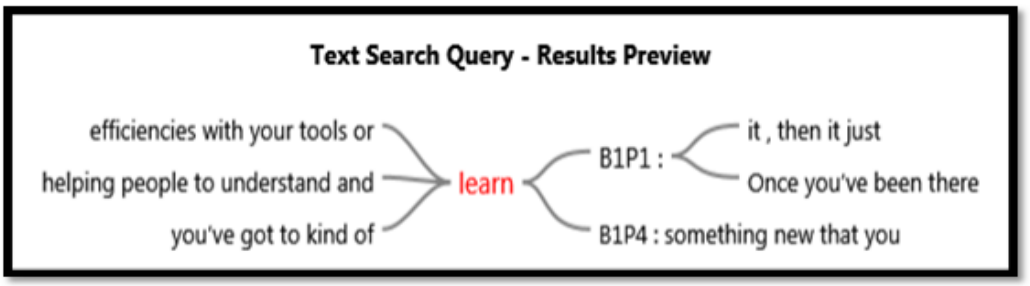


Figure 4. Text search query for knowledge creation theme

**Knowledge transfer**

There was significant recognition of the transfer of information amongst participants. As shown in Table 1, five out of six participants mentioned that the knowledge transfer process is strongly used in educational institutions in Australia. These informants reported that:

"So even when you're talking technical knowledge, and stuff like that, it's experience and things that need to come into that" (B1P1).

B1P2's been, like B1P2's our champion for knowledge, so she's been some, undertaking some training in, what they call knowledge center support, KCS. So that's what we're using to try and help us with this (B1P6).

"(...) So if we can prevent calls coming into us that costs us nothing, other than the cost of producing the document (...)" (B1P5).

"I'm valuable if I'm the only one who knows how to do it. Without me, you can't do it. And that's what the university's got to stop, because that knowledge is a university asset if you want to look at it that way, as well as that person's abilities" (B1P2).

"It's very variable, we have staff members' accounts on there. And someone come and try and teaches your course and they want to know what they've taught (...)"(B1P3).

Thus, the above quotations indicate that information can be transferred by both explicit and tacit knowledge. This theme includes two sub-themes: (i) codification knowledge transfer; and (ii) personalisation knowledge transfer. Codified knowledge transfers from a team or department to another with the technological tools used by individuals such as documents that would enable the staff to share their knowledge with other colleagues. Furthermore, participants also indicated that information transfers personally to other employees through shared points and experiences in knowledge transfer, training courses, various sources of knowledge, and the perceived benefit of knowledge access. This means that the transference of employee experiences among employees is prevalent at educational institutions in Australia.

**Knowledge utilisation**

Looking at Table 1 above, the majority (83.33%) of brainstormings participants indicated that information utilisation in their organisation through programs and courses such as a FAQ system. Synonymous terms include use, usage or application (Sunalai & Beyerlein, 2015). In the university, information is only valuable when it is used and applied properly to improve information systems and managerial practices further. This means that the university focuses on available information in order to make well-informed decisions. These participants reported that:

"Certainly like, to keep the information, like I said, various systems, but I suppose, trying to use like share points to keep knowledge in various repositories. And there are processes around that" (B1P1).

"We also track how much the knowledge is viewed and used, ..., and how it's been viewed and used" (B1P2).

"So that the quicker, or the earlier we can resolve an issue, with the use of knowledge thats available to first respond to this, the cheaper it is"(B1P3).

"Or you end up with so many different things in this big list, you're not sure which one, we use the current one, etc" (B1P5).

(...) "So that's what we're using to try and help us with this." "So, there is, like a, so you know I've asked [the university] on the portal, where students go to get help so that they can use the FAQ system" (B1P6).

More clearly, Text search query in Figure 5 indicates that knowledge utilisation is strongly used at educational institutions in Australia.

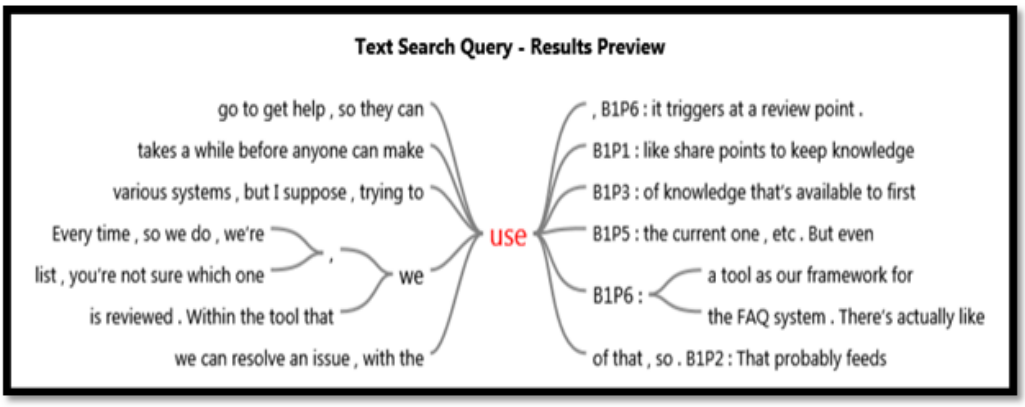


Figure 5. Text search query for knowledge utilisation theme

**Knowledge storage**

As can be observed from Table 1, four professional participants indicated that all information resources (documents, video, electronic, audio, visual, etc.) are adequately stored within the university's systems. Many terms have been utilized to describe a knowledge storage process including 'combination, codification, storage, organization, and sustain' (Sunalai & Beyerlein, 2015). For instance, four participants said:

"Certainly like, to keep the information. but I suppose, trying to use like share points to keep knowledge in various repositories". (...) "We certainly do notice that a lot of people do store a lot of their data on C drive." (...) "Certain teams that recommend it to be documented and stored in certain repositories" (B1P1).

"We have some core systems which store information and knowledge about, like a client software where people store information about students. (...) Yeah. Well, store is part of it,"(...)(B1P3).

"We store knowledge against products, system documentation, etc." (B1P4).

"There is Queensland government regulations on how long you have to keep particular information" (...) (B1P6).

Arguably, the text query search in Figure 6 confirms that knowledge storage is used at educational institutions in Australia.

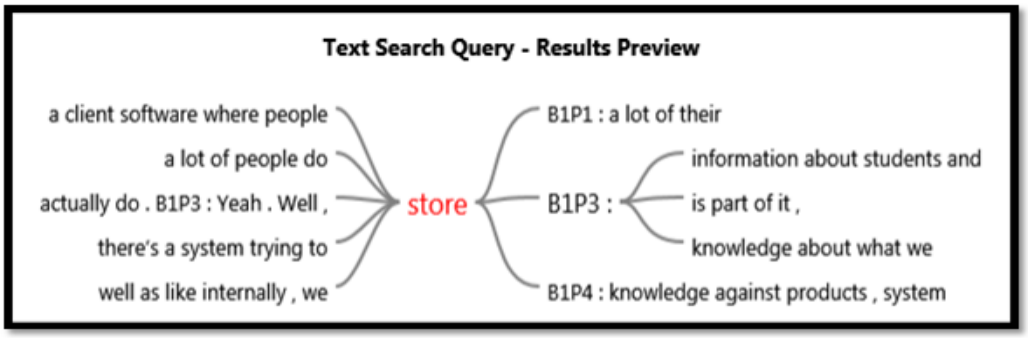


Figure 6. Text search query for knowledge storage theme

**Knowledge evaluation**

As can be noted from Table 1, four participants indicated that six months is needed to assess all used information and experience in the university. Many terms have been utilised to describe the knowledge evaluation process such as analyse, evaluate, assess, identify, measure, and validate (Sunalai & Beyerlein, 2015). These informants reported that:

"We default to six months. So, every six months, any knowledge thats been entered into the system, comes up for a review" (...). "So what weve done in the last six months is accepted that knowledge is really valuable" (...) (B1P2).

(...) "So, agreeing with your supervisor what's appropriate and then reviewing that after 12 months, or six months, depending on the area, to measure how you've gone against that" (B1P4).

"So, review as well. So, well make sure that content is reviewed. Within the tool that we use, it triggers, at a review point" (B1P6).

(...) "so, probably only been six months" (B1P1).

Text query search in Figure 7 indicates that knowledge evaluation is used within educational institutions in Australia.

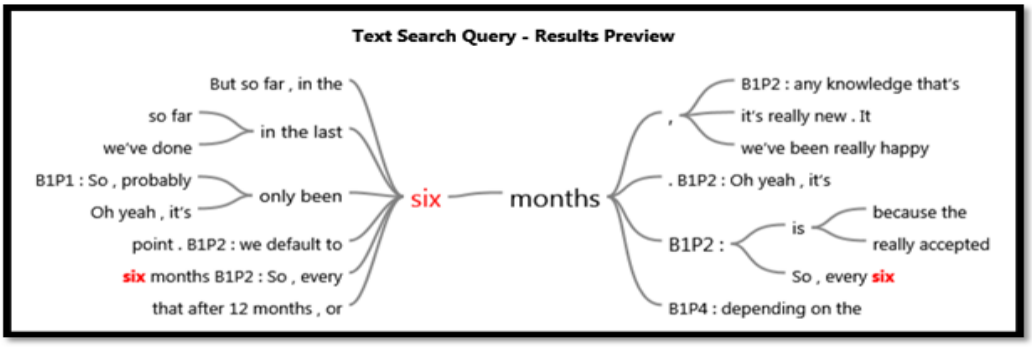


Figure 7. Text search query for knowledge evaluation theme

**Knowledge capture**

As shown in Table1, two professional participants noted that capturing information is a continual practice in learning processes within university functions. It was observed that there are various ways to capture all stored information in educational institutions in Australia such as using sensors. The capture category includes acquisition, buy, acquire, gain, and get (Sunalai & Beyerlein, 2015). For instance, as two participants said:

"Well the faculties, I mean technically we, I mean there's a lot of share points to try and capture stored information at different processes such as using sensors (...)" (B1P3).

"But then there's the internal knowledge that we need to make sure that we capture so that, like, when people leave, theres no gaping hole. Weve got that captured" (B1P6).

A text search query in Figure 8 confirms that knowledge capture is used in educational institutions in Australia.

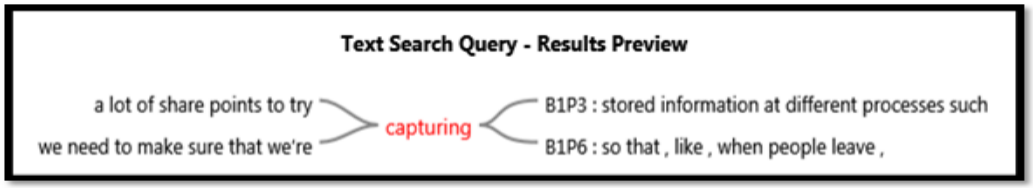


Figure 8. Text search query for knowledge capture theme

**Knowledge sharing**

Two high-level participants mentioned that the university staff exchange their information through communication. However, some of knowledge sharing techniques are not available to the university staff. Synonymous terms include share, transfer, allocation, contribution, dissemination, distribution, integration, (Sunalai & Beyerlein, 2015). For instance, as two participants said:

(...), "but if you don't have that culture around actually sharing the knowledge and communicating it and working together" (B1P1).

"And it'll take us a while to get that culture of sharing knowledge and not keeping it, but documenting stuff" (B1P2).

Text query search in Figure 9 indicates that knowledge sharing is used in educational institutions in Australia.

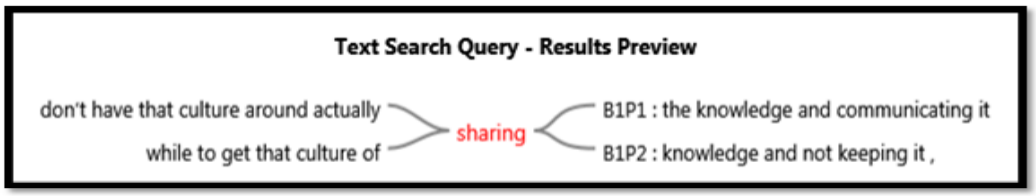


Figure 9. Text search query for knowledge sharing theme

**Knowledge construction**

One participant stated that acquired information is important to build working teams, this is indicated below.

(...) "we want that knowledge that they acquire to come back and help build the team that theyre in the frontline again" (B1P4).

## DISCUSSION

Analysis outlined eight main themes of KM within the university sector. Results of this study indicate eight related themes: creation, sharing, transfer, utilisation, storage, evaluation, capture and construction of knowledge. The first key theme explored by this research is knowledge creation. The outcomes of knowledge creation in QRU are similar to the previous studies of Kasemsap (2017); Sunalai and Beyerlein

(2015) who agree that that knowledge creation representing learning processes through social interaction among various academic divisions, is important to the university's functions.

The second key theme of this research is knowledge transfer. The finding of this theme is consistent with Kasemsap (2017); Masadeh et al. (2017); Veer Ramjeawon and Rowley (2017) who point out that knowledge transfer is a main tool of KM for higher education institutions. This theme includes two subthemes: (i) codification; and (ii) personalisation. These results are in line with (Rhodes, Hung, Lok, Ya-Hui Lien, & Wu, 2008; Tangaraja, Mohd Rasdi, Abu Samah, & Ismail, 2016; Venkitachalam & Willmott, 2016) who stated that knowledge transfer includes two items codification and personalisation. Codified knowledge transfers from a team or department to another with the technological tools used by individuals such as documents that would enable the staff to transfer their information with other colleagues. This finding conforms to the view of participants as stated by (Abd Rahman, Imm Ng, Sambasivan, & Wong, 2013; Rhodes et al., 2008; Tan & Wong, 2015) who emphasise that the codification knowledge transfer use technological tools by individuals such as e-mail, meetings, documents, discussions and internal network. Furthermore, The results of personalisation knowledge transfer are in line with Reichardt, Jürgens, Klöble, Hüter, and Moser (2009); Wiewiora, Brown, and Tafur (2015) who point out that an institution should transfer employee experiences to other employees through training courses, presentations, etc. (Abd Rahman et al., 2013; Tan & Wong, 2015).

The third key theme explored by this research is knowledge utilisation. The outcome of knowledge utilisation is similar to the previous studies of Steichen, Ashman, and Wade (2012) who argue that many information systems better denote the short and long-term user favorites. The fourth key theme recognised in this research is knowledge storage. These results correspond to the work of (Sunalai & Beyerlein, 2015) who recommended that knowledge storage is an essential tool of KMPs in educational institutions. The fifth key theme explored in this research is knowledge evaluation. Half of the participants indicated that six months is needed to assess all used information and experience in QRU. This result is in line with Heinrich, Uribe, Wübbeler, Hoffmann, and Roes (2016); Sunalai and Beyerlein (2015) who emphasize that a key practice of KM within an institution is knowledge evaluation.

The sixth key theme identified in this research is knowledge capture. These results conform to the work of Bouguettaya et al. (2012); Hoang (2016); Nalepa and Bobek (2014); Nykänen and Rodriguez (2014); Salminen, Jauhiainen, and Nurmeksela (2014) who point out that there is a necessary to capture knowledge in various methods such as "Direct sensor access", "Middleware infrastructure", and "Context server". Knowledge sharing is the seventh major theme mentioned by participants. This outcome is consistent with Alavi and Leidner (2001); Fullwood and Rowley (2017); Howell and Annansingh (2013); Naeem, Mirza, Ayyub, and Lodhi (2017) who states that academic institutions usually encourage a culture of sharing best practices among their employees to achieve institutional and individual objectives. The eighth and last key theme explored in this research is knowledge construction. The acquired information is important to build team works. This result is supported by Alt (2015); Sime-Cummins (2015) who point out that the construction knowledge is an active process which educational employees learn best practices by social interaction among them.

Overall, even though the results of this research are consistent with the previous research of KM, there are fundamental differences. This research is the first study that examines these themes in academic institutions in Australian. The agreement with the previous studies was partially either conceptual, theoretical, or regarding methodological meanings. For example, there is less a conceptual understanding including the whole themes and subthemes that were explored in this study.

## CONCLUSION

The brainstorming session examined eight key themes of KMPs in the higher education sector. The key themes were the creation, transfer, utilisation, storage, evaluation, capture, sharing, and construction of knowledge. The research found that QRU is aware of the investigated KMPs in all units and faculties of the university. As a result, participants consider those practices as strategic keys to institutional success. This study offers more arguments for adding more new ideas in regards to the policies of Australian higher education in general and Queensland specifically (Department of Education and Training, 2015,

2016). The outcomes of the study provide a clear outline for Australian universities in regard to personalisation, codification, combination, socialisation, internalisation, externalisation, utilisation, storage, evaluation, capture, sharing, and construction of information. This can be used to shed light on these themes within the QRU included in the study.

**Limitations and future research**

The limitations of this study are small sample size. There was only one Queensland regional university. A single case study is adopted by a small group of ICT managers who are working in one university. Moreover, there were some challenges of data collection in Australia even the availability of the best conditions. Further academic work would be useful to extend the examination to a broader sample of institutions within different industries.

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